Towards a Broader View of Hunter-Gatherer Sharing

Edited by Noa Lavi & David E. Friesem
Towards a Broader View of Hunter-Gatherer Sharing
Towards a Broader View of Hunter-Gatherer Sharing

Edited by Noa Lavi & David E. Friesem

With contributions by
Olga Yu. Artemova, Ran Barkai, Nurit Bird-David, Adam H. Boyette,
Hillary N. Fouts, David E. Friesem, Peter M. Gardner, Barry S. Hewlett,
Robert K. Hitchcock, Emmanuelle Honoré, Jean Hudson, Robert L. Kelly,
Noa Lavi, Jerome Lewis, Sheina Lew-Levy, Alan J. Osborn, Spencer R. Pelton,
Magalie Quintal-Marineau, Erick Robinson, Kenneth Sillander, Penny Spikins,
Gilbert B. Tostevin, Bram Tucker, George Wenzel & Thomas Widlok
This book was funded by the EU 7th Framework Programme (7FP), TropicMicroArch 623293 Project (http://cordis.europa.eu/project/rcn/187754_en.html). The book will be Open Access, thanks to FP7 post-grant Open Access (https://www.openaire.eu/postgrantoapilot).

Published by:
McDonald Institute for Archaeological Research
University of Cambridge
Downing Street
Cambridge, UK
CB2 3ER
(0)(1223) 339327
ej31@cam.ac.uk
www.mcdonald.cam.ac.uk

© 2019 McDonald Institute for Archaeological Research.
Towards a broader view of hunter-gatherer sharing is made available under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 (International) Licence:
https://creativecommons.org/licenses/by-nc-nd/4.0/


Cover design by Dora Kemp and Ben Plumridge.
Typesetting and layout by Ben Plumridge.

On the cover: Sharing space and selves among Nayaka people in South India. Image taken and processed by D.E. Friesem and N. Lavi.

Edited for the Institute by James Barrett (Series Editor).
Contents

Contributors ix
Figures xi
Tables xi
Acknowledgements xiii

Introduction  Noa Lavi & David E. Friesem 1
Why hunter-gatherers? Why sharing? 1
About the book 4
Innovative perspectives of sharing: chapters outline 5
Concluding remarks 9

Part I  Intimacy, presence and shared-living

Chapter 1  Where have all the kin gone? On hunter-gatherers’ sharing, kinship and scale 15
Nurit Bird David
The unscalability of kinship identities 17
Enter individuals 18
Kinship as a root metaphor 19
Demand-sharing constitutes social relations 20
Re-enter kinship, talk and presence 21
Conclusions 22

Chapter 2  Extending and limiting selves: a processual theory of sharing 25
Thomas Widlok
What is wrong with evolutionary models of sharing? 25
The problem of historical diversity 26
The problem of outcome 27
Extending the self 28
Limiting the self 30
The analytical purchase of the new theories of sharing 32
The opportunity to request 32
The opportunity to respond 34
The opportunity to renounce 34
Conclusions 36

Chapter 3  Intimate living: sharing space among Aka and other hunter-gatherers 39
Barry S. Hewlett, Jean Hudson, Adam H. Boyette & Hillary N. Fouts
Density of households: Sharing space in settlements 40
Sharing space in a home 42
Sharing space in a bed 44
Sharing interpersonal space: touching 45
Hypothetical implications of intimate living 49
Summary and conclusion 52

Chapter 4  Sharing and inclusion: generosity, trust and response to vulnerability in the distant past 57
Penny Spikins
Sharing in an evolutionary perspective 58
Sharing and care for injury and illness in the distant past 60
Sharing, tolerance and diversity 61
Contrasting emotional schemas – sharing through generosity and calculated collaboration 64
Conclusions 66
Chapter 5  The demand for closeness: social incentives for sharing among hunter-gatherers and other groups
Kenneth Sillander  71
Open aggregation  72
Relatedness  77
Conclusion  81

Chapter 6  An ethnoarchaeological view on hunter-gatherer sharing and its archaeological implications for the use of social space
David E. Friesem & Noa Lavi  85
Ethnoarchaeology of hunter-gatherer use of space  86
Social dynamics and their archaeological implications  86
Archaeological implications  90
Concluding remarks  93

Part II  Senses of connectedness beyond the horizons of the local group

Chapter 7  Sharing pleasures to share rare things: hunter-gatherers’ dual distribution systems in Africa
Jerome Lewis  99
Pygmies today  99
BaYaka cultural area  100
BaYaka egalitarianism and demand sharing  101
What is not shared on demand  102
Economies of joy  104
The regional economy and contemporary change  105
A dual economy  106
Hunter-gatherers’ dual economic systems  106
Conclusion  108

Chapter 8  The archaeology of sharing immaterial things: social gatherings and the making of collective identities amongst Eastern Saharan last hunter-gatherer groups
Emmanuelle Honoré  113
The concept and the practice of sharing in archaeology  113
Sharing: an ambivalent concept  113
Approaching the sharing of immaterial things in archaeology  115
Interaction and the making of social existences by sharing performances  115
Group cohesion and the different forms of sharing  118
Conclusion  119

Chapter 9  Information sharing in times of scarcity: an ethnographic and archaeological examination of drought strategies in the Kalahari Desert and the central plains of North America
Alan J. Osborn & Robert K. Hitchcock  123
Beads, adornment and information  124
Behavioural ecology and signalling theory  125
Beads and ethnohistory: the Kalahari Desert of Southern Africa  126
Beads and archaeology in the North American Great Plains  132
Discussion and conclusions  135

Chapter 10  Studying sharing from the archaeological record: problems and potential of scale
Robert L. Kelly, Spencer R. Pelton & Erick Robinson  143
Archaeological studies of sharing  144
Sharing in the prehistory of Wyoming, USA  147
Conclusions  150
Chapter 11  An elephant to share: rethinking the origins of meat and fat sharing in Palaeolithic societies
Ran Barkai
Thoughts about sharing 154
Becoming an elephant/mammoth 157
The origins of fat and meat sharing in the Palaeolithic 161
Endnote 163

Part III  Learning and sharing of knowledge

Chapter 12  Identifying variation in cultural models of resource sharing between hunter-gatherers and farmers: a multi-method, cognitive approach
Adam H. Boyette & Sheina Lew-Levy
Sharing in forager and farmer thought 172
Sharing and early life experiences 173
Evolutionary approaches to resource sharing 173
Ethnographic setting 174
Hypotheses and qualitative predictions 175
Methods 175
Results 177
Discussion 180
Conclusion 182

Chapter 13  Foragers with limited shared knowledge
Peter M. Gardner
Actual learning processes 186
The challenge of cognitive diversity 189
Evidentiary criteria for knowledge claims 190
Closing thoughts 191

Chapter 14  The sharing of lithic technological knowledge
Gilbert B. Tostevin
Framing the question 195
Why should one share flintknapping knowledge? 197
But to what extent can one share one’s flintknapping knowledge? 198
The importance of the tactical vs. strategic knowledge distinction for the experimental investigation of the sharing of flintknapping knowledge 199
What does it mean to share flintknapping knowledge? 201
Sharing space 201
Sharing time 202
Conclusion: how do we test our assumptions about when a given lithic technology must have been shared? 203

