Fitness Costs of Warfare for Women

Michelle Scalise Sugiyama

4 November 2014

Contents

Abstract Research to date has focused on fitness costs that coalitional aggression imposes on men and how these may have shaped male cognitive design. This study investigated whether warfare may have shaped female cognitive design by identifying fitness costs that lethal raiding imposes on women and determining how widespread these fitness costs are across a sample of forager and forager-horticulturalist societies. To this end, archaeological and ethnographic accounts of lethal raiding were used to generate a list of fitness costs suffered by women in warfare. Five costs were identified: woman killed, woman captured, offspring killed, mate killed/captured, and adult male kin killed/captured. A cross-cultural sample of forager and forager-horticulturalist oral traditions was then surveyed for the presence of these costs. Results suggest that lethal raiding has recurrently imposed fitness costs on women, and that female cognitive design bears reexamination in terms of the motivational and decision-making mechanisms that may have evolved in response to them. This study differs from previous studies of lethal raiding by addressing the lack of comparative research on the fitness costs of warfare for women, by examining a wider range of fitness costs, and by using oral tradition as a database.

Keywords Warfare, Lethal raiding, Forager, oral tradition, Women's evolved psychology

> If they catch a man and his wife at some distance from the village, they will more than likely take the woman after they kill her husband (Chagnon 1997:190).

As long as there have been wars, women have suffered as a result of them. The Kutchin tale of Atsunve graphically illustrates this point. In the story, the Eskimo attack a big Kutchin camp, killing everyone but Atsunve, an attractive young girl. According to one variant, the Eskimo marry her to two brothers, and she soon has a baby. The summer after her capture, the Eskimo attack the Kutchin again and return "with a canoe-load of Indians' heads" (Slobodin 1971:293), including the heads of her brothers. Atsunve hides her rage and encourages the village to have a big feast, play games, and conduct kayak races so that everyone will be exhausted and sleep soundly. That night, she slits her husbands' throats as they lay sleeping and cuts holes in all the kayaks except the fastest, in which she escapes, leaving her infant behind. She travels to another band of her tribe members and marries two young men. Together, they assemble a war party and raid the Eskimo camp. When they arrive, they find her dead infant hanging from a tree, and kill everyone in the camp. As a result of lethal raiding, then, Atsunve has lost her band, her brothers, her infant, and in the case of her first marriage, the ability to have any say in who fathers her children.

Atsunve's losses suggest that intergroup aggression imposes potentially heavy fitness costs on women, but to date little attention has been paid to these costs, let alone the ways in which they might have shaped female cognitive architecture. Recent evolutionary models of intergroup aggression characterize it as a behavior that resulted

from selection forces operating on males (e.g., Tooby and Cosmides 1988; Wrangham 1999; cf. Bowles 2009, who is silent with regard to gender). This study does not dispute the claim that, in humans, the capacity for intergroup aggression was selected for in males. Rather, it proposes that once this capacity evolved, the resultant behavior may have exerted selection pressure on females. It addresses this question by surveying forager and forager-horticulturalist war narratives to identify recurrent fitness costs experienced by women in the context of lethal raiding. Although modern forager and forager-horticulturalist life does not exactly parallel that of our ancestors, there are important similarities between them: a dependence on foraging for all or part of subsistence, small natural-fertility populations with low population density, and a lack of telecommunication, motorized transport, and Western medicine (Lee and DeVore 1968; Marlowe 2005). Thus, warfare practices among recent forager and foragerhorticulturalist societies can potentially illuminate the costs women faced in ancestral environments. Warfare is defined here as "an interaction in which members of one social group cooperate in threatening, chasing, striking, wounding, or killing at least one member of another" (Manson and Wrangham 1991:370).

Oral traditions were used for the study because, as data sets accumulated over generations, they span a broad time period, which makes them well-suited for delineating longitudinal patterns in lethal raiding. In contrast, ethnographic field studies are typically of a few months' or years' duration and thus may offer few opportunities to observe raiding at first hand. Although they represent an emic perspective, forager war narratives are widely alleged to present accurate descriptions of traditional raiding practices. For example, Opler claims that Jicarilla Apache war stories "follow so closely the warfare and raiding practices of the Jicarilla that they will serve as invaluable documents with which to illuminate an ethnological account" (1938:v; see also Parsons 1929:xviii). Similarly, the Tanaina tell stories that are "historical accounts of events that occurred in the wars with the neighboring Yupik Eskimos" (Tenenbaum and McGary 1984:7). Likewise, Rink claims that many Eskimo stories are rooted in historical fact, referring to "conflicts and meetings of the Eskimo with the Indians, which in recent times have still taken place on the banks of the Mackenzie and Coppermine Rivers" (1875:109; see also de Laguna 1995:289). Correspondences between oral accounts and the ethnographic record are so numerous that LeBlanc and Register (2003) argue that oral tradition may be useful in reconstructing the methods and tactics used in precontact tribal warfare. In sum, although it would be stretching the bounds of credulity to assert that all of these war narratives reference specific battles, there is considerable evidence that these narratives reference real-world raiding tactics. The findings reported here are thus grounded in the premise that these war narratives document actual warfare practices, regardless of whether they document actual warfare events, and thus constitute a supplementary source of cross-cultural data on lethal raiding.

Methods

To test the hypothesis that lethal raiding exerted selection pressure on ancestral women, archaeological and ethnographic accounts of forager and forager-horticulturalist lethal raiding were used to generate a list of losses suffered by women in warfare. This list was narrowed to losses that occur cross-culturally and impose clear-cut fitness costs. Five such losses were identified: woman killed, woman captured, offspring killed, mate killed/captured, and adult male kin killed/captured. A description of these casualties and their potential fitness costs, along with representative examples from the archaeological and ethnographic records, is presented in the next section.

Next, a cross-cultural sample of 45 forager and forager-horticulturalist oral traditions was surveyed for references to each of the five casualties. To assemble the study sample, Murdock's Ethnographic Atlas (Murdock 1967) was searched for forager societies. The basis for inclusion of a culture in the sample was a combined score of 7 or more for the categories of dependence on gathering, hunting, and/or fishing (as measured in Table A of the Atlas).[1] A stricter criterion of 100% dependence on gathering, hunting, and/or marine animals would have greatly reduced the sample size for the regions of East Eurasia, Insular Pacific, South America, and parts of North America, and it would have excluded forager-horticulturalist societies. The survey yielded 206 culture groups in 83 culture clusters from five of Murdock's six geographical regions (the Atlas contains no forager groups from the circum-Mediterranean). When a cluster contained more than one culture group, one culture group was chosen at random for the study sample. A library search was conducted for comprehensive collections of that culture's folklore (e.g., "Crow"+"texts"). If none were found, another culture was chosen randomly from that cluster, and the search process repeated. Collections were found for 45 of the 83 culture clusters (Table 1).

In assembling the sample, precedence was given to collections of (a) field-recorded texts (b) told by indigenous informants (c) to social science professionals and (d) aimed at presenting a representative sample of tales from a given culture. An exception to this is Gifford's (1936) collection of Yavapai tests, which contains only war tales. When no collections meeting at least three of these criteria were found for a given culture, another culture was chosen at random from the same cluster and the search process repeated. Some collections were distributed over multiple volumes (e.g., Jacobs 1939, 1940). The number of stories in the collections ranged from 13 to 364, with only five containing fewer than 20 stories (when a collection contained variants, each variant was counted as a separate story). The study sample is biased toward North American forager groups (see Table 1). This is largely due to historical happenstance: early Western anthropological investigation of forager cultures focused extensively on

[1] The Atlas may characterize some cultures, such as the Sanema/Yąnomamö, as having a greater dependence on foraging than has been documented by subsequent research.

