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## Living with Kin in Lowland Horticultural Societies

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### CA+ Online-Only Material: Supplement A

Postmarital residence patterns in traditional human societies figure prominently in models of hominid social evolution with arguments for patrilocal human bands similar in structure to female-dispersal systems in other African apes. However, considerable flexibility in hunter-gatherer cultures has led to their characterization as primarily multilocal. Horticulturalists are associated with larger, more sedentary social groups with more political inequality and intergroup conflict and may therefore provide additional insights into evolved human social structures. We analyze coresidence patterns of primary kin for 34 New World horticultural societies (6,833 adults living in 243 residential groupings) to show more uxoriality (women live with more kin) than found for hunter-gatherers. Our findings further point to the uniqueness of human social structures and to considerable variation that is not fully described by traditional postmarital residence typologies. Sex biases in coresident kin can vary according to the scale of analysis (household vs. house cluster vs. village) and change across the life span, with

women often living with more kin later in life. Headmen in large villages live with more close kin, primarily siblings, than do nonheadmen. Importantly, human marriage exchange and residence patterns create meta-group social structures, with alliances extending across multiple villages often united in competition against other large alliances at scales unparalleled by other species.

Patterns of postmarital residence in traditional human societies have figured prominently in models of hominid social evolution. Some have argued for mostly patrilocal human bands (Ember 1978; Murdock 1949; Radcliffe-Brown 1931; Service 1962; Steward 1938) similar in social structure to female-dispersal systems typical of other African apes (Harcourt 1978; Kuroda 1979; Pusey 1979; Wrangham 1986). The patrilocal human model from a primate perspective suggests that male philopatry may stem back to a last common ancestor between chimpanzees and humans, if not earlier (Wrangham 1986). Indirect evidence of stable isotopes in Australopithecines (Copeland et al. 2011) and mtDNA in Neanderthals (Lalueza-Fox et al. 2010; but see Vigilant and Langergraber 2011) may also tentatively support a deep evolutionary history of male philopatry. In contrast, some have argued for more female philopatry and the importance of maternal grandmother provisioning as ancestral human conditions (Hawkes et al. 1998). However, considerable variation in residence patterns both within and among human foraging societies has led to the characterization of hunter-gatherers as primarily “multilocal” in nature, with both males and females commonly dispersing or residing with natal families (Alvarez 2004; Hill et al. 2011; Kramer and Greaves 2011; Marlowe 2004). In a global sample of 32 hunter-gatherer societies, adult brothers and sisters often coreside and there is no overall tendency for either men or women to live with more parents or offspring (Hill et al. 2011). Long-term cooperation among adult brothers, sisters, and bilateral kin may have emerged from a novel and flexible human residence system facilitated by pair bonding and father recognition (Chapais 2008). Chapais’s (2008) model, a synthesis of contemporary primate evolutionary/ecological studies and human kinship and alliance theory as expounded by Lévi-Strauss (1949), explains how the affiliation of several men to the same woman, related to each other as consanguineal and affinal kin, ameliorates hostile between-group relations and allows visiting and opportunistic coresidence in human meta-group social structures (multiple residential bands exchanging spouses, goods, and information). Other primates lack this meta-group structure because either males or females generally emigrate at maturity without a system of exchange, a pattern that mostly isolates kin lineages to single communities.

The extent to which modern human societies represent ancestral human patterns may be partially addressed by concurrent

examination of patterns in both hunter-gatherer and horticultural societies. One point of contention against using contemporary hunter-gatherers as models of human evolution is that they reside in marginal habitats after being displaced by more powerful horticultural and agricultural groups (Alexander 1979; Lee and DeVore 1968; but see Porter and Marlowe 2007). This displacement likely led to smaller residential groups and more flexible residence strategies (Ember and Ember 1971; Service 1962). Horticulturalists are associated with higher-quality environments, larger social groups, more sedentary villages, more political inequality, and more intergroup conflict, and they may therefore provide additional insights into evolved human social structures. In terms of material wealth and wealth inequality, horticulturalists are more similar to hunter-gatherers than to pastoral or agricultural societies (Borgerhoff Mulder et al. 2009). Furthermore, lowland horticulturalists supplement their small-scale agricultural production with considerable hunting, fishing, and gathering (Hames 1989; Hames and Vickers 1983) and have mortality and fertility profiles similar to hunter-gatherers (Bentley, Goldberg, and Jasienska 1993; Gurven and Kaplan 2007).

Here we focus on lowland South America, a region of the world generally associated with swidden manioc horticulture and considerable tribal warfare (Chagnon 1967; Steward 1959; Steward and Faron 1959). Serious depopulation caused by introduced European diseases may have led to more ambilocality or multilocality in Amazonia, but to alleviate this problem partially we try to focus as much as possible on earlier studies with more intact populations. Patrilocality and patrilineality were originally listed as defining traits of tropical forest culture in lowland South America (Oberg 1955; Steward and Faron 1959). More recently, however, this view has been challenged by ethnographic descriptions that emphasize lateral over lineal principles in social structure and relationships (Århem 1981; Crocker 1967; Hornborg 1988; Kaplan 1975; Mason 1997). We test the patrilocal tropical forest culture hypothesis, which predicts coresidence biases of men with their parents, against the sibling coresidence hypothesis, which predicts frequent coresidence of brothers and sisters.

We compare our lowland data set with a global sample of hunter-gatherers (Hill et al. 2011) further to investigate complexities of human coresidence patterns in traditional human societies. An important aspect of more sedentary horticultural societies is that residential units are often hierarchically nested (e.g., houses within clusters within villages), and analyzing kin coresidence patterns at multiple scales of analysis provides insight into emergent patterns in social structure often glossed over by traditional residence typologies. We also investigate age trends to examine differential strategies of coresidence between males and females across the life span (e.g., bride service demands, mothers helping daughters). Finally, high-status males such as headmen are likely to owe their positions of political power, at least in part, to the number and strength of kinship ties (Chagnon 1982; Hughes 1988; Mair 1962; Thomas 1982; von Rueden, Gurven, and Kaplan 2008). Headmen have higher fitness (Chagnon 1979; von Rueden, Gurven, and Kaplan 2011; Werner 1981) and are

also likely to attract more kin to their village, and more kin in turn may lead to even higher status. This positive feedback is likely to be especially important in places like Amazonia where social capital is paramount and heritable resources are mostly lacking (Gurven et al. 2010). We compare kin coresidence patterns of headmen to nonheadmen and examine how this relationship varies with residential group size.

## Methods

We analyze census and genealogical data on group composition collected from published literature and unpublished field notes for a sample of 34 small-scale horticultural societies in lowland Central and South America (see CA+ online supplement A). This sample includes 6,833 adults living in 243 residential groupings (extended households, longhouses, and villages). We calculate the average number of adult primary kin (i.e., mother, father, sisters, brothers, daughters, and sons) coresiding in each ethnographic study group, replicating previous methods (Hill et al. 2011). The 95% confidence intervals for the estimated mean number of coresident kin of each type were constructed by resampling with replacement 10,000 times from the available sample of adults in each society using a Java program. Age estimates are available for 10 societies, and adults are defined as individuals 15 years of age or older. Kin counts are parsed into age intervals if there are sufficient individuals in the oldest age interval ( $n > 10$ ). In the absence of age information, adults are defined as individuals listed as married, divorced, widowed, or reproductive. Paternity is taken at face value as reported by informants. Fictive kin relationships are ignored. Half and full siblings are combined.