Part IV  Sharing in times of change

Chapter 15  Men hunt, women share: gender and contemporary Inuit subsistence relations
Magalie Quintal-Marineau & George W. Wenzel
Methods 211
Ningiqtuq: the traditional sharing system 211
Women, the mixed economy, sharing and subsistence 213
Discussion 217
Postscript 218
Chapter 16  The pure hunter is the poor hunter?  
Olga Yu. Artemova
Preliminary notes 221
Twists of fate 223
‘Absolutely tribal people’ 226
There is no other way 227
‘That’s enough for me’ 227
‘We cannot be like them’ 228
When generosity is stressed 229
Retrospect 231

Chapter 17  Ecological, historical and social explanations for low rates of food sharing among Mikea foragers of southwest Madagascar  
Bram Tucker
Mikea of Madagascar 239
Mikea food sharing 239
Why Mikea rarely share, explanation 1: culture history and property relations 241
Why Mikea rarely share, explanation 2: competitive self-interest 242
Why Mikea rarely share, explanation 3: social exchange 244
Conclusions 245
Contributors

Olga Yu. Artemova
Institute of Ethnology and Anthropology, Russian Academy of Sciences, 119991, Leninsky prospect 32a, Moscow, Russia.
Email: artemova.olga@list.ru

Ran Barkai
Department of Archaeology and Near Eastern Cultures, Tel-Aviv University, Tel-Aviv, 69978, Israel.
Email: barkaran205@gmail.com

Nurit Bird-David
Department of Anthropology, University of Haifa, Mt. Carmel, 31905 Haifa, Israel.
Email: n.bird@soc.haifa.ac.il

Adam H. Boyette
Max Planck Institute for Evolutionary Anthropology, Department of Human Behavior, Evolution, and Culture, Deutscher Platz 6, 04103 Leipzig, Germany.
Email: adam_boyette@eva.mpg.de

Hillary N. Fouts
Department of Child and Family Studies, University of Tennessee, Jessie W. Harris Building, Knoxville, TN 37996, USA.
Email: hfouts@utk.edu

David E. Friesem
McDonald Institute for Archaeological Research, University of Cambridge, Downing Site, CB2 3ER, Cambridge, UK.
Email: df360@cam.ac.uk

Peter M. Gardner
Department of Anthropology, University of Missouri, 112 Swallow Hall, Columbia, MO 65211, USA.
Email: GardenerP@missouri.edu

Barry S. Hewlett
Department of Anthropology, Washington State University, Vancouver, WA 98686, USA.
Email: hewlett@wsu.edu

Robert K. Hitchcock
Department of Anthropology, University of New Mexico, MSC01 1040, Albuquerque, NM 87131-0001 USA.
Email: rhitchcock@unm.edu

Emmanuelle Honoré
McDonald Institute for Archaeological Research, Downing Street, CB2 3ER Cambridge, UK.
Email: eigh2@cam.ac.uk

Jean Hudson
Department of Anthropology, University of Wisconsin, Milwaukee, 3413 N. Downer Ave. Sabin Hall 390, Milwaukee, WI 53211, USA.
Email: jhudson@uwm.edu

Robert L. Kelly
Department of Anthropology, University of Wyoming, Laramie, WY 82071, USA.
Email: RLKELLY@uwyo.edu

Noa Lavi
Department of Anthropology, University of Haifa, Mt. Carmel, 31905, Haifa, Israel.
Email: noalaviw@gmail.com

Jerome Lewis
Department of Anthropology, University College London, 14 Taviton Street, WC1H 0BW London, UK.
Email: Jerome.lewis@ucl.ac.uk

Sheina Lew-Levy
Department of Psychology, Robert C. Brown Hall RCB 5246, Simon Fraser University, 8888 University Drive, Burnaby, BC V5A 1S6 Canada.
Email: sheinalewlevy@gmail.com

Alan J. Osborn
Department of Sociology and Anthropology, University of Nebraska-Omaha, 383G ASH, Omaha, NE 68182 USA.
Email: aosborn2@unomaha.edu

Spencer R. Pelton
Transcom Environmental, 331 N. 3rd St., Douglas, WY 82633, USA.
Email: spencerpelton@gmail.com
Magalie Quintal-Marineau  
Centre Urbanisation Culture Société, Institut national de la recherche scientifique 385 Sherbrooke Street E., Montreal, Canada H2X 1E3.  
Email: magalie.quintalm@ucs.inrs.ca

Erick Robinson  
Department of Sociology, Social Work, and Anthropology, Utah State University, 0730 Old Main Hill, Logan, Utah 84322-0730, USA.  
Email: Erick.Robinson@usu.edu

Kenneth Sillander  
Swedish School of Social Science, University of Helsinki, P.O.Box 16, 00014 Helsinki, Finland.  
Email: kenneth.sillander@helsinki.fi

Penny Spikins  
Archaeology PalaeoHub, University of York, Wentworth Way, Heslington. York YO10 5DD, UK.  
Email: penny.spikins@york.ac.uk

Gilbert B. Tostevin  
Department of Anthropology, University of Minnesota, 395 H.H. Humphrey Center, 301 19th Ave. S Minneapolis, MN 55455, USA.  
Email: toste003@umn.edu

Bram Tucker  
Department of Anthropology, University of Georgia, Athens, GA 30602 USA.  
Email: bramtuck@uga.edu

George Wenzel  
Department of Geography, McGill University, 805 Sherbrooke Street W., Montreal, Canada H3A 0B9.  
Email: george.wenzel@mcgill.ca

Thomas Widlok  
African Studies, University of Cologne, Albertus-Magnus-Platz, 50923 Köln, Germany.  
Email: thomas.widlok@uni-koeln.de
Figures

2.1. The waves of sharing. 28
2.2. Screenshots from a field video documenting sharing among *Akhoe Hai/om. 29
2.3. Small foraging camp of a *Akhoe Hai/om person in the north of Namibia. 33
2.4. An Owarebo agro-pastoralist homestead in northern Namibia. 33
2.5. Advertisement for a gated community in Nairobi, Kenya (2015). 33
2.6. *Akhoe Hai/om burial ground. 36
2.7. *Aonin Nama burial ground. 36
3.1. Four people co-sleep on an Aka bed. 45
3.2. Percentage of time forager and farmer infants, children and adolescents are held or touched during the day. 47
3.3. Feedback loops between intimate shared spaces and other forms of sharing. 53
4.1. Significant cognitive-emotional capacities involved in sharing in mobile hunter-gatherer contexts. 58
4.2. Evolutionary pressures, motivations to share and sharing behaviours in early humans. 59
4.3. Example of an embedded figures test. 62
4.4. Example of portable art showing embedded figures (or overlapping forms). 63
4.5. Examples of embedded forms (or overlapping figures) in parietal art. 64
4.6. Contrasting internal working models and social behaviour between sharing through generosity and calculated collaboration. 65
8.1. The sharing of material things (dividing) and the sharing of immaterial things (multiplying). 114
8.2. Location map and general view of Wadi Sūra II, Eastern Sahara. 116
8.3. The central panel of Wadi Sūra II paintings. 116
8.4. A group of human figures depicted with bent legs in the rock art of Wadi Sūra II. 117
8.5. Human figures in a row at Wadi Sūra II. 117
8.6. A row of human figures holding possible musical instruments at Wadi Sūra II. 117
9.1. Interpretive framework for understanding the interrelationships between social recognition and quality signals. 126
9.2. Distribution of San language groups in southern Africa. 128
9.4. Tubular bone beads from the Felis Concolor Site (25SM20) in central Nebraska. 132
9.5. Spatial distribution of sites with tubular bone beads in the Central Plains of North America. 133
9.6. Temporal distribution of sites with tubular bone beads in the Central Plains of North America. 134
10.1. The Winterhalder-Kelly model of sharing relations between groups of foragers. 146
10.2. Radiocarbon dates, groundstone, nearest neighbor, and obsidian distance for the study area. 148
11.1. An Acheulean flint biface from Lower Paleolithic Revadim site, Israel. 157
11.2. An experiment in using flint handaxes in butchering operations. 159
11.3. A biface made on an elephant bone from the site of Fontana Ranuccio. 160
12.1. Box plot of cultural competency scores for Aka and Ngandu men and women. 177
14.1. The relationship between equipfinality and the likelihood of accurate reverse engineering of core reduction processes. 204
15.1. Country food consumption and financial support to harvesting activities. 216
16.1. Map of Australia. 224
16.2. Phillis Yankaporta throws the cast net. 225
16.3. Lucky family. 225
16.4. The interior of an Aurukun house. 229
16.5. The children of Aurukun. 230
17.1. Map of the forest camp of Belò in 1998, showing households clustered by space and kinship. 240