North American groups. As a result, the representation of forager cultures in the Ethnographic Atlas is geographically biased, and this bias carries over into the study sample. Owing to the language constraints of the investigator, only collections available in English were used, which may have introduced further bias into the study sample.

Table 1 Folklore collections in study sample by culture cluster, culture group, and geographic region

Culture Cluster	Culture Group	Geographic Region	Collection
1	Mbuti	Sub-Saharan Africa	Turnbull 1959
2	San	Sub-Saharan Africa	Lewis-Williams 2000
154	Yukaghir	East Eurasia	Bogoras 1918
157	Ainu	East Eurasia	Batchelor 1924, 1926
229	Ngarluma & Jinjiparndi	Insular Pacific	von Brandenstein 1970
230	Warlpiri	Insular Pacific	Rockman and Cataldi 1994
237	Mimika	Insular Pacific	Offenberg and Pouwer 2002
278	Nunamiut	N America	Ingstad 1987
279	Iglulik	N America	Rasmussen 1929
280	Naskapi	N America	Millman 1993
281	Micmac	N America	Rand 1894
282	Ojibwa	N America	Jones 1917
283	Beaver	N America	Goddard 1916
286	Ingalik (Ten'a)	N America	Chapman 1914
287	Tanaina	N America	Tenenbaum and McGary 1984
288	Tlingit	N America	Swanton 1909
289	Tsimshian	N America	Boas 1895
290	Kwakiutl	N America	Boas 1895
291	Nootka	N America	Sapir and Swadesh 1939
292	Twana	N America	Elmendorf 1993
293	Chinook	N America	Boas 1894
294	Coos	N America	Jacobs 1939
295	Karok	N America	Kroeber and Gifford 1980
297	Maidu	N America	Dixon 1912
299	Yokuts	N America	Gayton and Newman 1940
300	Tubatulabal	N America	Vogelin 1935
304	Owens Valley Paiute	N America	Steward 1936
306	Yavapai	N America	Gifford 1936
308	Klamath	N America	Gatschet 1890

Table 1 (continued)

Culture Cluster	Culture Group	Geographic Region	Collection
309	Nez Perce	N America	Spinden 1917
310	Coeur d'Alene	N America	Reichard 1947
311	Thompson	N America	Teit 1898
313	Blackfoot	N America	Grinnell 1892
314	Teton	N America	Deloria 1932
315	Crow	N America	Lowie 1918
316	Kiowa	N America	Parsons 1929
320	Menomini	N America	Bloomfield 1928
327	Jicarilla	N America	Opler 1938
364	Yanomamo	C/S America	Wilbert and Simoneau 1990
367	Warao	C/S America	Wilbert 1964
390	Yamana	C/S America	Gusinde 1977
391	Selknam	C/S America	Gusinde 1975
394	Mataco	C/S America	Wilbert and Simoneau 1982
396	Chamacoco	C/S America	Wilbert and Simoneau 1987
401	Bororo	C/S America	Wilbert and Simoneau 1983

Content analysis of the study sample was conducted manually by the investigator. Casualties were coded as "present" or "not present" in a collection: if a story contained multiple instances of a given casualty, only one was counted. Because the loss of adult male offspring imposes two fitness costs (loss of offspring and loss of protector/ provider), this occurrence was counted as an instance of both Offspring Killed and Adult Male Kin Killed/Captured. A search of a given collection was discontinued as soon as one story referencing one or more of the casualties was encountered. Thus, the study likely underestimates the extent to which women incur fitness costs due to lethal raiding.

Fitness Costs of Warfare for Women: Review of the Archaeological and Ethnographic Records

This section reviews evidence from the archaeological and ethnographic records that forager and forager-horticulturalist women, their mates, and close kin were often casualties of war. This evidence was used to generate the list of casualties used for

content analysis of the study sample. Each casualty type is discussed in terms of its potential fitness costs for women.

Woman Killed The most obvious cost of warfare is death, the fitness consequence of which is termination of the victim's reproductive output and investment. Additionally, although data are limited and there is no consensus on the amount of allomothering provided by females in hunter-gatherer societies (Konner 2010), forager women are known to help each other with child care (Hewlett 1991) and to provision their close female relatives in times of need (e.g., Tonkinson 1978:37). Thus, the death of a woman in warfare may result in the loss of alloparental investment for her female kin (e.g., mother, aunts, sisters). The archaeological record contains abundant evidence that reproductive-age women were killed in attacks. The people of the Kachemak Tradition (1500 BC–AD 1000), who lived in the Kodiak Archipelago and adjacent regions, are a case in point. Several sites on Kodiak Island contain remains of women and children that show evidence of perimortem dismemberment, cutting, breakage, and drilling (Simon and Steffian 1994:97). The Saunaktuk site (AD 1370±57) contains the remains of 35 Inuit women, children and elderly people. These remains exhibit signs of decapitation, skinning of the head, the severing of hands and feet, dismemberment, and extraction of marrow from long bones (Melbye and Fairgrieve 1994; Walker 1990). And at Crow Creek on the upper Missouri (ca. AD 1325), hundreds of people—men, women, and children—were massacred and their bodies dismembered (LeBlanc and Register 2003).

The ethnographic record tells the same story. For example, Burch reports that in a series of raids and counter-raids, the Koyukon killed everyone in an Inupiat village while the men were out hunting except for two women who were originally from their village. When the hunters returned, they "found the corpses with their genitalia cut off and strung out on a line" (1998:99). The Inupiat retaliated by killing everyone in the Koyukon camp except for two elders and the same two women. Among the Dusun of Borneo, raiders took heads and hands as trophies. An analysis of thirty-five trophy skulls at the village of Sensuron indicated that "much recent head-hunting warfare was directed against the aged, adolescents, and females; at least half of the skulls were female" (Rhys Williams 1965:67). Tribes of the American Southeast also killed women in warfare: in an address to the Choctaw and in talks with other tribes, Shawnee chief Tecumseh advocated for the abandonment of "the Indian custom of killing women and children in war" (Halbert and Ball 1969:44).

Woman Captured Women were often taken as captives in warfare and typically forced to marry their captor or another man in the enemy group. According to Maschner and Reedy-Maschner (2007:39), all Arctic and subarctic forager groups that were involved in warfare took women as war trophies. For example, the hostilities described above between the Koyukon and the Inupiat were spurred by the capture of two women, and in the series of reciprocal revenge raids that ensued, these two women were repeatedly captured by each side (Maschner and Reedy-Maschner 2007:37). The taking of female captives is well-documented throughout the region, from the Tlingit (McClel-

lan 1975a:519, 1975b:202) to the Yellowknife (Gillespie 1981:286; Helm 1981:294), the Aleut (Veniaminov 1984; Lantis 1970), and the Alutiiq (Davydov 1977:188; Osgood 1966:109–113, 183; Oswalt 1979:244–245). This practice was by no means limited to Arctic or subarctic climes. It has also been documented along the Pacific Northwest Coast (de Laguna 1972:583) and in South America and Australia. For example, in a survey of 11 South American tribal societies, Walker and Bailey (2012:32) found that in a total of 131 internal warfare events, 76 women were captured, and in a total of 56 external warfare events, 33 women were captured. According to Chagnon, all Yąnomamö women "fear being abducted by raiders and always leave the village with this anxiety at the back of their minds when their village is at war" (1997:126). Among the Warramunga and Waringari of Australia, enemy women were stolen whenever possible: "If they were able to surprise the enemy camps and kill or drive off the men, they carried away any women they found" (Meggitt 1962:38).