The relative number of coresiding primary kin living with men versus women is well described by a measure developed by Helm (1965). Helm's measure ( $H$ ) is calculated as the sum of all adult primary kin living with an average man ( $k_m$ ) divided by the sum of all primary kin living with both an average man ( $k_m$ ) and an average woman ( $k_f$ ) such that:

$$H = \frac{(k_{\text{siblings,m}} + k_{\text{offspring,m}} + k_{\text{parents,m}})}{(k_{\text{siblings,m}} + k_{\text{offspring,m}} + k_{\text{parents,m}}) + (k_{\text{siblings,f}} + k_{\text{offspring,f}} + k_{\text{parents,f}})}$$

Measure  $H$  can theoretically vary from zero, where women live with close kin but men do not, to unity, where men live with close kin but women do not. The valid measurement of residence patterns is an inherently complex problem (Fischer 1958; Goodenough 1956; Kronenfeld 1992). We prefer to focus on the simple elegance of  $H$ , which easily incorporates some of Fischer's (1958) critiques, such as defining marital residence in terms of individuals and not couples and reporting residence of both married and nonmarried individuals. However,  $H$  does not define residence in terms of the composition at the time of entry into that household and does not specify the degree of social integration into residential groupings, both of which are difficult to address given the available data.

A convenient aspect of  $H$  is that it does not vary system-

atically with the size of residential units because, while total kin counts increase with residential group size, this increase is similar for both men and women. Across our sample, the overall number of primary kin does not vary systemically with age because at population equilibrium parents die at approximately the same rate as offspring are born, although demographic stochasticity will affect age-related differences of coresiding kin within societies. There might be a concern that higher numbers of certain kin coresiding with a particular sex is simply driven by biased sex ratios, but none of the primary kin counts in our sample show this to be the case.

For a total of 78 residential groupings from 20 different societies in our sample, headmen were identified by ethnographers according to political leadership of longhouses or villages. More acculturated systems of leadership, such as elected "presidents," were excluded (see CA+ supplement A). We compare the number of primary kin living with headmen versus the average for all other men in the headmen's village as a function of residential group size. Group size was log transformed (base 10) better to approximate linear relationships of kin counts as a function of log group size, headman status, and the interaction effect between headman status and log group size. We ran models with society as random effect (varying intercept) because headmen analyses were at the level of a residential grouping and societies have variable numbers of entries (1–16).

## Results

Tabulations of the mean number of primary adult kin (parents, siblings, and offspring) coresiding in the same house, village, or longhouse (table 1) clearly support bisexual philopatry and dispersal for lowland horticulturalists not unlike that found for a global sample of hunter-gatherers where brothers and sisters commonly coreside (Hill et al. 2011). However, the lowland horticultural sample presented here is more uxori-local (women live with more primary kin) on average ( $t = 3.86$ ,  $P = .0003$ ,  $n = 34$  horticulturalists vs. 33 hunter-gatherers) using Helm's measure (fig. 1). Hunter-gatherers illustrate a greater tendency for brother-brother coresidence, and the total number of coresiding primary kin for men is typically higher (Hill et al. 2011). In contrast, 11 lowland horticultural societies show significant biases for women to live with more total primary kin, but only four societies show significant biases for men. There are 14 uxori-local examples of women living with significantly more parents than men, but only three significant viri-local examples of men living with more parents. Overall, both men and women live with similar numbers of brothers ( $\sim 0.7$ ) and sisters ( $\sim 0.8$ ). Given these results and that lowland horticulturalists are actually more uxori-local on average ( $H = 0.46$ ), especially for censuses at the extended household level ( $H = 0.38$ ,  $n = 5$ ), we reject the hypothesis of patrilocality as a defining trait of Amazonian tropical forest culture.

Statistical patterns of coresidence, including both individual kin counts and Helm's measure, match to some degree with

ethnographically reported postmarital residence typologies. Makuna longhouses exchange sisters across residential groups (Århem 1981), and they are the most viri-local society in our sample ( $H = 0.63$ ), with men coresiding with approximately twice the number of parents and siblings as women do. Another viri-local example is the Yanomamo (Chagnon 1974; Lizot 1984), where men coreside with 1.8 brothers on average, one of the highest kin counts in the sample. On the female-biased side, there is a cluster of five uxori-local groups ( $H \sim 0.35$ ), including the Je-speaking Krikati (Lave 1967), Bororo (Crocker 1967), and Suya (Seeger 1981), renowned for males transferring to live with in-laws of opposing moieties.

### Multiple Scales of Analysis

Arawete (Viveiros de Castro 1992) and Xavante (Maybury-Lewis 1967) show opposing examples of how residence biases can vary at different scales. Arawete men live with more kin at the level of clusters within their village ( $H = 0.55$ ), but women live with more kin at the village level ( $H = 0.44$ ), perhaps because they are a recent conglomeration of previously more dispersed groups. In contrast, Xavante women live with more kin at the level of extended households ( $H = 0.37$ ), but men live with more kin at the village level ( $H = 0.55$ ). In another case, the Krahô (Melatti 1970) are more uxori-local at the extended household level ( $H = 0.33$ ) than they are at the village level ( $H = 0.45$ ). We also examined multiple scales of analysis for the Bari (hearth group vs. longhouse), Tsimane (house vs. cluster vs. village), Yanomamo (lineage vs. village section vs. village), and Marubo (longhouse vs. longhouse cluster) but found similar results in terms of Helm's measure at different scales, and we therefore only report village level values in table 1.

### Coresidence over the Life Course

Helm's measure generally decreases slightly with age toward more uxori-locality (fig. 2). The decreasing Helm's trend with age reflects the fact that women marry and reproduce earlier and live longer than men (Gurven and Kaplan 2007) and may also reflect beneficial coresidence strategies of parents and daughters for cooperative reproduction later in life (Hawkes et al. 1998). Young men are often still in their natal house in the 15–21-year age interval, but then temporary bride service and often more permanent uxori-local residence drag down Helm's measure throughout later adulthood. One major exception is the Yanomamo, where older men (45+ years) are living with a number of sons (1.6) and brothers (2.2) on average. Also of note is the Makuna sister-exchange system, where emigrated women in their twenties live with almost no primary kin ( $H = 0.89$ ), while at later ages (30+ years) women begin to live with more adult offspring, primarily sons ( $H \sim 0.5$ ).

### Do Headmen Live with More Kin?

Our analysis shows that, in large groups, headmen live with more total number of adult primary kin than do other men

Table 1. Mean number of coresiding adult primary kin for men and women sorted from most to least biased toward women living with more primary kin