Tables

3.1. Measures of settlement density in five forager groups. 41
3.2. Average nearest neighbour in forager groups with data. 41
3.3. Average size and space per person in Aka and Efe homes. 43
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.4.</td>
<td>Comparison of space per person in a typical household of mobile hunter-gatherers and farmers.</td>
</tr>
<tr>
<td>3.5.</td>
<td>Average home size and living area per person in developed countries.</td>
</tr>
<tr>
<td>3.6.</td>
<td>Average space per person in a bed among Aka hunter-gatherers and Ngandu farmers.</td>
</tr>
<tr>
<td>3.7.</td>
<td>Infant holding and other measures of caregiver sensitivity.</td>
</tr>
<tr>
<td>3.8.</td>
<td>Percentage of time intervals G/wi adults touched or were within proximity of other males and females in the camp setting during daylight hours.</td>
</tr>
<tr>
<td>3.9.</td>
<td>Percentage of time G/wi adolescents touched or were within proximity of other males and females in the camp setting during daylight hours.</td>
</tr>
<tr>
<td>3.10.</td>
<td>Husband-wife co-sleeping in hunter-gatherers versus other modes of production.</td>
</tr>
<tr>
<td>3.11.</td>
<td>Average frequency of sex per week among married couples in three age groups among Aka foragers, Ngandu farmers and U.S. middle-class market economists.</td>
</tr>
<tr>
<td>7.1.</td>
<td>Southern Mbendjele mokondi massana (spirit plays) organised according to context of use.</td>
</tr>
<tr>
<td>9.1.</td>
<td>Late Stone Age and recent forager sites in the Kalahari that have evidence of ostrich eggshell beads.</td>
</tr>
<tr>
<td>9.2.</td>
<td>Iron Age sites in the Kalahari Desert region of Botswana with ostrich eggshell beads.</td>
</tr>
<tr>
<td>9.3.</td>
<td>Evidence for severe droughts on the plateau of southern Africa during the Iron Age Interpretive framework for understanding the interrelationships between social recognition and quality signals.</td>
</tr>
<tr>
<td>10.1.</td>
<td>Obsidian Frequencies by Wyoming County and Time Period.</td>
</tr>
<tr>
<td>12.1.</td>
<td>Interview questions and associated hypothetical domain.</td>
</tr>
<tr>
<td>12.2.</td>
<td>Percent of forced-choice responses by ethnicity and domain.</td>
</tr>
<tr>
<td>12.3.</td>
<td>Rankings of responses to the question: who teaches children to share?</td>
</tr>
<tr>
<td>12.4.</td>
<td>Rankings of responses to the question: Who do children share food with?</td>
</tr>
<tr>
<td>12.5.</td>
<td>Ranking of responses to the question: Who do children share non-food items with?</td>
</tr>
<tr>
<td>15.1.</td>
<td>Ningiqtuq/sharing interaction sets in the Inuit social economy.</td>
</tr>
<tr>
<td>17.1.</td>
<td>Percent of different foods given away to other households among Mikea and Ache foragers.</td>
</tr>
<tr>
<td>17.2.</td>
<td>Mikea foods and the predictions of the marginal utility model of tolerated theft.</td>
</tr>
</tbody>
</table>
Acknowledgements

First and above all, we wish to express on behalf of all the authors of this monograph our deepest gratitude to the people and communities with whom each of us worked and shared experiences. Without their sharing of selves, thoughts, actions, space and time, the studies presented here could not be possible. We are grateful for their help and trust and hope this volume will promote better understanding of their unique ways of sharing as they see it.

This monograph is a result of a conference we organized at the McDonald Institute for Archaeological Research at the University of Cambridge on ‘Sharing among hunter-gatherers’, which aimed to promote a wider notion of sharing. We are especially indebted to Nurit Bird-David and Peter Gardner for being our source of inspiration for the theme of this conference and for their endless support and encouragement along the road. We also thank Jerome Lewis who was extremely supportive and helpful in making the conference both attractive and successful.

A number of people at the McDonald Institute for Archaeological Research formed an important and essential part of the conference and we are grateful to all of them. Especially, to Emma Jarman and Laura Cousins, who were there from the beginning and made every request and need possible and simple. To Cyprian Broodbank and Simon Stoddart for their institutional support. To Patricia Murray, Luc Moreau, Emily Hallinan, Emmanuelle Honoré, Tanja Hoffmann, Cynthia Larbey and Laure Bonner, who made sure everything went smoothly and professionally. The success of the conference was truly thanks to them.

The publication of this monograph owes much to the work of those involved in the McDonald Conversations Series and we are very thankful to James Barrett for his support, help and advice and to Ben Plumridge for his editing and typesetting work. We are also grateful for the anonymous reviewers who helped us improve each chapter and the monograph as a whole. Thanks too to Elizaveta Friesem for her help and invaluable comments on earlier versions of the text.

The conference and the monograph were funded by the McDonald Institute for Archaeological Research, the University of Cambridge and the People Programme (Marie Curie Actions) of the European Union’s Seventh Framework Programme (FP7/2007-2013) under REA agreement no. 623293 (granted to D.E.F.). OpenAIRE, the European Research Council FP7 post-grant OA publishing fund, contributed to the open-access publication of the monograph.

Lastly, we would like to thank all the people who took part in the conference and the writing of this monograph for imparting their knowledge, experiences and thoughts, giving their time and helping us to promote a better and more holistic understanding of the core social notion and practice of sharing.

Noa Lavi & David E. Friesem,
Cambridge, October 2019
Anthropologists and archaeologists interested in hunter-gatherers have given a great deal of attention to technology, subsistence, and social organization but less to information and information sharing (e.g. Binford 2001; Crothers 2004; Damas 1969; Kent 1996; Leacock & Lee 1982; Lee & Daly 1999; Lee & DeVore 1968; Panter-Brick et al. 2001). There are, however, notable exceptions to this generalization (e.g. Barton et al. 1994; Conkey 1978; Moore 1981; Whallon 2006; Whallon et al. 2011; Wobst 1977).