The capture of women is frequently mentioned as a motivation for raiding (e.g., Chagnon 1997; McClellan 1975a, 1975b; Osgood 1970:86). For example, among the Kaska, a primary reason for waging war was "a desire to steal women" (Honigmann 1981:447). Similarly, Wheeler (1910) reports that the motives given for intra- and intergroup fighting among various Aborigine groups across Australia are "women, murder . . . and territorial trespass" (118/139; cited in Gat 2006:21). In a survey of rewards warriors might expect to receive from participating in lethal raiding, female capture was mentioned in 7 out of 20 small-scale societies (Glowacki and Wrangham 2013), and in a tally of motives for killings in South American tribal societies, acquisition of captive women and children accounted for 7% of responses (Walker and Bailey 2012:31).

Capture can affect women's fitness in a number of ways. First, in societies where females have some say in whom they marry, marriage or concubinage by capture circumscribes female mate choice, as does rape. For example, among the Yąnomamö, "A captured woman is raped by all the men in the raiding party and, later, by all the men in the village who wish to do so but did not participate in the raid. She is then given to one of the men as a wife" (Chagnon 1997:190). In societies where parents or other kin have the greater say in whom a girl marries (as is the case in the majority of forager societies; see Apostolou 2007), female capture deprives the girl and her family of a valuable opportunity to expand their social network and reap the associated benefits (for the obvious reason that enemies are not viable exchange partners). For example, the girl and her parents cannot expect to secure marriage partners for her siblings from among her husband's kin. Additionally, a woman may be treated with hostility by her captor's group members, perpetually regarded as an outsider and excluded from the circle of mutual aid that characterizes forager bands. Furthermore, unlike a woman who is freely married to a man from another band, a woman captured by the enemy cannot make periodic visits to her family or call upon them for assistance. Also, when a woman is captured her children are typically left behind; captivity thus terminates her ability to invest in her existing offspring and defend their fitness interests. For a nursing infant, separation from a captured mother means almost certain death. For this

reason, during times of war, Yąnomamö women take their young children with them when they leave the village, "so that if they are abducted, the child's future will not be put in jeopardy because of the separation of the mother" (Chagnon 1997:126). As we will see, this tactic can backfire. Finally, as with death, capture removes a woman from her group and is thus likely to impose fitness costs on any females for whom she provided allomothering assistance.

Offspring Killed As the plight of nursing infants suggests, another potential fitness cost of warfare for women is loss of offspring. Sites such as Kodiak Island, Crow Creek, and Saunaktuk (described above) offer incontrovertible evidence that children were not spared in warfare. This evidence accords with the ethnographic record: children have been documented as victims of warfare across a wide range of forager and foragerhorticulturalist habitats and cultures, from the Amazon Basin (Walker and Bailey 2012) to the Arctic and subarctic (Maschner and Reedy-Maschner 2007) to Southeast Asia (Rhys Williams 1965). This record documents the massacre of entire villages (Burch 1998:99), the taking of children's heads as war trophies (Rhys Williams 1965:67), and the summary killing of the children of women captives. This last practice is described by Helena Valero, a Brazilian woman captured by the Yąnomamö: "Then the men began to kill the children; little ones, bigger ones, they killed many of them. They tried to run away, but they caught them, and threw them on the ground, and struck them with blows which went through their bodies and rooted them to the ground. Taking the smallest by the feet, they beat them against the trees and rocks" (Biocca 1970:36). Children were also lost through capture. For example, along the Pacific Northwest Coast, neighboring tribes were raided for the express purpose of acquiring slaves, with both adults and children being taken (McDowell 1997; Maschner & Reedy Maschner 2007). Capture deprived children of the investment and protection of their close kin and made them vulnerable to victimization by their captors, which in turn could lead to death. For example, Chagnon describes a raid in which a Yąnomamö headman was killed and his ten-year-old son abducted. The boy was later shot by a man who couldn't stand to see the boy persecuted and tormented by the other children (1997:189). Loss of children to capture could be considerable. For example, among the Ache of Paraguay, for all age groups except unweaned children, most "deaths" (including individuals who were captured and never seen again) were caused by raids and warfare, and for infants and children, "being captured accounted for about one-fourth of all 'deaths' to both sexes" (Hill and Hurtado 1996:163).

Mate Killed/Captured The loss of a husband means the loss of an important protector. On this point, we would expect a captured woman's husband to be involved in any attempt to rescue her (this information was noted in the survey; see "Results"). Additionally, the loss of her mate inflicts potentially profound nutritional deficits on both the woman and her dependent offspring. Because in many forager societies men provide the bulk of protein and calories in the diet (Kaplan et al. 2000; cf. Hiatt 1978), the wounding, death, or capture of her mate in warfare is likely to substantially reduce a woman's nutritional intake and that of her offspring. This loss is poignantly expressed

in a !Kung story about woman whose husband is accidentally killed while hunting: "my children grow ugly [thin]. For their father used to bring them good things. They ate fat when their father was alive" (Lewis-Williams 2000:64). Lowered nutrition, in turn, jeopardizes the health of a woman and her children by impairing pathogen resistance.
Adult Male Kin Killed/Captured As with the loss of a mate, the loss of a father, uncles, adult sons, brothers, and/or male cousins (often classificatory brothers) reduces the size of a woman's core support network, which is an important source of protection and provisioning. For example, a Yąnomamö "woman can usually depend on her brothers for protection. They will defend her against a cruel husband. If a man is too severe to a wife, her brothers may take the woman away from him and give her to another man" (Chagnon 1997:125).

The protection afforded a woman by her male kin is attenuated in groups that practice patrilocal marriage, but the frequent between-band visiting characteristic of forager groups goes a long way toward maintaining the bonds of reciprocity between biological kin. The Tareumiut and Nunamiut are a case in point. In their Arctic habitat, resource failures were common, and kin-based assistance was the main coping strategy. Children were taught the names and appropriate kinship terms for all relatives who were obligated to help them and whom they were obligated to help in return. This network encompassed three levels of kinship affiliation: the nuclear family, extended family, and regional group (Minc 1986). Given the degree to which foragers depend on the sharing of large game to manage variance in male hunting returns (Kaplan et al. 2000), the loss of multiple adult males in warfare would potentially compromise the nutritional and health status of all women and dependent offspring in the band, as well as their extended cooperative network.