Society	Residential units	Total adults	Women's parents	Men's parents	Women's sisters	Men's sisters	Women's brothers	Men's brothers	Women's primary kin	Men's primary kin	Helm's measure	Source
Machiguenga	20 ext. houses	68	.26 <sup>†</sup>	.08	.14	.04	.02	.00	.63 <sup>†</sup>	.28	.31	1
Krikati	22 ext. houses	120	.38 <sup>†</sup>	.24	.34 <sup>†</sup>	.20	.17 <sup>†</sup>	.04	1.29 <sup>†</sup>	.72	.36	2
Tenetehara	1 village	60	.59 <sup>†</sup>	.21	.81	.21	.19	.21	1.96 <sup>†</sup>	1.11	.36	3
Bororo	19 ext. houses	101	.24 <sup>†</sup>	.13	.07	.11	.09	.04	.67 <sup>†</sup>	.38	.36	4
Suya	1 village	44	.36	.26	1.60	.95	.72	.63	3.24 <sup>†</sup>	1.84	.36	5
Xavante	65 ext. houses	356	.29 <sup>†</sup>	.10	.83 <sup>†</sup>	.17	.11	.24*	1.39 <sup>†</sup>	.81	.37	6
Wakuenai	2 villages	29	1.13 <sup>†</sup>	.46	.80 <sup>†</sup>	.38	.33 <sup>†</sup>	.15	2.99 <sup>†</sup>	1.91	.39	7
Waiwai	4 villages	34	.22	.13	.33	.25	.22	.25	1.06	.69	.39	8
Trio	8 villages	102	.33	.18	.17	.13	.10	.22	.93	.69	.43	9
Ka'apor	2 villages	55	.40	.24	.27	.24	.20	.16	1.23	.92	.43	10
Wari'	5 villages	48	.15	.27	.77 <sup>†</sup>	.18	.15	.27	1.28	.96	.43	11
Apinayé	1 village	59	.81 <sup>†</sup>	.50	.45	.50	.45	.29	2.41	1.89	.44	12
Mayangna	2 villages	143	.99 <sup>†</sup>	.72	1.61	1.35	1.33	1.13	4.93 <sup>†</sup>	3.90	.44	13
Arawete	1 village	77	.65 <sup>†</sup>	.30	.81	.95	1.03	.85	3.09 <sup>†</sup>	2.45	.44	14
Krahó	4 villages	296	.58 <sup>†</sup>	.37	.63	.63	.54 <sup>†</sup>	.31	2.23 <sup>†</sup>	1.80	.45	15
Chacobo	20 villages	388	.87 <sup>†</sup>	.60	1.04 <sup>†</sup>	.84	.81	.68	3.48 <sup>†</sup>	2.81	.45	16
Kagwahiv	2 villages	39	1.05 <sup>†</sup>	.50	.63	.60	.63	.50	2.99	2.45	.45	17
Yuqui	1 village	39	.32	.59*	1.91	1.29	1.00	1.06	3.82	3.18	.45	18
Karitiana	1 village	90	.81	.92	2.91	2.38	1.66	1.41	6.25	5.53	.47	19
Tsimane	28 villages	2397	.98	.94	1.23	1.15	1.27 <sup>†</sup>	1.14	4.54 <sup>†</sup>	4.09	.47	20
Waimiri	3 villages	70	.34	.34	.75	.71	.84	.79	2.35	2.13	.48	21
Panare	2 villages	36	.81	.67	.76	1.00	.71 <sup>†</sup>	.40	3.05	2.81	.48	22
Piaroa	10 ext. houses	72	.41	.46	.43	.46	.38	.37	1.73	1.60	.48	23
Barí	10 longhouses	228	.33 <sup>†</sup>	.21	.53	.61	.58	.50	1.72	1.60	.48	24
Warao	3 villages	81	1.12 <sup>†</sup>	.84	1.40	1.58	1.40	1.11	4.88	4.55	.48	25
Katukina	2 villages	58	.90	.68	.47	.96*	.90	.79	3.11	3.18	.51	26
River Pumé	2 villages	125	.76	.83	.65	1.13*	1.15	1.08	3.51	3.68	.51	27
Ayoreo	2 villages	76	.44	.41	.21	.19	.18	.38*	1.28	1.35	.51	28
Pemon	3 villages	47	.78	.85	1.33	2.00*	1.48	1.00	4.37	4.70	.52	29
Yekwana	6 villages	98	.83	.88	.83	1.13*	.78	.60	3.25	3.57	.52	30
Shuar	25 villages	928	.66	.84*	.99	1.23*	1.13	1.39*	3.58	4.13*	.54	31
Yanomamo	5 villages	313	.52	.62	1.15	1.25	1.24	1.77*	3.46	4.20*	.54	32
Marubo	4 longhouses	57	.47	.39	.94	.87	.59	1.30*	2.47	2.95	.54	33
Arawete	6 clusters	77	.30	.28	.22	.44*	.46	.72	1.36	1.66	.55	14
Xavante	3 villages	356	.37 <sup>†</sup>	.28	1.23	1.38	.93	1.31*	2.77	3.44*	.55	6
Makuna	17 longhouses	99	.28	.63*	.13	.37*	.40	.77*	1.32	2.21*	.63	34
Mean			.59	.49	.83	.80	.69	.67	2.70	2.46	.46	

Sources. 1 = Johnson (2003), 2 = Lave (1967), 3 = Wagley and Galvão (1949), 4 = Crocker (1967), 5 = Seeger (1981), 6 = Maybury-Lewis (1967), 7 = Hill and Moran (1983), 8 = Meggers and Evans (1964), 9 = Rivière (1969), 10 = Balée (1984), 11 = Conklin (1989), 12 = Da Matta (1971), 13 = Koster (ND), 14 = Viveiros de Castro (1992), 15 = Melatti (1970), 16 = Córdoba and Villar (ND), 17 = Kracke (1978), 18 = Stearman (2001), 19 = Lucio (1996), 20 = Gurven and von Rueden (ND), 21 = Silva (2009), 22 = Dumont (1978), 23 = Kaplan (1975), 24 = Beckerman (ND), 25 = Suárez (1968), 26 = Deturche (2009), 27 = Kramer and Greaves (ND), 28 = Bugos (1985), 29 = Thomas (1982), 30 = Arvelo-Jimenez (1971), 31 = Sugiyama and Hagen (ND), 32 = Chagnon (1974) and Lizot (1984), and Hagen (ND), 33 = Melatti (1977), and 34 = Århem (1981). (ND) = data not published elsewhere.

Note. Arawete and Xavante enter twice at different scales but only the village level enters into the overall averages. "Ext. houses" refers to extended family households. Significant differences were determined by resampling.

\* Indicates significantly more kin coresiding with men.

† Indicates significantly more kin coresiding with women.

(fig. 3). Further statistical tests of individual types of kin show that the interaction effect between group size and headman status is driven primarily by siblings and secondarily by offspring (table 2). The interaction effect for offspring is only borderline significant and diminishes when age is introduced into the model because headmen are 40 years old on average,

about 6 years older than average nonheadmen. The finding that headmen live with more siblings in large villages, both brothers and sisters in approximately equal amounts, may suggest both that coresident siblings are fundamental for headmen to attain leadership in competitive settings and that siblings prefer to reside in villages where their brother is headman.



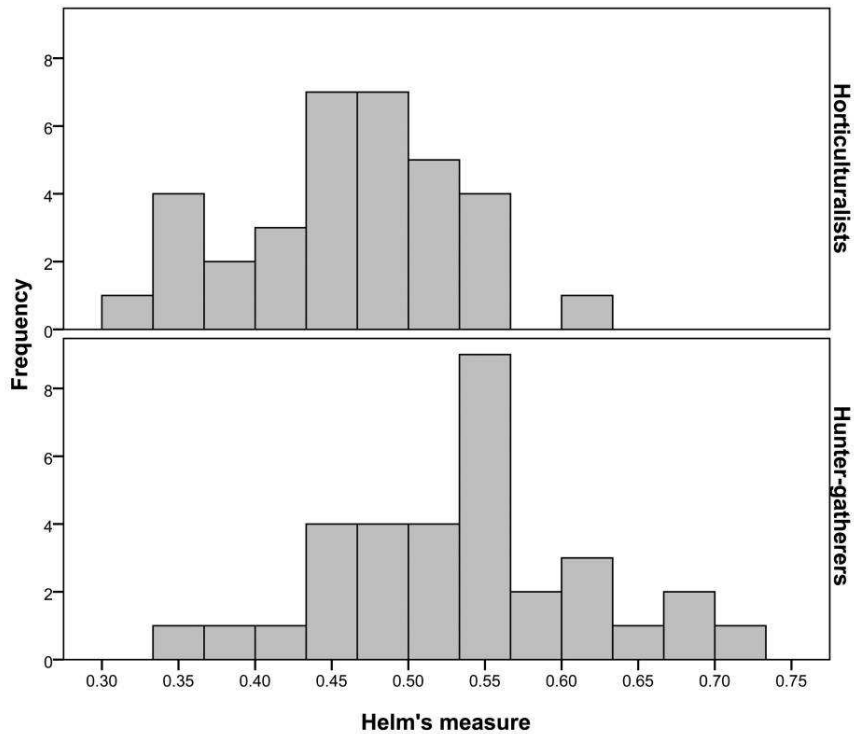


Figure 1. Frequency distribution of Helm's measure for 34 lowland horticulturalists (top, mean = 0.46, SD = 0.07) compared to 33 hunter-gatherer societies (bottom, mean = 0.53, SD = 0.08).