All sentient organisms receive a diverse array of information from their surroundings, and they possess multiple means for conveying information to other individuals. Animals are able to transmit information via calls, displays, and formalized interactions as well as by means of phenotypic features (e.g. horns, antlers, ruffs, colourful plumage, and so forth; see Smith 1977). Among humans, information or knowledge can be transmitted verbally or non-verbally via real time conversations, displays, dance, ritualized behaviour, and body adornment. In addition, information may be exchanged indirectly via petroglyphs, pictographs, message sticks, and portable ‘art’. We propose that human communication is information sharing and operates at two levels. First, effective verbal and visual communication requires that both senders and receivers share underlying coded systems and conventions. Second, both direct and indirect human interactions convey shared information that ultimately alters the behaviour of the receiver(s) in the short- and long-term.

Human body modification (e.g. tattooing, scarification, cranial deformation, neck rings, and dental inlays) and body adornment can be viewed as a behavioural means to physically alter and/or enhance our phenotype in order to communicate or transmit supplemental information about ones physical and social status. Clothing (including belts, headbands, and accessories), hair styles, jewelry, and body pigments provide additional information in various arenas of social interaction. Human communication involving these various forms of information exchange can only be effective if senders and receivers share underlying coding systems and conventions.

In the fall of 2016, the McDonald Institute for Archaeological Research at Cambridge University held a conference titled SHARING: The Archaeology and Anthropology of Hunter-Gatherers. This conference was meant to encourage archaeologists and anthropologists to collaborate in their studies of sharing behaviour among hunter-gatherers. Such collaboration has perhaps occurred more frequently in North America, particularly in the Great Plains, the American Southwest, and the Great Basin where the boundary between past and present indigenous people is less distinct as compared to other regions of the world (e.g. Eggan 1952; Steward 1938; Wedel 1938). For example, Julian Steward conducted extensive ethnographic fieldwork among Paiute and Shoshoni hunter-gatherers in the Basin-Plateau region of North America (1938). His model of hunter-gatherer land use was re-examined by David Hurst Thomas using archaeological survey and excavation data (Thomas 1969, 1971, 1972). More recently, Lewis R. Binford’s (2001) extensive research regarding modern hunter-gatherers of the world has resulted in a number of archaeological studies to test his empirically generated expectations (Johnson 2008; Johnson 2013; Johnson & Hard 2008; Johnson et al. 2014).

It should be noted that sharing is done at various levels among hunter-gatherers, pastoralists and farmers. At the camp level, sharing of food, such as the meat of larger animals, is done with relatives and friends who are present. This sharing is often directly and is not necessarily always seen as gift-exchange or requiring of reciprocity. Much of this sharing is done discreetly, not openly. Foraging peoples such as the Ju/'hoansi San gave gifts of food in order to reinforce...
friends and to reduce risk (Marshall 1961, 1976, 295–303; Wiessner 1977). These exchanges occur both at the camp and regional level. A specific example of food sharing at the regional level can be seen in the case of elephants which are sometimes killed by hunters who then request local community members from a number of different places to come to the kill site to help in the processing and to get some of the meat and other products (for a comparable discussion, see Barkai, this volume).

Networks of sharing relationships exist both within and between camps. As Jiro Tanaka points out about sharing among the G/uit and G//ana San of the Central Kalahari, Botswana,

> Food is shared equitably among those who are present [in the camp] and relieves all of them, not just certain members, from hunger. … They share ‘as a matter of course’ Tanaka 2014, 87).

Meat-sharing is one aspect of sharing that has received significant attention from archaeologists and anthropologists (Barkai, this volume; Marshall 1976, 295–303; Speth 1990; Speth & Spielmann 1983; Wenzel, Hovelsrud-Broda & Kishigami 2000). In camp settings, individuals can see one another and are very likely to know what kind of meat and other goods that are brought into camp. Sometimes, if an individual sees another person with meat, he or she will demand a share (see Peterson 1993; Schnegg 2015; Suzman 2017, 188–90; Widlok 2017, 64–8). If an individual does not share meat when asked, that person is seen as ‘hard-hearted’ or stingy, and becomes the subject of much criticism by others in the camp (Tanaka 2014, 78). Meat is often shared in order to avoid evoking jealousy on the part of other people.

It is not just food that is shared at the camp level; it is also information. When a new group came to join another group at its residential location, a variety of information was shared, ranging from the distribution and abundance of resources in other areas to the location and activities of other groups. Information is also exchanged on such topics as the potential availability of an individual for marriage, the health status of people in other camps and their domestic animals, and the actions of government agencies that might affect a group’s well-being.

One way to assess food sharing at the camp level is to look at site structure and the distribution of faunal remains (Yellen 1977a; Bartram 1993; Bartram, Kroll, & Bunn 1991; Enloe 2003). Sometimes hearths have scatters of trash including faunal remains near them while there are also cases where there are specialized activity areas such as butchering localities inside or on the edge of camps (Yellen 1977a; Hitchcock 1987). Analyses of the faunal remains can reveal patterns of butchering and meat distribution. The distribution of ostrich eggshell pieces and beads in camps also may reveal sharing patterns. The ostrich eggshells that are found and brought to camp are sometimes shared at the local level, thus enabling individuals, especially women and young girls, to manufacture beads (Hitchcock 2012; Ikeya 2018). Bead-making activities are often carried out under trees in sight of the shelters and hearths in camp. These days, bead-making is done using wooden drills with iron tips. Skins are used for sitting and for holding the ostrich eggshell and the beads that are produced, and sometimes beads, bead blanks, and ostrich eggshell pieces are found in concentrations in places where shade exists in camps.

Ostrich eggshell beads are manufactured at the camp level, but they are also shared at the regional level, linking people from different camps together. As will be shown in this paper, there are connections between the two systems – sharing of food and things and the sharing of information – and these connections are important in understanding of gift-giving and receiving and the roles that gift-giving facilitates the reinforcement of social relationships, maintaining friendly interactions, enhancing information dissemination, and reducing risk.

The present chapter explores information sharing among hunter-gatherers from both archaeological and anthropological perspectives. It focuses upon possible interrelationships between body adornment (i.e. beads) and information sharing among hunter-gatherers, pastoralists and cultivators. More specifically, we make use of the archaeological and ethnographic records of the North American Great Plains and the Kalahari Desert of southern Africa to gain greater insights into the systemic linkages between body adornment, information sharing, and environmental uncertainty. In both cases, particular attention will be given to the appearance, distribution, and context of beads in the archaeological and ethnographic record of these two regions.

**Beads, adornment and information**

Archaeologists have recently recovered a variety of beads from prehistoric sites in Europe, Asia, the Levant, Africa, and North America (e.g. Bar-Yosef-Mayer et al. 2017; Bednarik 2015; Bouzouggar et al. 2007; d’Errico et al. 2005; Jacobson 1987; Jodry 2010; Kabiru 2016; Kuhn et al. 2001; Kuhn & Stiner 2007; Quinn 2006; Stiner 2014; Vandiver & Gruhl 2011; Wilkins 2010; Wyllie & Hole 2012). Some of the earliest
beads include those recovered in Grotte des Pigeons near Taroralt, Morocco (Bouzouggar et al. 2007); the cave Godi Buticha in Ethiopia (Assefa et al. 2018) and Blombos Cave on the southern Cape of Africa (d’Errico et al. 2005; Vibe 2007) that date to 82,000, 43,000 and 75,000 years ago, respectively.