Results

As Table 2 shows, the majority of the collections (82%) contain a story in which at least one casualty type is referenced. Results are discussed below by casualty.
Woman Killed Stories that referenced the death of at least one woman in warfare occurred in 44% of collections. Given their value as wives, it is surprising how often women are killed rather than captured in warfare. One explanation is that women slow the pace of retreat, thereby making their captors vulnerable to a retaliatory attack before they reach the comparative safety of their home territory. Women may also be killed in order to eliminate the source of future enemy warriors, as among the Mundurucu (Durham 1976). Finally, in some habitats, the killing of enemy women may be an indirect attempt to kill enemy males. This is evinced in the practice by some Arctic and subarctic peoples of killing all the women in a village while the men are away hunting. Survival in such a harsh climate required a two-person team who divided daily life tasks between them; thus, the continued survival of an individual who lost a spouse was uncertain at best. This is reflected in a Nunamiut story in which Kobuk

raiders kill all the Colville River women, and in retaliation, Colville River raiders kill all the Kobuk men. The Colville River men decide to take the Kobuk women as wives: 'We cannot live otherwise, so let us . . . take wives from among the Kobuk people'" (Ingstad 1987:349).

Woman Captured Stories that referenced female capture occurred in 49% of collections. Only actual capture incidents were recorded; stories in which a man unsuccessfully attempted to rape or carry off a woman were not counted. For example, the Yamana tell of an ogre who falls in love with a woman and tries to seduce her. When she rebuffs his advances, he threatens to kill her. He recruits some of his clansmen to attack her, but she successfully defends herself against them (Gusinde 1977:179). Rape was subsumed under the Capture of Woman or Death of Woman category. This is because most women who are captured are forced into marriage or concubinage and, in instances where women are raped but not brought into the tribe, they are usually killed. A case in point is a Netsilik story that tells of two women who are abducted by unspecified Indians while out gathering fuel. The women are taken to the Indian camp, where they are gang raped: "all the men lay with them . . . and performed coition as much as they wished. . . . when they were tired of them they lighted a big fire at the foot of a high cliff. . . . A man seized one of the women and threw her down the cliff so that she fell into the fire" (Rasmussen 1931:126). The second woman meets the same fate.

Oral tradition reveals effects of warfare on women that are largely invisible in the archaeological and ethnographic records. For example, a woman may be treated as an outsider by her captor's group members and excluded from the cooperative network. This predicament is referenced in a story about a Sioux girl captured by a Crow man to replace his daughter who has recently died: "he took this child and returned to Crowland with it. There the man formally adopted the child in place of the lost one, and lavished much affection on her" (Deloria 1932:269). However, the rest of the band was not so kind: they ridiculed her and, when she married, "her sisters-in-law and her mother-in-law continually referred to her as 'that Dakota woman' in an unkind tone" (Deloria 1932:269). When her adoptive father dies, she resolves to return to the Sioux rather than remain an outcast among the Crow for the rest of her life: "Now that the one who befriended me is gone, I shall be more like a captive than ever. I believe I'll go home" (Deloria 1932:269).

Table 2 References to figness costs of warfare for women in forager oral tradition

Culture Group	Woman Killed	Woman Captured	Offspring Killed	Mate Killed or Captured	Male Kin Killed or Captured	At Least 1 Type of Casualty
Mbuti						–
San	X		X	X	X	X
Yukaghir	X		X			X
Ainu	X	X	X	X	X	X
Ngarluma/ Jinji-parndi			X		X	X
Warlpiri			X	X	X	X
Mimika		X		X		X
Nunamiut	X	X	X	X	X	X
Iglulik	X	X	X		X	X
Naskapi						–
Micmac		X	X	X	X	X
Ojibwa						–
Beaver		X				X
Ingalik (Ten'a)						–
Tanaina	X	X	X		X	X
Tlingit	X	X	X	X	X	X
Tsimshian	X		X		X	X
Kwakiutl						–
Nootka						–
Twana	X	X	X	X	X	X
Chinook			X	X	X	X
Coos	X	X	X		X	X
Karok		X	X	X	X	X
Maidu						–
Yokuts		X				X
Tubatulabal			X		X	X
Owens Valley Paiute	X		X		X	X

Table 2 (continued)

Culture Group	Woman Killed	Woman Captured	Offspring Killed	Mate Killed or Captured	Male Kin Killed or Captured	At Least 1 Type of Casualty
Yavapai			X	X	X	X
Klamath	X	X	X	X	X	X
Nez Perce		X				X
Coeur d'Alene	X	X		X	X	X
Thompson	X		X		X	X
Blackfoot	X	X	X			X
Teton				X		X
Crow	X	X	X		X	X
Kiowa		X				X
Menomini		X	X	X	X	X
Jicarilla	X		X	X	X	X
Yanomamo	X		X	X	X	X
Warao			X	X	X	X
Yamana						–
Selknam		X	X	X	X	X
Mataco		X				X
Chamacoco	X		X	X	X	X
Bororo	X	X	X	X	X	X
Total % of Cultures	44.44	48.89	64.44	46.67	62.22	82.22

X indicates presence of fitness cost in at least one story in the collection sampled for that culture.

Offspring Killed Stories that referenced the loss of offspring in warfare occurred in 64% of collections. Immature as well as reproductive-age children were counted because reproductive potential is nullified in both cases. Only deaths were counted, because abducted children were sometimes adopted by their captors and treated as family. However, it is likely that this category underestimates the fitness costs of warfare to women because, as both the ethnographic record and oral tradition indicate, abducted children were at least occasionally killed. One tale, for example, recounts the fate of a group of Indian children taken prisoner by the Iglulik: the latter drove the children "ahead of them towards their village. The Indian children soon grew tired, and started moaning. . . . But every time the Indian children complained, they were struck on the head and killed" (Rasmussen 1929:291). Only two children made it to the village alive.

Offspring may also be lost because of deliberate abandonment by the mother. Women frequently have children by their captors, and when presented with an opportunity to escape, they face an excruciating dilemma: is it better to continue investing

in current offspring fathered by their captor, or abandon them for future reproductive opportunities with a mate of their choosing? Because children impede travel, impose extra energy costs, and, with their crying, increase the odds of detection, escape typically requires that a woman leave her children behind, as illustrated in the story of Atsunve cited above. A Chipewyan story references the same predicament: "Once a woman was stolen by the Eskimo. After she had lived with them for some time and had a child, she went away, taking it with her. . . . The child was very greedy, often eating everything up away from its mother. After a time they came to a large lake where she sat down and cried. . . . 'I am going to leave that greedy boy behind,' she said to herself" (Goddard 1912:52; for a Beaver variant, see Goddard 1916:250). This is another case in which oral tradition lends insight into the fitness costs of warfare.

Mate Killed/Captured Stories that referenced the capture or death of a mate in warfare occurred in 47% of collections. Since either circumstance deprives a woman of her mate's investment, both of these were counted as loss of mate. As noted above, loss of her mate puts a woman's nutritional status and that of her offspring in jeopardy. The anxiety precipitated by this circumstance is reflected in a Dena story about a group of co-wives whose husband is killed by another man. The primary concern of the bereaved women is "who will take the place of their slain husband and get food for them" (de Laguna 1995:313).

The protection afforded by a mate is underscored by captivity narratives. Although some of these stories recount instances in which women are captured while being defended by their husband, in many cases the woman is alone when she is abducted. A common plot involves a woman being captured while she and her husband are camped by themselves and the man is out hunting. A case in point is a Beaver story about a man who "left a large camp in which he had many brothers and camped alone with his wife. As they moved about they came to a large lake that one could not see across and camped by it. One day while he was away, hunting, someone stole his wife" (Goddard 1916:268). The fact that the couple is attacked while camped away from the protection of the group points to a woman's need for multiple male protectors, such as adult male kin (see below).