Discussion

Several of our findings point to a human social structure not fully described by traditional postmarital residence typologies or by biological categorizations of philopatry. First, adult brothers and sisters frequently coreside in nearly all societies in our sample, and more sibling coresidence is associated with

political leadership in large villages. Second, Arawete and Xavante show how residence biases can vary at different scales of analysis, and there is no known anthropological term for this type of variation. Third, sex biases in coresident kin vary considerably across the life span, with age trajectories generally showing an increasing importance of women living with

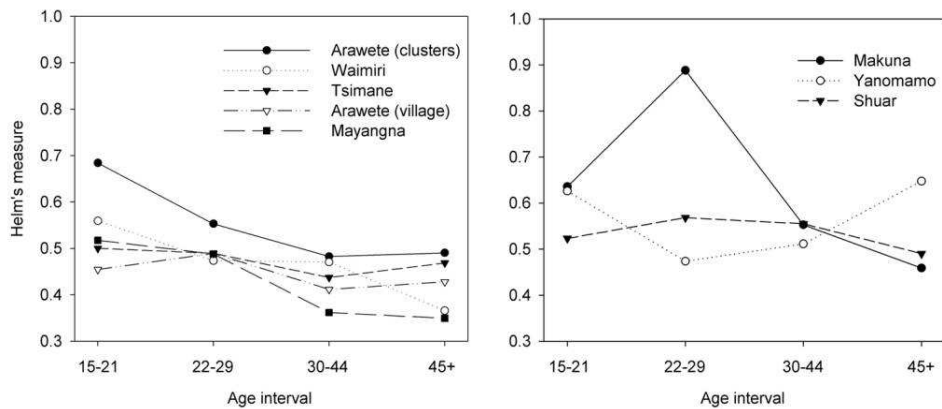


Figure 2. Helm's measure as a function of age (where available) for societies with an age trend toward more uxorilocality (left) and for the more virilocal societies in the sample where age trends are more variable (right).

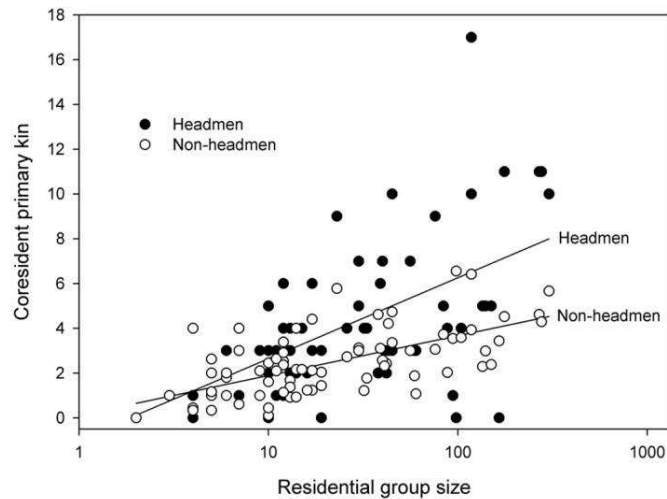


Figure 3. Total number of coresident primary kin as a function of residential group size (log scale) for 78 headmen versus all other nonheadmen averaged. The slope of this relationship for headmen is twice as high (slope = 3.6, 95% confidence interval = 2.6–4.7,  $R^2 = 0.38$ ) as the slope for nonheadmen (1.8, 95% confidence interval = 1.3–2.3,  $R^2 = 0.42$ ).

primary kin, at least in more uxorilocal contexts. Finally, while statistical patterns of coresidence do match to some degree with ethnographically reported postmarital residence, there is again no appropriate anthropological term for some cases. For example, at both the village and household levels, Xavante men live with statistically more brothers than do women, and women live with significantly more parents.

Classical social organization studies examine postmarital residence decisions by asking whether or not couples generally reside with or near particular relatives after marriage (Murdock 1949). Historically, the standard method was to note the ideal arrangement or the most common type of residence pattern and to ignore variation. However, it can be difficult clearly to distinguish actual decisions made by individuals and the on-the-ground availability of kin of different categories from preferences for particular residence situations that may not be realized due to demographic constraints. Our method using actual coresidence information may offer some advantages over standard anthropological typologies by reporting and comparing counts of coresident kin (Helm 1965; Hill et

al. 2011; Kramer and Greaves 2011). Stated cultural “rules” may still be informative, however, since our method can only clearly distinguish moves between segments within villages from coresidence in the natal house when censuses are specific to multiple scales of analysis. For example, the “matrilineal puzzle” (Schneider 1961) is potentially solved by men marrying locally to retain decision-making power over matrilineal groups. In such a case, a society may be strictly matrilocal at the household level but coresidence analysis at the community level will show brothers and sisters coresiding. The Xavante are another example where women live with more kin at the level of extended households, perhaps to facilitate child care, but men live with more kin at the village level, perhaps to facilitate male alliances. Because of these complexities, more complete accounts of ethnographic variation should ideally include both traditional residence typologies and actual patterns of coresidence from censuses taken at multiple scales of community structure.

Explaining variation in residence patterns remains a formidable task. Some potentially important variables include

Table 2. Parameter estimates from regressions of kin count as a function of log residential group size, headman status, and the interaction between the two

Dependent variable	Intercept	Log group size	Headman	Log group size × headman
Total close kin	-.04	1.90*	-1.07	1.83*
Parents	.24	.22	-.35	.12
Siblings	-.14	1.20*	-1.08	.95*
Offspring	.04	.43	.36	.76

Note. Society was entered as random effect (varying intercept). Estimates not marked with an asterisk have  $P > .05$ .

\*  $P < .01$ .

the scale of horticulture, relative importance of fishing versus hunting (Beckerman 1993), value of bride service, internal versus external warfare (Ember and Ember 1971), brother-brother competition over mates, male or female cooperative labor, length of male absence, rate of wife capture, costs of obliging kin, and demographic stochasticity. While these variables are likely to affect residence strategies, most are difficult to quantify in our sample given the anecdotal nature of the ethnographic record. We do note that lowland Amazonians are traditionally more warlike than the hunter-gatherer sample, and yet lowlanders are more uxorilocal and show less of a brother-brother bias than that seen in hunter-gatherers. Tentatively, it seems that those Amazonians traditionally under strong pressure of internal conflict within ethnolinguistic boundaries (e.g., Makuna, Marubo, Shuar, Xavante, and Yanomamo) do emphasize brother-brother coresidence, whereas those under mostly external conflict, which potentially requires more male absence, are more uxorilocal (e.g., Suyá, Bororo, Trio, and Arawete), as has been supported in a global sample of human cultures (Ember and Ember 1971). If warfare is intense between multivillage blocks, and brothers are not too far away, they can still form important alliances in external warfare without competing directly for available mates in the local village.