Archaeologists and palaeoanthropologists have argued that the early appearance(s) of rock art (parietal), portable art, and body ornamentation (e.g., pigments and jewelry) reflect the transition to modern humans marked by significant behavioural and cognitive changes (Kuhn et al. 2001; Kuhn & Stiner 2007; Stiner 2014; Wadley 2015; Wei et al. 2016; Gärdénfors & Lombard 2018). Interestingly, some researchers proposed that such non-utilitarian aspects of early Upper Palaeolithic culture reflect increased reliance upon information and communication technologies (Binford 1983; Conkey 1978; Houston 2004; Kuhn et al. 2001; Kuhn & Stiner 2007; Stiner 2014).

Regarding the elaborate array of body adornments worn by highland New Guinea males, Binford stated:

…the material items they wear are tokens of social relationships and they circulate exclusively in terms of those negotiated alliances between individuals….They are not trade-goods, but symbols. They are not exchanged for their intrinsic value, but are worn because they carry information about the number and variety of alliances an individual has made (Binford 1983, 147, emphasis added).

Researchers have also begun to view art and body adornment as mechanisms for transmitting information about the human condition. Such information may concern an individual, a group, or a more extensive social network. Barton et al. (1994, 191) point out:

Conceptualizing art as a monitor of the volume of information flow channeled through regional and sub regional alliance networks allows us to model relationships between paleoenvironment, regional demography and the distribution of art that can be evaluated empirically.

Kuhn & Stiner propose that ‘Body ornaments are most important for communicating to people “in the middle distance” socially, individuals who are close enough to the wearer to understand the meaning of the ornaments he or she wears, but who do not know her or him personally’ (Kuhn et al. 2007, 47).

Kuhn & Stiner (2007, 51) go on to say that:

…the appearance of this new medium of ornamentation [beads] implies that social information – and identities- were longer lasting and more structured, such that there was an advantage to expressing them in semi-permanent media. The particular choice of transferable, durable objects may also imply an expanded scale of social interaction, with messages exchanged over larger areas and among a wider variety of people.

At this point, it becomes necessary to think about conditions that require increased body adornment as well as ‘expanded scales of social interaction’. We might then anticipate that uncertainties related to climate, plant and animal food resources, potable water, and intrusive human populations would select for increased collection, storage, and sharing of information. Sustained, long-term regional droughts would produce very significant uncertainties for hunter-gatherer, cultivator, and pastoralist populations (e.g. Meltzer 1999; Yellen 1977a, b; Fleuret 1988; Hitchcock 1979; Schnegg & Linke 2015; Schnegg & Bollig 2016). Human groups might respond to local droughts by shifting food getting strategies (e.g. cultivating to foraging). Under such conditions, foragers might also increase the frequencies of residential moves as well as the distances between residential locations. They also employ fall-back strategies, including selling off of assets, dipping into food stores, moving closer to pastoralists and farmers in order to take advantage of employment opportunities and food hand-outs or diversifying their food-getting activities, exploiting more diverse kinds of resources (Scudder 1971; Devitt 1977; Hitchcock 1979). Severe, long-lasting droughts may also be accompanied by dust storms that would adversely impact the viability of plants and animals (both wild and domesticated), availability of water, and human health (e.g., Mormon & Plumlee 2014). These dust storms are sometimes correlated with aridity and with a reduction of food availability, thus increasing risks to the livelihoods of individuals and communities.

Behavioural ecology and signalling theory

Recently, ecologists, anthropologists, and archaeologists have given considerable attention to signaling theory that includes costly, honest, and quality signals (e.g. Bliege Bird & Smith 2005; Bliege Bird et al. 2001; Dawkins & Krebs 1978; Gintis et al. 2001; Hawkes & Bliege Bird 2002; Hebets & Papaj 2005; Scott-Phillips
et al. 2012; Sheehan & Bergman 2016). Behavioural ecologists Sheehan & Bergman (2016) have recently proposed a conceptual framework that describes the interplay between social recognition and quality signalling among ‘conspecifics’ or individuals within a given population. We suggest that this conceptual framework is particularly applicable to our study of information sharing between and among prehistoric populations of hunter-gatherers, cultivators, and pastoralists in the arid lands of southern Africa and the North American Great Plains.

Sheehan & Bergman (2016, 2) state, ‘Information reduces the uncertainty surrounding decisions … and animals can reduce uncertainty inherent in social interactions by acquiring information about the trait values of conspecifics ….’ Individuals within a small group would possess information about the status and behaviour of others within the group as a result of social recognition or frequent observations and interactions regarding stable characteristics of group members. Social recognition, then, ‘refers to information learned about the quality or characteristics of other individuals or groups of individuals during the course of social interaction or observations’ (Sheehan & Berman 2016, 3). Social recognition in small group can provide very reliable information regarding individuals within the group.

As group membership increases, populations may become more dispersed and encounters become less frequent. We would expect to observe greater reliance upon quality signals (e.g. body adornment) that would be used to provide additional information about less familiar individuals. Quality signals among animals include badges of status or ornaments which transmit information about relatively stable aspects of sender quality related to resource holding potential (RHP) (Sheehan & Bergman 2016, 4). Importantly, Sheehan & Bergman (2017, 6) state, ‘With quality signaling, information is gathered directly from the phenotype of the sender.’ Consequently, information is transmitted during initial interactions so that previous interactions are not required. They (2016, 4) also state, that ‘Signaling is relatively more costly for the senders that for receivers.’ And, importantly, ‘Once the meaning of a signal is learned, however, the information is transferable to all individuals and so does not add significantly to the marginal costs of attending to signals’ (Sheehan & Bergman 2016, 4).

This behavioural ecological framework may, then, provide greater insights into the appearance and proliferation of prehistoric beads in the arid lands of southern Africa and the North American Great Plains. Small multi-family groups or bands would be expected to send and receive information through social recognition. These small social groups would have shared access to critical resources and would have consisted of closely related kin. Increased population size, increased residential mobility, and more extensive regional, social networks favoured the appearance and reliance upon quality signals (e.g. beads and pendants) so that more distantly related individuals and groups could enhance information flow (Fig. 9.1).

**Beads and ethnology: the Kalahari Desert of Southern Africa**

The San and their neighbours inhabit an immense sandfilled basin that covers between 900,000 and 1,100,000 sq. km (Mendelsohn et al. 2009, 48; Thomas & Shaw 2010, 2–9). This basin lies in the interior of southern Africa and stretches from the Congo River in the north to the northern part of South Africa in the south. Portions of Angola, Botswana, the Democratic Republic of Congo, Namibia, South Africa, Zambia, and Zimbabwe contain Kalahari sands.