The protection afforded by mates is also evidenced in rescue narratives. Successful rescue attempts occurred in 20% of collections. In all but one ambiguous case, in which the captured women were rescued by their "relatives" (Ingstad 1987:347), the rescue party was led by the woman's husband. In one of these cases, the husband was accompanied by his brother, and in another he was accompanied by his wife's brothers. In the remaining cases, the husband either mounted the rescue attempt on his own or received assistance from other, unspecified band members.

A further fitness cost is the nutritional stress caused simply by a husband going off to war. Travel to and from an enemy camp can take weeks or even months. For example, after their attack on the Kiowa, the Jicarilla Apache "counted the days it took them to get back. It took them twenty days" (Opler 1938:383). That's a minimum of forty days away from home. While her husband is away, a woman is without a provider for

herself and her offspring. The hardship this imposes is illustrated in an Inuit tale about two cousins, Kumagdlat and Asalok, who travel to the land of the erkileks (Indians) for a raiding spree. Before he leaves, Kumagdlat deposits his wife and mother in an Inuit village, then leaves them to their own devices. The wife moves in with an old bachelor who "had taken her into his house and provided for her, considering her to be a widow" (Rink 1875:115). As this comment suggests, a woman whose husband is on an extended raiding expedition is, in effect, a widow, lacking a provider and protector. When Kumagdlat returns and asks his wife and mother how they have survived, they tell him that the old bachelor has shared his food with them so they wouldn't starve to death. The story makes it clear that this almost certainly would have been their fate: Kumagdlat himself tells his wife and mother that he expected to find them on the verge of starvation.

For Kumagdlat's wife, his return is no less problematic than his absence. Although not explicitly stated, it is clearly understood by all present that the wife and the bachelor have been cohabiting: will Kumagdlat punish them for this? The tension is palpable as Kumagdlat invites the bachelor into his tent to choose a knife from his war booty. Fearing a trap, the bachelor counters by asking that the knife be brought to him. A standoff ensues, with Kumagdlat politely entreating the bachelor to come into his tent and be properly thanked, and the bachelor politely declining his offer:

> Kumagdlat . . . continued calling from within; and now at last the old man just crossed the threshold, saying, "Well, then, let me have the knife" but Kumagdlat still entreated him to come further into the room; and having at length made him sit down, said, "Thou hast provided well for these poor creatures; I thank thee very much, and hope thou wilt accept of these knives," and he offered him two with beautiful handles (Rink 1875:115).

And with that, Kumagdlat reclaims his wife. Because of the male-centered action, it is easy to overlook the finesse with which Kumagdlat's wife manages her fate, but closer scrutiny reveals the diplomatic skills warfare must often have demanded of women. When Kumagdlat asks her how she has managed to survive in his absence, she could tell him the bald truth that she cohabited with the bachelor. Instead, she characterizes their living arrangement as a favor that the older man has done for Kumagdlat so that she would be alive and well when he returned for her: "'the old bachelor has provided for us, that we might not perish from hunger'" (Rink 1875:115).

Adult Male Kin Killed/Captured Stories that referenced the capture or death of adult male kin occurred in 62% of collections. Since either circumstance deprives a woman of male investment, both were counted as loss of adult male kin. As with mates, the protection afforded by adult male kin is vividly illustrated in the abundant stories about women who are captured or killed when men are away from camp. In a Netsilik tale, for example, Indians attack the village while the men are out hunting and kill all the women and children except for two little girls (Rasmussen 1931:123). Similarly,

the Klamath tell of a group of Lake tribe women attacked by a Snake raiding party while their men were away fishing (Gatschet 1890:28).

The protection afforded by adult male kin is also illustrated by rescue narratives in which the woman's brothers, brothers-in-law, or other relatives are named as members of the rescue party (see "Mate Captured/Killed," above). Since only one story per collection was included in the survey, the study results may underestimate the degree to which women are rescued by their close male kin. For example, a Beaver story tells of a man whose "two sisters had been taken by a people who lived at a great distance and he was going to get them back" (Goddard 1916:267). In another Beaver story, a man recruits his wife's brothers to help him rescue his wife: he "told them someone had stolen his wife. He asked them to go with him and help him fight to get her back. They went with him" (Goddard 1916:269). These plots point to the vulnerability of a woman who loses adult male kin in battle: the fewer male protectors she has, the more likely she is to be captured and the less likely she is to be rescued.

Discussion: Suggestions for Further Research

Research to date has proceeded from the premise that coalitional aggression has exerted more selection pressure on men than on women and, accordingly, has focused on ways in which it has shaped male cognition (e.g., Tooby and Cosmides 1988; Wrangham 1999). A case in point is Walker and Bailey's (2012) survey of violent death in 11 indigenous South American societies, in which they found that 69% of victims were males and 31% were females. This, they argue, suggests that the "selective pressure of violence is slightly more than twice as strong on males as it is on females" (2012:31). However, as we have seen here, forager war narratives suggest otherwise. Although fewer females than males suffer violent death, the loss of a male in warfare potentially imposes fitness costs on his female kin (e.g., mother, sister, mate, daughter) through the reduction of male protection and provisioning. Moreover, death is not the only negative fitness effect of lethal raiding on women: the capture of self or offspring can be costly as well. The findings reported here indicate that coalitional violence exerted strong selection pressure on women as well as men, and that female cognition bears examination in terms of this recurrent problem. The following discussion initiates this process by outlining critical assessments women are faced with in the context of lethal raiding.

Determining Enemy Intent Women's high value as reproductive resources means that, to a much greater degree than men, it behooves them to assess the intent of their attackers. For a man, it is a safe assumption that his enemy intends to kill him, but this is not necessarily true for a woman. As Gat frankly observes, "Palaeolithic men were of no use to the enemy. For them, the options were either running away or fighting to the finish. By contrast, women were themselves a resource in competition. They had better chances than the men did to survive the day by submitting, conforming,

co-operating, and manipulating" (2006:81). Thus, we would expect women to have a psychology that weighs the probability of being captured versus killed by an attacker.

Among other things, this requires assessment of one's reproductive value and consideration of one's reproductive state. On the one hand, reproductive-age women are more desirable as captives than post-reproductive women. On the other hand, a visibly pregnant woman is a liability from the aggressor's perspective because he cannot immediately begin producing offspring with her and because she may slow him down on his retreat. If capture is the inferred goal of the attacker, further assessments are necessary: the risk to self of resisting capture, the likelihood of successfully resisting capture, and the probability of escape or rescue if captured. Integral to these calculations is assessment of the attacker's formidability. Tellingly, research shows that women assess male upper body strength (a reliable proxy of fighting strength) from photographs (Sell et al. 2009) and voice recordings (Sell et al. 2010) as accurately as men do, lending credence to the hypothesis that, like men's, women's psychology has been shaped by lethal aggression.

Assessing the risks of resistance versus compliance also requires several knowledge sets, including enemy warfare practices (do they take captives and, if so, do they target a certain demographic, such as women or children?) and treatment of captives (are captives adopted and treated as in-group members, or are they enslaved and brutalized?). Thus, we would expect female as well as male minds to track such information. One prediction that follows from this hypothesis is that, in preliterate societies, this information will be stored in oral tradition. This appears to be the case, as seen in the story (see "Results") about the two Netsilik women who were captured, gang-raped, and killed. Another story tells of a Beaver man who captured and enslaved a woman after killing her husband and son, "causing her to suffer terribly. He used to burn her skin. He killed that old woman too" (Goddard 1916:276). The prediction that women as well as men track such information could be tested by having male and female subjects listen to stories and measuring their retention of the content in question.