While hunter-gatherers show more brother-brother coresidence biases (Hill et al. 2011) and lowland horticulturalists show more parent-daughter biases, a uniquely human pattern of flexible philopatry, dispersal, and visiting across multiple levels of social structure creates frequent adult brother-sister coresidence across both subsistence types (see also Irons 1979). This is further support for the importance of long-term sibling and bilateral kin cooperation as predicted from Chapais's (2008) model, where amicable between-group relations are facilitated by visiting and opportunistic coresidence in human meta-groups. As seen across Amazonia, meta-group social structure also serves to ramp up the scale of warfare by uniting multiple lineages, villages, and even chiefdoms against other confederations (Chagnon 1967, 1974; Oberg 1955; Redmond 1994; Steward 1959). Between-group alliances stemming from marriage exchange and trading systems likely increased the scale of cooperative networks to levels unparalleled by other species and essential for successful competition against other large alliances.

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## References Cited

Alexander, Richard D. 1979. *Darwinism and human affairs*. Seattle: University of Washington Press.

- Alvarez, Helen P. 2004. Residence groups among hunter-gatherers: a view of the claims and evidence for patrilineal bands. In *Kinship and behavior in primates*. Bernard Chapais and Carol M. Berman, eds. Pp. 420–442. Oxford: Oxford University Press.
- Århem, Kaj. 1981. *Makuna social organization: a study in descent, alliance, and the formation of corporate groups in the north-western Amazon*. Stockholm: Almqvist & Wiksell.
- Arvelo-Jimenez, Nelly. 1971. Political relations in a tribal society: a study of the Ye'cuana Indians of Venezuela. PhD dissertation, Cornell University, Ithaca, NY.
- Balée, William L. 1984. The persistence of Ka'apor culture. PhD dissertation, Columbia University, New York.
- Beckerman, Stephen. 1993. Major patterns in indigenous Amazonian subsistence. In *Tropical forests, people and food: biocultural interactions and applications to development*. Claude M. Hladik, Annette Hladik, Olga F. Linares, Helene Pagezy, Alison Semple, and Malcolm Hadley, eds. Pp. 411–424. Paris: Parthenon.
- Bentley, Gillian R., Tony Goldberg, and Grazyna Jasienska. 1993. The fertility of agricultural and non-agricultural traditional societies. *Population Studies* 47(2):269–281.
- Borgerhoff Mulder, Monique, Samuel Bowles, Tom Hertz, Adrian Bell, Jan Beise, Greg Clark, Ila Fazzio, et al. 2009. The intergenerational transmission of wealth and the dynamics of inequality in pre-modern societies. *Science* 326(5953):682–688.
- Bugos, Paul E., Jr. 1985. An evolutionary ecological analysis of the social organization of the Ayoreo of the Northern Gran Chaco. PhD dissertation, Northwestern University, Evanston, IL.
- Chagnon, Napoleon. 1967. *Yanomamö: the fierce people*. New York: Holt, Rinehart & Winston.
- . 1974. *Studying the Yanomamö*. New York: Holt, Rinehart & Winston.
- . 1979. Is reproductive success equal in egalitarian societies? In *Evolutionary biology and human social behavior*. Napoleon Chagnon and William Irons, eds. Pp. 374–401. North Scituate: Duxbury.
- . 1982. Sociodemographic attributes of nepotism in tribal populations: man the rule-breaker. In *Current problems in sociobiology*. King's College Sociobiology Group, eds. Pp. 291–318. Cambridge: Cambridge University Press.
- Chapais, Bernard. 2008. *Primeval kinship: how pair-bonding gave birth to human society*. Cambridge, MA: Harvard University Press.
- Conklin, Beth A. 1989. Images of health, illness and death among the Wari' (Pakaas Novos) of Rondonia, Brazil. PhD dissertation, University of California, San Francisco.
- Copeland, Sandi R., Matt Sponheimer, Darryl J. de Ruiter, Julia A. Lee-Thorp, Daryl Codron, Petrus J. le Roux, Vaughan Grimes, and Michael P. Richards. 2011. Strontium isotope evidence for landscape use by early hominins. *Nature* 474(7349):76–78.
- Córdoba, Lorena, and Diego Villar. 2008. Some aspects of marriage alliance among the Chacobo. Paper presented at the 5th Annual Conference of the Society for the Anthropology of Lowland South America, Oxford.
- Crocker, John C. 1967. The social organization of the Eastern Bororo. PhD dissertation, Harvard University, Cambridge, MA.
- Da Matta, Roberto. 1971. Apinayé social structure. PhD dissertation, Harvard University, Cambridge, MA.
- Deturche, Jeremy. 2009. Les Katukina du Rio Biá (Etat d'Amazonas-Brésil): Histoire, organisation sociale et cosmologie. PhD dissertation, University of Paris, Paris.
- Dumont, Jean-Paul. 1978. *The headman and I: ambiguity and ambivalence in the fieldworking experience*. Austin: University of Texas Press.
- Ember, Carol R. 1978. Myths about hunter-gatherers. *Ethnology* 17(4):439–448.
- Ember, Melvin, and Carol R. Ember. 1971. The conditions favoring matrilineal versus patrilineal residence. *American Anthropologist* 73(3):571–594.
- Fischer, Jack L. 1958. The classification of residence in censuses. *American Anthropologist* 60(3):508–517.
- Goodenough, Ward H. 1956. Residence rules. *Southwestern Journal of Anthropology* 12(1):22–37.
- Curven, Michael, Monique Borgerhoff-Mulder, Paul Hooper, Hillard Kaplan, Robert Quinlan, Rebecca Sear, Eric Schniter, et al. 2010. Domestication alone does not lead to inequality: intergenerational wealth transmission among horticulturalists. *Current Anthropology* 51(1):49–64.
- Curven, Michael, and Hillard Kaplan. 2007. Hunter-gatherer longevity: cross-cultural perspectives. *Population and Development Review* 33(2):321–365.