Mean annual precipitation for the Kalahari Desert equals 250 mm and ranges from 170 to 700 mm (Smithers 1971, 11; Tanaka 1980, 21). Inter-annual variation in rainfall for the Kalahari may fluctuate more than 500 per cent. Droughts are frequent in the Kalahari and occur in two years out of five; severe droughts can be expected in one out of four years and there is a pattern of severe droughts every second decade (Lee
1979, 112; Manthe-Tsuaneng 2014; Tyson & Lindsey 1992; Tyson & Preston-Whyte 2000). Botswana was experiencing a serious drought in 2015-2016 and again in 2017–2018 which saw a wide range of options being employed by the San population in order to adapt to these periods of low rainfall and high stress. These options included migrating to new places in order to access food and employment; increasing their exchange of goods such as ostrich eggshell beads necklaces, headbands, and bracelets; seeking assistance from relatives, and opting to engage in government relief programs such as Ipeleng in which people are paid to debush agricultural fields, clear roads, and construct community facilities such as schools. One of the other responses of Ju/'hoansi, much to the chagrin of community members, was to reduce the sizes of sharing units, not unlike the behaviour of Mikea in southwestern Madagascar (see Tucker, this volume). According to Wiessner (2014, 14028) ‘The average Ju/'hoan in the 1970s had 15–16 hxaro partners residing between 30 and 200 km away.’ The number of hxaro partners appears to have declined by 2017–2018, when people Hitchcock interviewed said that they had fewer than 10 hxaro partners. It is clear, therefore, that patterns of sharing both at the community level and the regional level have declined, in part, perhaps, because of the shift toward a cash-based economic system.

**Table 9.1. Late Stone Age and recent forager sites in the Kalahari that have evidence of ostrich eggshell beads.**

<table>
<thead>
<tr>
<th>Location</th>
<th>District</th>
<th>Features</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cgae Cgae (/Xai/Kae, /Kae/Kae)</td>
<td>North West</td>
<td>The remains of 3 blinds were close to the pan</td>
<td>19° 52' 46&quot; S</td>
</tr>
<tr>
<td>Chapman's Baobab</td>
<td>Central District</td>
<td>1 hunting blind close to the baobab, scatter of lithics and OES beads</td>
<td>20° 29' 21&quot; S</td>
</tr>
<tr>
<td>ǂGi Pan</td>
<td>North West</td>
<td>14 blinds are in or close to ǂGi Pan; beads in the site</td>
<td>19° 37' S</td>
</tr>
<tr>
<td>Gutsa Pan and Green's Tree</td>
<td>Central District</td>
<td>4 hunting blinds in the pan and one next to a tree; scatters of OES beads</td>
<td>20° 25' 29&quot; S</td>
</tr>
<tr>
<td>Gwanasi, Tsodilo Hills</td>
<td>North West</td>
<td>Salt licks at pans south of the hills where there were lithics and OES beads and pieces of ostrich egg</td>
<td>18°45' 40&quot; S</td>
</tr>
<tr>
<td>Kaucaca Pan</td>
<td>Central District</td>
<td>Tshwa informants noted the use of blinds there and manufacture of OES beads</td>
<td>19° 52' 45&quot; S</td>
</tr>
<tr>
<td>Kedakeba</td>
<td>Central District</td>
<td>Tshwa informants said blinds were used there and OES beads produced</td>
<td>20° 53' 23&quot; S</td>
</tr>
<tr>
<td>Kudiakam Pan</td>
<td>Central District</td>
<td>5 hunting blinds in lowest part of pan, all with OES beads</td>
<td>20° 7' 58.08&quot; S</td>
</tr>
<tr>
<td>Ngxaishini Pan</td>
<td>Central District</td>
<td>Acheulean, MSA, LSA site with recent hunting blinds, OES beads in LSA portion</td>
<td>20° 05' 05.52&quot; S</td>
</tr>
<tr>
<td>Nxai Pans</td>
<td>North West</td>
<td>Blinds located next to the pans at Baines’ Baobabs, OES beads and blanks scattered in area</td>
<td>19° 50' 45&quot; S</td>
</tr>
<tr>
<td>Toromoja</td>
<td>Central District</td>
<td>Lithic scatter with OES beads and blanks</td>
<td>21° 04' 24&quot; S</td>
</tr>
</tbody>
</table>

Note: Data obtained from fieldwork; see also Helgren & Brooks 1983; Hitchcock 1982, 52–3, Table 1; Thomas & Shaw 2010, 196, Table 8.1; Yellen 1977a, b; Yellen & Brooks 1988.

---

**Megadroughts**

Mega-droughts, those lasting ten or more years, also have been known to occur in the Kalahari and adjacent areas (Cohen et al. 2007; Hoell et al. 2015, 2016; Hoell 2017; Woodborne et al. 2015). Tudhope et al. (2005, 1514) mention one drought in 2500 BC that lasted 6 years. Some of the drivers of the climate in southern Africa are postulated to be El Nino-Southern Oscillation (ENSO) events related to the monsoons and currents and other weather factors in the Indian Ocean and South Atlantic. Proxies for ascertaining drought events include the presence of burned daga (wattle and daub) floors in Iron Age sites, hyrax middens, bat guano in caves, pollen, and ostrich eggshell which can be dated (Brooks et al. 1990) as can geomorphological features (e.g. sand dunes, stream-cut areas such as dombos, omaramba and mekgacha), and stalagmites and stalactites in caves (Thomas & Shaw 2010; Thomas Huffman, pers. comm. 2017). Table 9.1 shows Late Stone Age and recent forager sites in the Kalahari that contain evidence of ostrich eggshell beads.

**Beads and hxaro in the ethnographic record**

An important social feature among Ju/'hoansi San in Botswana and Namibia relates to the exchange of non-food items (including ornaments) and gift-giving through a network that ties together people in dif-
different areas (Fig. 9.2). This system, which is known as *hxaro* (*xaro*) has been described in detail by Polly Wiessner (1977, 1982, 1986, 2002, 2014). The exchange system links people together in complex systems of reciprocity. It serves to reinforce social alliances and facilitates mobility of people who are connected through *hxaro* ties. Gift-giving includes ostrich egg-shell bead necklaces and bracelets, decorated skin bags, and other items. The social ties created by the gift-giving provides people access to other places during times of resource scarcity, especially during droughts, floods, and times when wild foods are unavailable.

As Wiessner (2002, 421) notes, *hxaro* relations serve as a proxy for long-term mutual support among Ju/'hoansi. *Hxaro* is a system aimed at reducing risk and reproducing social values that are crucial in an egalitarian society, one where people depend on each other in order to survive. Sharing, giving, and talking are all important features of the Ju/'hoansi (Marshall 1976; Lee 1979; Wiessner 2014). The creation of social bonds is crucial in order to be able to rely on other people’s help in times of need. These social ties constitute the basis for intra-group and inter-group alliances, provide critical information regarding resource availability, and facilitate access to more distant areas where one has exchange partners.

Demi, a !Kung man explained how exchange is often a social, rather than a purely economic transaction in non-monetary societies:

> If people do not like each other but one gives a gift and the other must accept, this brings a peace between them. We give to one another always. We give what we have. This is the way we live together. (Marshall 1976, 311).

As the Ju/'hoansi describe it, *hxaro* interactions involve a balanced, but non-equivalent delayed exchange of gifts. Many of the *hxaro* exchanges are with kin. By the time of marriage, the average Ju/'hoan will have between ten and sixteen *hxaro* partners; these include ones drawn from their immediate families, members of their own band or members from other more distant bands (Wiessner 1982, 72–4). The exchange serves to maintain networks of mutual aid, and, according to the Ju/'hoansi, is essential for group survival.