If killing rather than capture is the inferred goal of the attacker, another information set comes into play: defensive and evasive tactics known to have been effective for women in past assaults. Again, we would expect women as well as men to track such information and, in preliterate societies, we would expect this information to be stored in oral tradition. References in forager war narratives to tactics deployed specifically by women indicate that this is a promising line of inquiry. For example, an Iglulik story describes the use of smoke by women to impair their attackers' vision: "they [attackers] tore open the windows and stabbed the women to death through the window openings. The women then hit upon the plan of setting fire to their sleeping rugs, and this sent up such a stench and smoke that the Indians could not see" (Iglulik; Rasmussen 1929:290; see also Rasmussen 1931:118). As with treatment of captives, the prediction that women as well as men track information about defensive and evasive tactics could be tested by having subjects listen to stories and measuring retention of the content in question.

Identification/Integration with Enemy Group Once captured, a woman faces the further problem of securing protection and incorporating herself into a cooperative network within a foreign and hostile group. On this view, Stockholm Syndrome may be profitably reexamined in light of the recurrent problem of captive taking in ancestral environments. The term refers to the positive feelings a hostage may develop for his or her captor, which are alleged to increase the victim's chances of survival by motivating acceptance of the situation and thereby reducing attempts to resist the captor (Namnyak et al. 2008). Interestingly, Stockholm Syndrome is not a recognized Mental Subject Heading; no diagnostic criteria have been identified, and there is little evidence suggesting that it is a psychiatric disorder (Namnyak et al. 2008). Nevertheless, a range of case studies indicate that this effect—which McKenzie (2004) more accurately labels the hostage/captor effect (HCE)—is very real. A number of studies have identified conditions associated with its occurrence: physical restraint or confinement, and the threat or actual administration of physical, sexual, and/or emotional abuse (e.g., McKenzie 2004; Namnyak et al. 2008). Significantly, these conditions are also characteristic of captivity in forager and forager-horticulturalist groups. This parallel suggests that HCE may be an evolved strategy for increasing the captive's chances of survival through acute assimilation.

To date, HCE has only been examined in industrialized state societies. This begs the question: is HCE a pan-human phenomenon? Examination of the treatment received by captives taken in lethal raiding and their responses to captivity is critical to answering this question. For example, based on the conditions associated with the occurrence of HCE in modern environments, we can make predictions about environmental cues that might trigger HCE in forager and foragerhorticulturalist environments and then review ethnographic and ethnohistorical accounts of captivity to see whether these cues are present cross-culturally. These cues may include failure/lack of attempts to rescue the captive; extreme vigilance on the part of the captor, his household, and his kin; an imbalance of power favoring the captor's group; great distance and/or prohibitively dangerous terrain between the captive's present location and her home territory; and inclement weather. If HCE is an evolved strategy, we would expect it to be summarily disengaged when the severity of these constraints falls below a critical threshold (with disengagement operationalized as an escape attempt). Cues of reduced constraints might include relaxed vigilance on the part of the captor, his household, and kin; a predictable period of exhaustion and/or unpreparedness on the part of the captor and/or his support network; a predictable period of group dispersal (e.g., when men are away from camp on a hunting trip); travel in the direction of the captive's home territory or signs of the presence of the captive's band members; and weather conditions that enable speedy travel, reduce the likelihood of detection, and/or discourage pursuit.

Another important question is whether there are sex differences in HCE. To the extent that women were more often taken captive than men, we may expect HCE to be more highly developed or more readily triggered in females. In industrialized popu-

lations, HCE has been reported in both men and women, but because comparatively few cases have been documented, it is impossible to resolve this question with any certainty at this point. The answer may be best arrived at through computer simulations of captivity experiences.

Strategic Manipulation of Male Behavior Engaging in warfare can entail fitness benefits as well as costs. For example, a group with a reputation for fierceness may be less likely to be attacked by its neighbors. Consequently, a man's participation in warfare can potentially benefit his mate, offspring, and other dependents by making them less vulnerable to killing or capture by hostile groups. Thus, females stand to benefit from manipulating male participation in lethal aggression. We would therefore expect women's psychology to include mechanisms that (1) calculate the cost/benefit ratio of their male support network engaging the enemy on a given occasion and (2) motivate women to encourage or discourage participation by their male support network accordingly. Encouragement may be effected by praising ferocity and/or disparaging timidity, which has been documented anecdotally in some populations. For example, Yąnomamö women "occasionally goad them [men] into taking action against some possible enemy by caustically accusing the men of cowardice" (Chagnon 1997:126).

We may expect to find this psychology reflected in war narratives, as suggested by a story about a Dakota woman married to a youth who "was very fearful of war, and had an uncontrollable dread whenever he went on the warpath" (Deloria 1932:270). The woman offers to accompany her husband on a raid of the Crow, telling him that, because she speaks the Crow language, "it is just possible that I can help you" (1932:270). When they are attacked by a Crow man during the raid, "the woman rushed up to him and addressed him in Crow. For an instant this disarmed him, and he stopped short; but in that instant the woman's husband went around him and killed him. And from that day on, this young man began to be very successful in battle" (1932:271). We also find examples of women exhorting their protectors to flee rather than fight. A case in point is an Inuit story about a young woman captured by Indians while she and her family are on a fishing trip. When she escapes and returns to her camp, her first words are, "'Let us be off at once and remove to some other place; the inlanders [Indians] are sure to come and seek me here'" (Rink 1875:267). Her exhortations are effective: the story reports that "they at once left the mainland to settle down on one of the farthest-off islets" (1875:267).

These predictions are tentative, and by no means exhaustive, but they point to an aspect of human experience that has been overlooked in the study of our species' evolution. The findings presented here strongly suggest that female cognitive design bears reexamination in terms of the fitness effects of warfare on women.

Acknowledgements

I thank Lawrence Sugiyama, Klaree Boose, and two anonymous reviewers for their helpful insights and suggestions.

References

Apostolou, M. (2007). Sexual selection under parental choice: The role of parents in the evolution of human mating. Evolution and Human Behavior, 28, 403–409.

Batchelor, J. (1924). Ainu fireside stories. Tokyo: Kyobunkwan.

Batchelor, J. (1926). Ainu life and lore. Tokyo: Kyobunkwan.

Biocca, E. (1970). Yanoáma: The narrative of a white girl kidnapped by Amazonian Indians. New York: Dutton.

Bloomfield, L. (1928). Menomini texts. Publications of the American Ethnological Society, Volume XII. New York: G. E. Stechert.

Boas, F. (1894). Chinook texts. Bureau of American Ethnology Bulletin 20. Washington, DC: U.S. Government Printing Office.

Boas, F. (1895). Indian myths & legends from the North Pacific Coast of America. D. Bertz (Trans.). R. Bouchard & D. Kennedy (Eds.). Vancouver, BC: Talon Books

Bogoras, W. (1918). Tales of the Yukaghir, Lamut, and Russianized natives of eastern Siberia. Anthropological Papers of the American Museum of Natural History XX. New York: American Museum Press.

Bowles, S. (2009). Did warfare among ancestral hunter-gatherers affect the evolution of human social behaviors? Science, 324, 1293–1298.