- Hames, Raymond B. 1989. Time, efficiency, and fitness in the Amazonian protein quest. *Research in Economic Anthropology* 11:43–85.
- Hames, Raymond B., and William T. Vickers, eds. 1983. *Adaptive responses of native Amazonians*. New York: Academic Press.
- Harcourt, Alexander H. 1978. Strategies of emigration and transfer by primates, with particular reference to gorillas. *Z. Tierpsychol* 48(4):401–420.
- Hawkes, Kristen, James F. O'Connell, Nicholas G. Blurton Jones, Helen Alvarez, and Eric L. Charnov. 1998. Grandmothering, menopause, and the evolution of human life histories. *Proceedings of the National Academy of Sciences of the USA* 95(February):1336–1339.
- Helm, June. 1965. Bilaterality in the socioterritorial organization of the Arctic Drainage Dene. *Ethnology* 4(4):361–385.
- Hill, Jonathan, and Emilio Moran. 1983. Adaptive strategies of Wakuénaí peoples to the oligotrophic rain forest of the Rio Negro basin. In *Adaptive responses of native Amazonians*. Raymond B. Hames and William T. Vickers, eds. Pp. 113–139. New York: Academic Press.
- Hill, Kim R., Robert S. Walker, Miran Bozicevic, James Eder, Thomas Headland, Barry Hewlett, A. Magdalena Hurtado, Frank Marlowe, Polly Wiessner, and Brian Wood. 2011. Co-residence patterns in hunter-gatherer societies show unique human social structure. *Science* 331(6022):1286–1289.
- Hornborg, Alf. 1988. *Dualism and hierarchy in lowland South America: Trajectories of indigenous social organization*. Uppsala: Acta Universitatis Upsaliensis, Uppsala Studies in Cultural Anthropology 9.
- Hughes, Austin L. 1988. *Evolution and human kinship*. Oxford: Oxford University Press.
- Irons, William. 1979. Investment and primary social dyads. In *Evolutionary biology and human social behavior*. Napoleon A. Chagnon and William Irons, eds. Pp. 181–212. North Scituate: Duxbury.
- Johnson, Allen. 2003. *Families of the forest: the Matsigenka Indians of the Peruvian Amazon*. Berkeley: University of California Press.
- Kaplan, Joanna O. 1975. *The Piaroa: a people of the Orinoco Basin*. Oxford: Clarendon.
- Kracke, William H. 1978. *Force and persuasion: leadership in an Amazonian society*. Chicago: University of Chicago Press.
- Kramer, Karen, and Russell Greaves. 2011. Postmarital residence and bilateral kin associations among hunter-gatherers: Pumé foragers living in the best of both worlds. *Human Nature* 22(1–2):41–63.
- Kronenfeld, David B. 1992. Ethnography and ethnology: Goodenough versus Fischer a generation later. *Quantitative Anthropology* 4(1):1–21.
- Kuroda, Suehisa. 1979. Grouping of the pygmy chimpanzees. *Primates* 20(2): 161–183.
- Lalueza-Fox, Carles, Antonio Rosas, Almudena Estalrich, Elena Gigli, Paula F. Campos, Antonio García-Taberner, Samuel García-Vargas, et al. 2010. Genetic evidence for patrilocal mating behavior among Neandertal groups. *Proceedings of the National Academy of Sciences of the USA* 108:250–253.
- Lave, Jean C. 1967. Social taxonomy among the Krikati (Gè) of central Brazil. PhD dissertation, Harvard University, Cambridge, MA.
- Lee, Richard B., and Irven DeVore. 1968. Problems in the study of hunters and gatherers. In *Man the hunter*. Richard B. Lee and Irven DeVore, eds. Pp. 3–12. Chicago: Aldine.
- Lévi-Strauss, Claude. 1949. *Les structures élémentaires de la parenté*. Paris: Presses Universitaires de France.
- Lizot, Jacques. 1984. *Les Yanomami Centraux*. Paris: Éditions de L'École des Hautes Études en Sciences Sociales.
- Lucio, Carlos F. 1996. Sobre algumas formas de classificação social: Etnografia sobre os Karitiana de Rondônia (Tupi-Arikém). MS thesis, Universidade Estadual de Campinas, Campinas, Brazil.
- Mair, Lucy P. 1962. *Primitive government: a study of traditional political systems in eastern Africa*. Harmondsworth: Penguin.
- Marlowe, Frank. 2004. Marital residence among foragers. *Current Anthropology* 45(2):277–284.
- Mason, Alan. 1997. The sibling principle in Oronao' residence. *Ethnology* 36(4):351–366.
- Maybury-Lewis, David H. P. 1967. *Akwa-Shavante society*. Oxford: Clarendon.
- Meggers, Betty J., and Clifford Evans. 1964. Genealogical and demographic information on the Wai Wai of British Guiana. In *Völkerkundliche Abhandlungen des Niedersächsischen Landesmuseums, Abteilung für Völkerkunde*. Herbert Baldus, ed. Pp. 199–208. Hannover: Kommissionsverlag Münstermann-Druck GMBH.
- Melatti, Julio C. 1970. O sistema social Krahô. PhD dissertation, University of Brasília, Brasília.
- . 1977. Estrutura social marubo: um sistema australiano na Amazônia. *Anuário Antropológico* 76:83–120.
- Murdock, George P. 1949. *Social structure*. New York: Macmillan.
- Oberg, Kalervo. 1955. Types of social structure among the lowland tribes of Central and South America. *American Anthropologist* 57(3):472–487.
- Porter, Claire C., and Frank W. Marlowe. 2007. How marginal are forager habitats? *Journal of Archaeological Science* 34:59–68.
- Pusey, Anne. 1979. Intercommunity transfer of chimpanzees in Gombe National Park. In *The great apes*. David A. Hamburg and Elizabeth R. McCown, eds. Pp. 465–479. Menlo Park, CA: Benjamin/Cummings.
- Radcliffe-Brown, Alfred R. 1931. *The social organization of Australian tribes*. Melbourne: Macmillan.
- Redmond, E. M. 1994. *Tribal and chiefly warfare in South America*. Ann Arbor: University of Michigan Museum of Anthropology Press.
- Rivière, Peter. 1969. *Marriage among the Trio: a principle of social organisation*. Oxford: Clarendon.
- Schneider, David M. 1961. Introduction: the distinctive features of matrilineal kin groups. In *Matrilineal kinship*. David Schneider and Kathleen Gough, eds. Pp. 1–32. Berkeley: University of California Press.
- Seeger, Anthony. 1981. *Nature and society in central Brazil*. Cambridge, MA: Harvard University Press.
- Service, Elman R. 1962. *Primitive social organization: an evolutionary perspective*. New York: Random House.
- Silva, Marcio F. 2009. *Romance de primas e primos: uma etnografia do Parentesco Waimiri-Atroari*. Manaus, Brazil: Valer Editora.
- Stearman, Alynn M. 2001. *Yuqui: nomads in a changing world*. Mason, OH: Thomson Learning.
- Steward, Julian H. 1938. Basin-plateau aboriginal sociopolitical groups. *Bureau of American Ethnology Bulletin* 120:1–346.
- . ed. 1959. *The comparative ethnology of South American Indians*. Washington, DC: Smithsonian.
- Steward, Julian H., and Louis C. Faron. 1959. *Native peoples of South America*. New York: McGraw-Hill.
- Suárez, María M. 1968. *Los Warao: indígenas del Delta del Orinoco*. Caracas: IVIC.
- Thomas, David J. 1982. *Order without government: the society of the Pemón Indians of Venezuela*. Urbana: University of Illinois Press.
- Vigilant, Linda, and Kevin E. Langergraber. 2011. Inconclusive evidence for patrilocality in Neandertals. *Proceedings of the National Academy of Sciences of the USA* 108:E87.
- Viveiros de Castro, Eduardo B. 1992. *From the enemy's point of view: humanity and divinity in an Amazonian society*. Chicago: University of Chicago Press.
- von Rueden, Christopher, Michael Gurven, and Hillard Kaplan. 2008. Multiple dimensions of male social status in an Amazonian society. *Evolution and Human Behavior* 29(6):402–415.
- . 2011. Why do men seek high social status? fitness payoffs to dominance and prestige. *Proceedings of the Royal Society of London B: Biological Sciences* 278:2223–2232.
- Wagley, Charles, and Eduardo E. Galvão. 1949. *The Tenetehara Indians of Brazil: a culture in transition*. New York: Columbia University Press.
- Werner, Dennis. 1981. Gerontocracy among the Mekranoti of central Brazil. *Anthropological Quarterly* 54:15–27.
- Wilbert, Johannes. 1964. *Warao oral literature*. Instituto Caribe de Antropología y Sociología. Fundación La Salle de Ciencias Naturales. Monograph no. 9. Caracas: Editorial Sucre.
- Wrangham, Richard W. 1986. Ecology and social relationships in two species of chimpanzee. In *Ecological aspects of social evolution: birds and mammals*. Daniel I. Rubenstein and Richard W. Wrangham, eds. Pp. 352–378. Princeton, NJ: Princeton University Press.

## Supplement A from Walker et al., “Living with Kin in Lowland Horticultural Societies”

(Current Anthropology, vol. 54, no. 1, p. 96)

### Study Populations with Notes on Residence and Leadership

*Apinaye*: Da Matta (1971) censused one village of Je-speaking Apinayé in Brazil in 1963. The village had one recognizable headman. He emphasized uxori-locality but “certain marriages do not follow the matrilocal rule” (483). (See the map in fig. A1 for locations of study populations.)