Silberbauer (1981) discusses the strategies of G/ui San in the Central Kalahari which involved calling on
alliances in times of stress. In some cases, these alliances were symbolized by exchange relations (see also Tanaka 1980, 2014). Stories and story-telling reinforced actual sharing practices for the exchange of information as well as food and desirable objects. Exchange across language boundaries has been documented (Barnard 1992, 141; Widlok 2017) as has long-distance trade involving a wide range of ethnic groups in southern Africa. Mobility among Kalahari hunter-gatherers relates both to the spatial structure of resources and the distribution of other groups (Harpending & Davis 1972; Lee 1979).

The Naro San of Botswana have a system of formalized exchange, //aï, identical to the Ju/'hoan idea of hxaro (Barnard 1992, 141). This gift giving system is also found among Nama. A less formalized but significant system of gift-giving and loans is seen among non-San groups (Barnard 1992, 55). According to Schapera (1930, 321) sorogus, or magus (‘giving to each other’) is a ceremonial form of gift-giving that underscores a ‘mutual form of obligation and assistance in all aspects of life’. Each person may demand or take from his sorì partner whatever he wants, thus making it a more powerful relationship than the exchange system among hunter-gatherers (Schapera 1930, 321). There were exchange relationships between Tswana and non-Tswana, some of which are advantageous or disadvantageous, depending on the power relationships of the groups involved (Hitchcock 1990, 230; Schapera 1938, 214–23; Wilmsen 1989, 99, 133, 138).

As Wiessner (2009, 134) puts it, ‘Hxaro had two components: one was a delayed exchange of gifts that transmitted information that the relationship was alive and well; the other was an underlying mutual obligation to give access to resources and alternative residents in time of need.’ She goes on to say that sharing and hxaro are the dominant economic institutions governing the distribution of resources among the Ju/'hoansi (Wiessner 2009, 134). The advantage of such a system was that it allowed for people to create social ties with other people whose services or resources could then be called upon in times of stress. The exchange relationships functioned in such a way as to allow extended visits to the hxaro partners’ nloresi (territories) (Wiessner 1982, 74–7). What these exchange relationships served to do, therefore, was to allow the Ju/'hoansi to pool their risk and to allow for goods to pass across space and ultimately to allow mobility of people during times of stress.

This complex exchange custom ensured (a) good relations between different bands with members in each connected by the exchange system, (b) regular inter-band visiting and (c) most importantly, cooperation during times of stress, particularly during droughts. If a person has an unproductive period of foraging or is in a community facing drought and hunger, he or she knows that they can rely on their hxaro partners for help. If there is a general shortage of food, the band members will turn to their hxaro partners in other bands. If a drought problem is widespread Ju/'hoansi will move to the lands of their most distant hxaro partners and stay there until the crisis has passed. In the period between 1968 and 1974, for example, Ju/'hoansi in western Ngamiland experienced some severe resource shortages, and people spent an average of 3.3 months visiting hxaro partners in other places (Wiessner 1986, 2014, 14027). The length of time people spent visiting hxaro partners was considerably less in 2017–2018, presumably in part because people had alternative sources of food from government drought relief programs.

Extensive ethnographic studies of the San contain a great deal of information regarding the role of beads within these hunter-gatherer societies in southern Africa. Beads, including ones made of ostrich eggshell (Struthio camelus), are used extensively by the San and other populations in the Kalahari Desert region of Botswana and have been for thousands of years (Collins & Steele 2017; Dayet al. 2017; De Voogt & Ng 2017; Hitchcock 2012; Marshall 1976, 304–6; Mitchell 2013, 48–481; Robbins et al. 2000, 2009; Tapela 2001; Vibe 2008; Wilmsen 2015; Wingfield 2003). Silberbauer (1981, 227) points out that the G//ui in the Central Kalahari put beads on harnesses that are used for young children that have yet to learn to walk. An apron measuring 22 by 28 cm and containing 4000 beads represents nearly 200 hours of work, while a harness for a child required 60 hours of work (Silberbauer 1981, 227). Beadwork, for which the G//ui use the term lxamdzi, is considered to be very important socially and economically. As a result, skilled bead-makers are regarded highly (Fig. 9.3).

Ostrich eggshell beads were observed on both adults and children by Siegfried Passarge in the Kalahari during his explorations in the region in 1896–97 (Passarge 1997 [1907], 150–2). Emil Holub, who traveled in the Kalahari in 1872–79, noted that the ‘Bushmen’ in the Makgadikgadi region of north eastern Botswana, decorated themselves with beads (Holub 1881, 82). Beads of various types were exchanged with travelers for pots and other items by San in the Kalahari, especially after the increase in the numbers of European and other travelers after 1849. The majority of the ostrich eggshell beads analysed by Wilmsen (2015, 99) were from the 19th and early 20th century, and he makes the important point that the exchange of these beads was done prior to the expansion of bead production as part of the tourist trade.
Deacon & Deacon (1999, 138) see hxaro-like exchange as a likely explanation behind the appearance of seashells in Later Stone Age sites far inland from the coast, as does Mitchell (1996). As they note, more than merely ‘trade items’, the beads may be a material expression of relationships that a variety of groups maintained with one another across the southern African subcontinent. Information regarding Iron Age sites as well as forager sites in Botswana that contain ostrich eggshell beads is provided in Table 9.2. Judging from the numbers and diversity of beads in the dated layers of these sites, it is evident that there were larger numbers and more diverse kinds of beads found at times that appear to correspond to megadroughts.

The Iron Age in southern Africa is generally broken down into three periods: the Early Iron Age (AD 200–900), the Middle Iron Age (AD 900–1300), and the Late Iron Age (AD 1300–1840) (Huffman 2007, 331–461). Food-producing populations expanded into southern Africa from areas further north around the time of Christ, bringing with them iron implements, ceramics, domestic livestock, and a variety of crops. Houses were built of daga, a mixture of termite earth, dung, wooden poles, and thatch, with smooth floors of dung and time earth. Archaeologists often recognize these house features when they are burned (Huffman 2007, 4–6). This is also true for granaries, storage features made up of wattle-and-daub, with daga floors that are raised up on poles, and are usually round or rectangular (Huffman 2007, 8). A third type of feature on Iron Age sites is a kraal (corral) in which domestic animals were kept. These are recognizable archaeologically because they are areas some 10–20 meters across that are bounded by stone or pole fences and contain deposits of vitrified dung which is sometimes burned intentionally for both hygienic and ritual

Iron Age sites in southern Africa contain beads made from a range of materials including ostrich eggshell, marine shell, glass trade beads from India, copper, and gold (DuBroc 2010; Huffman 2009; Klehm 2013; Wood et al. 2009). Tapela (2001) has proposed that both Later Iron Age foragers and Iron Age agro-pastoralists made and exchanged ostrich eggshell beads. In some cases, it is assumed that ostrich eggshell beads are exchanged over long distances, while in others bead production is done locally, while still communicating social information.