Burch, E. S. (1998). War and trade. In W. Fitzhugh & A. Crowell (Eds.), Crossroads of continents (pp. 227– 240). Washington, DC: Smithsonian Institution Press.

Chagnon, N. (1997). Yãnomamö (5th ed.). Fort Worth TX: Harcourt Brace.

Chapman, J. (1914). Ten'a texts and tales. Publications of the American Ethnological Society, VI. New York: E. J. Brill.

Davydov, G. I. (1977). Two voyages to Russian America, 1802–1807. C. Bearne (Trans). R. A. Pierce (Ed.). Kingston, ON: Limestone Press de Laguna, F. (1972). Under Mount Saint Elias: The history and culture of the Yakutat Tlingit. Parts I, II. Smithsonian Contributions to Anthropology, 7. Washington, DC: Smithsonian Institution Press.

de Laguna, F. (1995). Tales from the Dena. Seattle, WA: University of Washington Press.

Deloria, E. (1932). Dakota texts. Publications of the American Ethnological Society, XIV. New York: G. E. Strechert.

Dixon, R. (1912). Maidu texts. Publications of the American Ethnological Society, IV. Leyden: E. J. Brill.

Durham, W. H. (1976). Resource competition and human aggression, Pt. 1: A review of primitive war. Quarterly Review of Biology, 51, 385–415.
Elmendorf, W. (1993). Twana narratives: Native historical accounts of a Coast Salish culture. Seattle: University of Washington Press.
Gat, A. (2006). War in human civilization. New York: Oxford University Press.
Gatschet, A. (1890). The Klamath Indians of southwestern Oregon. Contributions to North American Ethnology, 2. Washington, DC: U.S. Government Printing Office.
Gayton, A. H., & Newman, S. (1940). Yokuts and Western Mono myths. University of California Publications in Anthropological Records, V (1). Berkeley: University of California Press.
Gifford, E. (1936). Northeastern and Western Yavapai. Publications in American Archaeology and Ethnology, XXXIV (4), 247–354. Berkeley: University of California Press.
Gillespie, B. C. (1981). Yellowknife. In J. Helm (Ed.), Handbook of North American Indians Vol. 6 : Subarctic (pp. 285–290). Washington, DC: Smithsonian Institution Press.
Glowacki, L., & Wrangham, R. (2013). The role of rewards in motivating participation in simple warfare. Human Nature, 24, 444–460.
Goddard, P. (1912). Chipewyan texts. Anthropological Papers of the American Museum of Natural History, X(1), 1–65. New York.
Goddard, P. (1916). The Beaver Indians. Anthropological Papers of the American Museum of Natural History, X(4), 201–292. New York.
Grinnell, G. (1892). Blackfoot lodge tales. Lincoln: University of Nebraska Press.
Gusinde, M. (1975), Folk literature of the Selknam Indians. J. Wilbert (Ed.). Los Angeles: UCLA Latin American Center Publications.
Gusinde, M. (1977). Folk literature of the Yamana Indians. J. Wilbert (Ed.). Berkeley: University of California Press.
Halbert, H., & Ball, T. (1969). The Creek War of 1813 and 1814. Southern Historical Publications 15. Tuscaloosa: University of Alabama Press.
Helm, J. (1981). Dogrib. In J. Helm (Ed.), Handbook of North American Indians, Vol. 6: Subarctic (pp. 291– 309). Washington, DC: Smithsonian Institution Press.
Hewlett, B. (1991). Intimate fathers. Ann Arbor: University of Michigan Press.
Hiatt, B. (1978). Woman the gatherer. In F. Gale (Ed.), Woman's role in Aboriginal society. Canberra: Australian Institute of Aboriginal Studies.
Hill, K., & Hurtado, M. (1996). Ache life history: The ecology and demography of a foraging people. Hawthorne: Aldine de Gruyter.
Honigmann, J. J. (1981). Kaska. In J. Helm (Ed.), Handbook of North American Indians, Vol. 6: Subarctic (pp. 442–550). Washington, DC: Smithsonian Institution Press.
Ingstad, H. (1987). Nunamiut stories. K. Bergsland (Trans. & Ed.). Barrow, AK: The North Slope Borough Commission on Iñupiat History, Language and Culture.

Jacobs, M. (1939). Coos narrative and ethnologic texts. Publications in Anthropology, 8 (1). Seattle: University of Washington.

Jacobs, M. (1940). Coos myth texts. Publications in Anthropology, 8 (2). Seattle: University of Washington.

Jones, W. (1917). Ojibwa texts. Publications of the American Ethnological Society, VII (1). T. Michelson (Ed.). Leyden: E. J. Brill.

Kaplan, H., Hill, K., Lancaster, J., & Hurtado, A. (2000). A theory of human life history evolution: diet, intelligence, and longevity. Evolutionary Anthropology, 9, 156–185.

Konner, M. (2010). The evolution of childhood. Cambridge: Belknap Press.

Kroeber, A., & Gifford, E. (1980). Karok myths. G. Buzaljko (Ed.). Berkeley: University of California Press.

Lantis, M. (1970). The Aleut social system, 1750 to 1810, from early historic sources. In M. Lantis (Ed.), Ethnohistory in southwestern Alaska and the southern Yukon: Method and content. Studies in Anthropology, 7. Lexington: University Press of Kentucky.

LeBlanc, S., & Register, K. (2003). Constant battles: The myth of the peaceful, noble savage. New York: St. Martin's Press.

Lee, R. B., & DeVore, I. (Eds.). (1968). Man the hunter. Chicago: Aldine.

Lewis-Williams, J. D. (Ed.). (2000). Stories that float from afar. College Station: Texas A&M University Press.

Lowie, R. (1918). Myths and traditions of the Crow Indians. Anthropological Papers of the American Museum of Natural History, XXV (1). New: York.

Manson, J. H., & Wrangham, R. W. (1991). Intergroup aggression in chimpanzees and humans. Current Anthropology, 32(4), 369–390.

Marlowe, F. (2005). Hunter-gatherers and human evolution. Evolutionary Anthropology, 14, 54–67.

Maschner, H., & Reedy-Maschner, K. (2007). Heads, women, and the baubles of prestige: Trophies of war in the Arctic and Subarctic. In R. Chacon & D. Dye (Eds.), The taking and displaying of human body parts as trophies by Amerindians (pp. 32–43). New York: Springer.

McClellan, C. (1975a). My old people say: an ethnographic survey of southern Yukon Territory, Part 2. Publications in Ethnology 6(2). Ottawa: National Museum of Canada.

McClellan, C. (1975b). Feuding and warfare among Northwestern Athapaskans. In A. M. Clark (Ed.), Proceedings of the Northern Athapaskan Conference. 1971, Vol. 1 (pp. 181–258). Canadian Ethnology Service Paper 27. Ottawa: National Museums of Canada

McDowell, J. (1997). Hamatsa: The enigma of cannibalism on the Pacific Northwest Coast. Vancouver, BC: Ronsdale Press.

McKenzie, I. (2004). The Stockholm syndrome revisited: Hostages, relationships, prediction, control and psychological science. Journal of Police Crisis Negotiations, 4, 5–21.

Meggitt, M. J. (1962). Desert people: A study of the Walbiri Aborigines of Central Australia. Chicago: University of Chicago Press.

Melbye, J., & Fairgrieve, S. (1994). A massacre and possible cannibalism in the Canadian Arctic: New evidence from the Saunaktuk site (NgTn-1). Arctic Anthropology, 31, 57–77.