*Arawete*: Viveiros de Castro (1992) worked with a village of Tupi-speaking Arawete in eastern Amazonia (Middle Xingu, Brazil) that was divided into six clusters. “The village is a fusion of survivors of sundry groups, and has a much larger population than traditional local groups did, which accounts for the autonomy of residential sections and the consequent minimization of the position of the chief. The authority of a traditional ‘owner of the village’ was probably greater precisely because the local groups was smaller ... the uxori-local extended family, or more properly (since, as in most of Amazonia, uxori-local residence is not a mechanical rule, but obeys the proviso *ceteris paribus*), the extended family that manages to attract sons-in-law and to retain sons at the same time” (115).

*Ayoreo*: Bugos (1985) gives censuses for two Zamuco-speaking Ayoreo villages (Campamento and Zapoco). “The preferred form of post-marital residence is uxori-locality” (149). “The Ayoreo are essentially an egalitarian people” (117) and so were not included in the headman analysis.

*Barí*: Beckerman collected censuses of 10 Colombian Barí longhouses in the region of Lake Maricaibo the 1970s. Of these, five longhouses had recorded headmen (“old chiefs”).

*Bororo*: Crocker (1967) gives residential composition of 19 households (both nuclear and extended families) in two communities of Je-speaking Bororo in Central Brazil. “The great majority of marriages follow the nominal stipulation for uxori-local residence. However, many young couples reside patrilocally” (202). Crocker states that in one community a plethora of leaders exists, and this, combined with the fact that genealogies are only at the level of the household, means no headman analysis is done for the Bororo.

*Chacobo*: Between 2000 and 2010 Córdoba and Villar collected a genealogical database of approximately 1,200 people in 20 villages or settlements. The census comprises the entire Chacobo population in Bolivia (Pano language family). Despite missionary influence, the Chacobo still practice traditional cross-cousin marriage. A typical Chacobo household or settlement consists of a male ego with a constellation of his daughters and their husbands (and unmarried young sons who will be off when married). The daughters remain together while the sons marry somewhere else and move. One would generally expect that Chacobo women coreside with younger unmarried brothers and sisters (and husbands and in-laws that come from other groups). A possible hypothesis to explain coresiding masculine kin in an uxori-local context would be the strong Chacobo preference for “serial alliance” (i.e., ego marries where someone of his group like a brother or parallel cousin has already been married). The ideal is that a set of “brothers” (real or classificatory, i.e., parallel cousins) marries a set of “sisters” (real or classificatory). The Chacobo explain it by saying that it is safer and more convenient because the group of “brothers” can have kin to rely on in the new settlement considering they have to obey, respect, and work for their father-in-law, and thus form a united front in relations with affines (Córdoba and Villar 2008). Headmen are designated in the traditional sense (i.e., focal men in the kinship web, the “anchor” of any given uxori-local settlement) and not “presidentes” or “capitanes” (i.e., men in current office whose function is mainly to deal with the outside world).

*Ka’apor*: Balée (1984) provides two village censuses for Tupi-speaking Ka’apor in Eastern Amazonia, Brazil. “Informants articulate no particular permanent residence rule per se. Bride service seems to lead to eventual uxori-locality” (164). Headmen not identified on the censuses.

*Kagwahiv*: Kracke (1978) provides censuses and genealogies for the Portinho group led by Homero in its heyday and another group led by Ukarepukú of about 20 years previous. “Marriage is regulated by a system of patrilineal, exogamous moieties” (12). “During bride service, the bridegroom lives in his father-in-law’s household. After concluding it, the new husband is free to establish his own household in his father-in-law’s settlement or to move away altogether. If his father-in-law is group headman and at all persuasive, however, the result tends to be permanent uxori-local residence in his settlement. Bride service, then, is a key element of Kagwahiv political structure” (14).

*Katukina*: Deturche (2009) provides censuses for two villages in the southern part of the state of Amazonas, Brazil. Each village has a chief that derives from a choice that takes into account the capacity for leadership and knowledge of

ritual, mythology, and the outside world. Marriages ideally involve a couple from the same village or block. After marrying, the couple normally live in the house of the wife's family until the first child is born at which time they may build their own house.

*Karitiana*: Lucio (1996) worked in the single village of Tupi-speaking Karitiana in the state of Rondonia, Brazil, divided into two halves known as the shaman's people and the pastor's people or "believers." Marriages between people from different factions are commonplace, and men integrate into their father-in-law's faction.

*Krahô*: Melatti (1970) gives genealogies for four villages of Je-speaking Krahô in Brazil. He mentions how each house typically shelters women who were born into it and the men who married them. He also mentions that in the past villages were often led by several headmen of either the same or different faction. Leaders at the time of research were preferred of those who spoke better Portuguese and could deal with the outside world. For this reason, the Krahô were not included in the headman analysis.

*Krikati*: Lave (1967) censused 22 extended households in 1963 in two villages of Je-speaking Krikati in Brazil. Household heads were recognized but not a headman for the whole village. The preference, and the majority pattern, is tribal endogamy. "In a divorce the man returns to his parents' or sister's home" (75).

*Machiguenga*: Johnson (2003) did fieldwork between 1971 and 1980 with Arawak-speaking Machiguenga in southeastern Peru and censused 20 extended households or hamlets in 1972. Given the family-level social structure in the Machiguenga, they are not included in the analysis of headmen. A common and ideal form of marriage is the brother-sister pairs intermarrying allowing newlyweds to stay close to their parents after marriage.

*Makuna*: Århem (1981) censused 17 Makuna longhouses, Tukano-speakers in the northwest Amazon. "(Makuna) explicitly state the direct-exchange marriage as a norm. In different circumstances, they also say that bride capture—the violent abduction of women from far away—is a correct and customary form of marriage" (152). Århem shows that 44 of 48 marriages have virilocal residence. "Each residence has a headman. He is the owner of the house, the man who was responsible for the joint undertaking of building it" (83).

*Marubo*: Melatti (1977) studied a cluster of four Marubo longhouses, Pano-speakers of western Amazonia, each with identifiable headmen. According to Melatti, there is no evidence for a simple residence rule, and he emphasizes various alternative scenarios for the establishment and maintenance of longhouse communities.

*Mayangna*: Data are based on censuses and genealogical research by Koster in two Mayangna/Miskito communities of swidden horticulturalists in Nicaragua. One of the communities was the subject of research in 2008 and the other in 2005. If both husband and wife are relatively young, it is common for the new couple to reside in the household of the wife's family until after the birth of a child, at which time the couple considers forming a new household. Somewhat less commonly, new couples may reside in the household of the husband's family. In both cases, the new additions to the household are expected to contribute to household-related tasks, often in concert with their same-sex affinal kin. Time allocation data suggest that people continue to associate regularly with their same-sex affinal kin after they no longer coreside in the same household. Ethnographers noted the presence of multifamily longhouses in the early twentieth century, but households now maintain separate dwellings. Descent is traced bilaterally. Although an adult man is elected as the "judge" in each community and others participate in territorial governance, there are few formally-designated leadership positions within the community.

*Panare*: Dumont (1978) censused two villages of Carib-speaking Panare in Venezuela. Marquito and Ramón Gallardo were recognized as headmen. Dumont notes the importance of sister exchange and a tendency toward uxorilocality.

*Pemon*: Thomas (1982) censused three Carib-speaking Pemon villages in Venezuela in 1970, two of which had recognizable political heads. Both political and spiritual leaders owe their positions to number and strength of kinship ties on which they draw support. "When the verbal ideal norm of residence at marriage is with the wife's parents, the young couple will in fact spend a good deal of time moving back and forth between the households of the parents of both spouses, even after they have set up manioc plots close to the wife's parents' household. Visiting may involve travel over a considerable distance, but most young couples seem to enjoy it, and periodic trips to the natal family of the groom continue as long as his parents are alive" (101).