Millman, L. (1993). Wolverine creates the world: Labrador Indian tales. Santa Barbara: Capra Press.

Minc, L. (1986). Scarcity and survival: The role of oral tradition in mediating subsistence crises. Journal of Anthropological Archaeology, 5, 39–113.

Murdock, G. (1967). Ethnographic atlas. Pittsburgh: University of Pittsburgh Press.

Namnyak, M., Tufton, N., Szekely, R., Toal, M., Worboys, S., & Sampson, E. L. (2008). "Stockholm syndrome": psychiatric diagnosis or urban myth? Acta Psychiatrica Scandinavica, 117, 4–11.

Offenberg, G., & Pouwer, J. (2002). Amoko: Myths & legends of the Asmat and Mimika Papuans. Belair SA: Crawford House.

Opler, M. (1938). Myths and tales of the Jicarilla Apache Indians. New York: American Folklore Society.

Osgood, C. (1966). The ethnography of the Tanaina. Yale University Publications in Anthropology, 16. Reprinted by Human Relations Area Files Press, New Heaven.

Osgood, C. (1970). Contributions to the ethnography of the Kutchin. Yale University Publications in Anthropology, 14. Reprinted by Human Relations Area Files Press from the 1936 edition.

Oswalt, W. (1979). Eskimos and explorers. Novato, CA: Chandler and Sharp.

Parsons, E. C. (1929). Kiowa tales. New York: American Folk-Lore Society.

Rand, S. (1894). Legends of the Micmacs. New York: Longmans, Green.

Rasmussen, K. (1929). Intellectual culture of the Iglulik Eskimos. Report of the 5th Thule Expedition 1921–24, Vol. VII(1). Copenhagen: Gyldendalske Boghandel, Nordisk Forlag.

Rasmussen, K. (1931). The Netsilik Eskimos: Social life and spiritual culture. Report of the 5th Thule Expedition 1921–24, Vol. VIII(1–2). Copenhagen: Gyldendalske Boghandel, Nordisk Forlag.

Reichard, G. (1947). An analysis of Coeur D'Alene Indian myths. Philadelphia: American Folklore Society.

Rink, H. (1875). Tales and traditions of the Eskimo. (1997 reprint edition) Mineola, NY: Dover.

Rhys Williams, T. (1965). The Dusun: A North Borneo society. New York: Holt, Rinehart and Winston.

Rockman, P., & Cataldi, L. (1994). Warlpiri dreamings and histories. San Francisco: HarperCollins.

Sapir, E., & Swadesh, M. (1939). Nootka texts. Philadelphia: University of Pennsylvania.

Sell, A., Cosmides, L., Tooby, J., Sznycer, D., von Rueden, C., & Gurven, M. (2009). Human adaptations for the visual assessment of strength and fighting ability from the body and face. Proceedings of the Royal Society B, 276, 575–584.

Sell, A., Bryant, G., Cosmides, L., Tooby, J., Sznycer, D., von Rueden, C., Krauss, A., & Gurven, M. (2010). Adaptations in humans for assessing physical strength from the voice. Proceedings of the Royal Society B, 277, 3509–3518.

Simon, J., & Steffian, A. (1994). Cannibalism or complex mortuary behavior? In T. Bray & T. Killion (Eds.), Reckoning with the dead (pp. 75–100). Washington, DC: Smithsonian Institution Press.

Slobodin, R. (1971). Without fire: A Kutchin tale of warfare, survival and vengeance. In A. M. Clark (Ed.), Proceedings of the Northern Athapaskan Conference. 1971, Vol. 1 (pp. 259–301). Ottawa: National Museums of Canada.

Spinden, H. (1917). Nez Perce tales. Memoirs of the American Folk-Lore Society, XI, pp. 180–201. Lancaster, PA: American Folk-Lore Society.

Steward, J. (1936). Myths of the Owens Valley Paiute. University of California Publications in American Archaeology and Ethnology, 34(5), 355–439. Berkeley: University of California Press.

Swanton, J. (1909). Tlingit myths and texts. Bureau of American Ethnology Bulletin, 39, 1–451. Washington, DC: U.S. Government Printing Office.

Teit, J. (1898). Traditions of the Thompson River Indians of British Columbia. Boston: Houghton, Mifflin.

Tenenbaum, J. & McGary, M. J. (1984). Dena'ina sukdu'a: Traditional stories of the Tanaina Athabaskans. Fairbanks: Alaska Native Language Center, University of Alaska

Tonkinson, R. (1978). The Mardudjara Aborigines: Living the dream in Australia's desert. New York: Holt, Rinehart & Winston.

Tooby, J. & Cosmides, L. (1988). The evolution of war and its cognitive foundations. Institute for Evolutionary Studies Technical Report #88-1.

Turnbull, C. (1959). Legends of the BaMbuti. Journal of the Royal Anthropological Institute of Great Britain and Ireland, 89(1), 45–60.

Veniaminov, I. (1984). Notes on the islands of the Unalaska District [1840]. L. Black & R. H. Goeghega (Trans.). R. A. Pierce (Ed.). Alaska History 27. Kingston, ON: Limestone Press.

Vogelin, C. F. (1935). Tübatulabal texts. Berkeley: University of California Press.

von Brandenstein, C. G. (1970). Narratives from the north-west of Western Australia, 2 vols. Canberra: Australian Institute of Aboriginal Studies.

Walker, P. (1990). Tool marks on human bone from Saunaktuk. Appendix 5 in Archaeological Investigations at Saunaktuk, by Charles D. Arnold. Ms. Yellowknife: Prince of Wales Northern Heritage Center.

Walker, R., & Bailey, D. (2012). Body counts in lowland South American violence. Evolution and Human Behavior, 34, 29–34.
Wheeler, G. (1910). The tribe and intertribal relations in Australia. London: John Murray.
Wilbert, J. (1964). Warao oral literature. Caracas: Editorial Sucre.
Wilbert, J., & Simoneau, K. (Eds.). (1982). Folk literature of the Mataco Indians. Los Angeles: University of California.
Wilbert, J., & Simoneau, K. (Eds.). (1983). Folk literature of the Bororo Indians. Los Angeles: University of California.
Wilbert, J., & Simoneau, K. (Eds.). (1987). Folk literature of the Chamacoco Indians. Los Angeles: University of California.
Wilbert, J., & Simoneau, K. (Eds.). (1990). Folk literature of the Yanomami Indians. Los Angeles: University of California.
Wrangham, R. W. (1999). Evolution of coalitionary killing. Yearbook of Physical Anthropology, 42, 1–39.

Michelle Scalise Sugiyama is a member of the Department of Anthropology and the Institute of Cognitive and Decision Sciences at the University of Oregon. Her research explores the role that storytelling played in human evolution by examining recurrent themes in forager oral tradition, the information demands of forager life, and the cognitive capacities that scaffold narrative processing and storytelling. She also examines crosscultural patterns in story content to formulate and test hypotheses about human cognitive architecture.

Michelle Scalise Sugiyama
Fitness Costs of Warfare for Women
4 November 2014

Hum Nat (2014) 25:476–495. DOI 10.1007/s12110-014-9216-1
Author's contact: Department of Anthropology and Institute of Cognitive and Decision Sciences, University of Oregon, Eugene, OR 97403, USA
e-mail: mscalise@uoregon.edu