*Piaroa*: Kaplan (1975) tabulated the distribution of kin living in 10 large, multiple-family, conically-shaped houses in two territorial regions of Salivan-speaking Piaroa in the Orinoco Basin of Venezuela. These extended family houses are relatively isolated residential units and are named after the male leader. She did an extensive analysis of kin coresidence, finding a slight tendency toward patrilocality, but remarks on an ideal of sisters living together that takes precedence over brothers living together and on the commonality of cross-sex sibling coresidence. "No single principle can explain decisions made by the Piaroa on residence. One cannot facily label Piaroa residence in accordance with any one of such traditional anthropological categories as patrilocality, matrilocality, or ambilocality. This is a consequence of the fact that a number of choices are available to each individual" (119–120).

*Pumé*: Kramer and Greaves contribute censuses from two separate River Pumé communities. Both were censused in the 2005 and 2007 dry season. The River Pumé are fisher-horticulturalists, geographically distinguishable from the Savanna

Pumé, who are foragers. The foraging savanna Pumé were censused in back-to-back dry and wet seasons from 1992 and 1993 and in two dry seasons in 2005 and 2006 and another camp was censused in two dry seasons in 2005 and 2006 and are included in the hunter-gatherer sample ( $H = 0.49$ ). Dry season camps are less aggregated (households within a village) and wet season camps are more aggregated, but Helm's measure is actually similar for both, and so we analyze them together. The Pumé recognize these economic differences and self-reference themselves using separate terms. The Pumé language is a linguistic isolate. Kinship organization across the Pumé is primarily bilateral (Kramer and Greaves 2011) and River Pumé postmarital residence tends to be bilocal. Headmen have limited authority; their role is primarily to interact with outsiders, and so they are not included in the headman analysis.

*Shuar*: Sugiyama and Hagen provide recent censuses for 25 Shuar villages in Ecuador (Jivaroan speakers). Most villages do not have a "headman" but instead elect "presidentes," who do not reflect the real power structure of the village and therefore are not included in the headman analysis.

*Suya*: Seeger (1981) censused a village of Je-speaking Eastern Suya in Central Brazil that included a number of other individuals captured from raiding tribes. The village headman was Niokombedi. "Preferential matrilineal cross-cousin marriage, a group of siblings marrying another group of siblings, and brother-sister exchange (the exchange of men between two houses) are all considered good or ideal marriages by the Suya" (129).

*Tenetehara*: Wagley and Galvão (1949) carried out fieldwork in the state of Maranhão, Brazil, with Tupi-speaking Tenetehara or Guajajara. The census is from one village in 1942 named after the headmen Camirang composed of four extended families. "Since residence is matrilineal for a year or two after marriage, during which the groom works for his father-in-law, many young couples live with the bride's parents. As a rule, after a year or two they build a house for themselves, generally near the dwelling of the wife's parents" (23).

*Trio*: Rivière's (1969) research among the Carib-speaking Trio of Suriname occurred after the traditional settlement pattern of dispersed villages had been replaced by several large villages. He attempted to reconstruct, at least partially, the main features of relationships among traditional villages by combining his genealogical data with village census data of eight villages collected by Schmidt in the period 1940–1942. He did an extensive analysis of kin coresidence showing that 69.3% of close kin and affines live in the same village. "Post marital residence is neither strongly patrilineal nor matrilineal, although there is a slight tendency towards the latter. This, however, can be explained thus—most marriages occur within the village, but the lack of suitable women will drive a man to search for a wife elsewhere" (112). Rivière also analyzes the relationship of village inhabitants to various male leaders.

*Tsimane*: Gurven and colleagues collected genealogies and censuses for 28 villages of Tsimane in Bolivia taken repeatedly over a number of years. Residence was also recorded at the level of household and house cluster, but Helm's measure was comparable across these different scales. Tsimane villages generally have several highly influential, elected men ("corregidores") who dominate community meetings, settle conflicts, and represent the village to outside political forces. There are 15 communities where "corregidores" were identifiable in more traditional villages with less recent demographic instability (von Rueden, Gurven, and Kaplan 2008).

*Waiwai*: Meggers and Evans (1964) provide genealogies and censuses for four Carib-speaking Waiwai of Guyana. "Matrilineal descent is reflected in matrilineal residence" (200). No headmen were recognized in the study.

*Waimiri-Atroari*: Silva (2009) presents censuses with recently contacted Carib speakers living in three communities in the state of Amazonas, Brazil. These villages later fissioned in 1987 and then fused again in 1989. The earlier 1986 census is used here. Ideal residence is considered to be an entire community living in one large, round house led by one male leader. Marriage is preferred within the round house with temporary uxoriality, but higher status families are often virilocal with daughter exchange.

*Wakuenai*: Hill and Moran (1983) provide kinship and residence for two villages and respective headmen for Arawak-speaking Wakuenai (also known as Curripako) in the upper Rio Negro Basin. "The high rate of uxoriality in Punta Bella (village name) may be seen as a transformation of the traditional custom of bride service from a 2-year process to a life-time status" (124). "The village of Gavilán (second village name) presents an interesting contrast ... based on a patrilineal-patrilocal cluster of 4 men, one of which is headman" (127).

*Warao*: Suárez (1968) provides censuses for three Warao villages in Venezuela, each with recognized leaders. "The Warao community is a matrilineal, matrilineal lineage. ... Local endogamy prevails" (Wilbert 1964:17).

*Wari'*: Conklin (1989) provides reconstructed data on residential patterns for five precontact Wari' villages in circa 1930, three in 1954, and 1960. "Data (for precontact villages) indicate that the Wari' have no prescriptive rule determining postmarital residence. After fulfilling bride service obligations, married couples may live with either spouse's kin" (126). Mason (1997) states how marriage took place with members of nearby settlements along established patterns of marital exchange.

*Xavante*: Maybury-Lewis (1967) surveyed three villages of Je-speaking Xavante, each with recognizable chiefs, comprised of 65 extended households. "As marriage is uxorial it is clearly much easier for a man to marry a number of uterine sisters, so that there is no problem as to where he should live and he acquires only one set of in-laws" (87).

*Yanomamo*: Chagnon (1967, 1974) provides a complete genealogy and census for Mishimishmaböwei-teri and Lower Bisaasi-teri in a situation of intense warfare. He recognizes headmen for both villages and emphasizes virilocality after temporary bride service and an exchange system of spouses between patrilineages. Lizot (1984) censused two villages but does not identify headmen. Hagen censused one Yanomamo village, and a principal components analysis revealed the exact power structure of the village, which was based on alliances between the families of the headman, head shaman, and village founder.

*Yekwana*: Arvelo-Jimenez (1971) worked with six villages of Carib-speaking Yekwana in Venezuela, three of which are named after headmen. “When a marriage is made public the man takes up residence in his wife’s household, implicitly recognizing the authority of his father-in-law as head of the household. ... A man who marries outside his natal village is placed in an unfavorable position, since he must usually live in a community where he has no sister and hence no home to chat and relax in except for his wife’s household” (102).

*Yuqui*: Stearman (2001) studied Tupi-speaking Yuqui in Bolivia. Although traditionally hunter-gatherers, Yuqui were settled at the time of the census (1983) into one endogamous mission station with flexible postmarital residence patterns. Leonardo was identified as the young headman with legitimate claim as an old headman’s grandson, but he had still not attained the complete acceptance of all his people, seen by some as more the missionaries’ and not the Yuqui’s choice.



Figure A1. Locations of the 34 societies in our sample colored according to statistically significant biases for men living with more total primary kin (marked in blue), women living with more primary kin (pink), or no significant differences between the sexes (gray). Arawete men actually live with more kin at the level of clusters within the village, while Xavante women live with more kin at the level of extended households instead of at the village level as shown here.