**Table 9.2. Iron Age sites in the Kalahari Desert region of Botswana with ostrich eggshell beads.**

<table>
<thead>
<tr>
<th>Site Name</th>
<th>District</th>
<th>Features</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bosutswe</td>
<td>Central District (east-central Kalahari near Mashoro)</td>
<td>Iron Age Site (AD 700–1700) OES beads and pieces</td>
<td>21°57’09” S 26°36’39” E</td>
</tr>
<tr>
<td>Mmadipudi</td>
<td>Central District (east-central Kalahari, 3 km from Bosutswe)</td>
<td>Iron Age (AD 550–1200) burned daga, OES beads (354 whole, broken, and in preparation)</td>
<td>21°57’09” S 26°36’39” E</td>
</tr>
<tr>
<td>Kaitshaa (Tsaitshe)</td>
<td>Central District (southern Sua Pan)</td>
<td>Iron Age Site on the southern margins of Sua Pan (AD 700–1000) OES beads and pieces</td>
<td>2126 A1 140555 GPS reading</td>
</tr>
<tr>
<td>Divuyu, Tsodilo Hills</td>
<td>North West District (Tsodilo Hills)</td>
<td>Iron Age Site (AD 540–1000), OES beads</td>
<td>18°45’ 40” S 21°44’45” E</td>
</tr>
<tr>
<td>Nqoma, Tsodilo Hills</td>
<td>North West District (Tsodilo Hills)</td>
<td>Iron Age Site (AD 650–1280), OES beads</td>
<td>18°45’ 40” S 21°44’45” E</td>
</tr>
<tr>
<td>Xaro</td>
<td>North West District (Okavango Delta)</td>
<td>Iron Age Site (AD 1270–1420) OES beads, ceramics, domestic animal remains</td>
<td>18°29’ 14” S 21°55’11” E</td>
</tr>
</tbody>
</table>

Note: Data drawn from Denbow 2011; Denbow et al. 2008; DuBroc 2010; Klehm 2013; Klehm & Ernenwein 2016; Wilmsen 2011; Mike Main, pers. comm. 2016.
Information sharing in times of scarcity

It is possible that rainmaking hills and caves were utilized more frequently during periods when there were droughts. One of the constraints that exists in the archaeological interpretation of rainmaking sites and residential sites is that they both may contain pole-and-daga structures, grinding stones, faunal remains, and broken ceramic vessels (Huffman 2007, 73). One item that is not uncommon in rainmaking sites is broken beer pots (Isaac Schapera, pers. comm. 1980). During droughts, foragers appear to have moved closer to Iron Age agro-pastoral sites in order to get access to food, water, employment opportunities, and domestic labour. Agro-pastoralists, for their part, also employed fallback strategies, expanding the amount of foraging they did or reducing the size of sharing networks. Agro-pastoralists also engaged in exchanges of goods such as livestock, pots, and iron weapons with foragers as a means of gaining resources that they could use for subsistence purposes. Agro-pastoralists became foragers at various points in time, and foragers transformed themselves into agro-pastoralists, acquiring livestock, agricultural implements, and grain grinding facilities (see Crowther et al. 2017).

For both agro-pastoralists and foragers, engagement in rituals was a key way to cope with environmental and social stress (Lee 1979; Marshall 1976; Schapera 1971). In many cases, when rituals were performed, people wore beads and other items such as leg rattles made of cocoons (Megan Biese, Tsam-xao #Oma, George Silerbauer, pers. comm. 2011). A way that Tswana and their ancestors dealt with drought was to ‘bring in a San’ who were known for reasons (Huffman 2007, 8, 17, 2013, 3553). Iron Age settlement in the Limpopo Region and in the Kalahari fluctuated in size and location, depending upon climatic conditions. Some Iron Age communities were located on hills in order to avoid tsetse fly (Glossina morsitans); the location also reduced the chances of large bush fires from decimating the homes, granaries, and livestock corrals.

Burning cycles were related in part to El Nino events. There were times when Iron Age villages were burned by wildfires and sometimes suffered destruction at the hands of competitors. In dry periods, Iron Age populations moved into more marginal areas, in part to take advantage of hunting and gathering and mineral exploitation opportunities. Drought periods saw rising social tensions in the region, with an expansion, in some cases, of conflict. Climatic data from Iron Age sites include information drawn from tree rings, oxygen isotypes, pollen, and speliotherms in stalactites in caves. The climate conditions fluctuated between wet and dry and warm and cold periods (Huffman 2007, 99; Tyson & Lindsey 1992).

Burnt daga was a product of fires that were due to several factors, including lightning strikes, intentional burning by people, and possibly a result of internal combustion in piles of dung. The frequency of fires varied in part with temperature, wind, rainfall, and fuel loads. It is interesting to note that rainmaking rituals tended to increase in hot dry periods (Huffman 2007, 71–73; Schapera 1971). Table 9.3 provides data on severe droughts that occurred on the plateau of southern Africa during the Iron Age (for a discussion of the droughts and their relations with high Oxygen values and the presence of burned daga structures, see Huffman 2009, 2010; Huffman & Woodborne 2016). It is possible that rainmaking hills and caves were utilized more frequently during periods when there were droughts. One of the constraints that exists in the archaeological interpretation of rainmaking sites and residential sites is that they both may contain pole-and-daga structures, grinding stones, faunal remains, and broken ceramic vessels (Huffman 2007, 73). One item that is not uncommon in rainmaking sites is broken beer pots (Isaac Schapera, pers. comm. 1980).

During droughts, foragers appear to have moved closer to Iron Age agro-pastoral sites in order to get access to food, water, employment opportunities, and domestic labour. Agro-pastoralists, for their part, also employed fallback strategies, expanding the amount of foraging they did or reducing the size of sharing networks. Agro-pastoralists also engaged in exchanges of goods such as livestock, pots, and iron weapons with foragers as a means of gaining resources that they could use for subsistence purposes. Agro-pastoralists became foragers at various points in time, and foragers transformed themselves into agro-pastoralists, acquiring livestock, agricultural implements, and grain grinding facilities (see Crowther et al. 2017).

For both agro-pastoralists and foragers, engagement in rituals was a key way to cope with environmental and social stress (Lee 1979; Marshall 1976; Schapera 1971). In many cases, when rituals were performed, people wore beads and other items such as leg rattles made of cocoons (Megan Biese, Tsam-xao #Oma, George Silerbauer, pers. comm. 2011). A way that Tswana and their ancestors dealt with drought was to ‘bring in a San’ who were known for

<table>
<thead>
<tr>
<th>Time period</th>
<th>Stratified rainmaking hill</th>
<th>Sites with high O values</th>
<th>Sites with burnt daga</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group XIII AD 1650</td>
<td>Modipe Hill</td>
<td></td>
<td>Modipe</td>
</tr>
<tr>
<td>Group XII AD 1530</td>
<td>Matokwa</td>
<td>Faure</td>
<td>Faure</td>
</tr>
<tr>
<td>Group XI AD 1440–1450</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X AD 1350–1400</td>
<td></td>
<td>Icon</td>
<td>Icon</td>
</tr>
<tr>
<td>Group IX AD 1300 (±15)</td>
<td>Kirstenbos</td>
<td>Bosutswe</td>
<td>Bosutswe</td>
</tr>
<tr>
<td>Group VIII AD 1200–1250</td>
<td>GZ PIII</td>
<td>Font Drift I; Mapungubwe Hill</td>
<td>Font Drift I; Mapungubwe Hill</td>
</tr>
<tr>
<td>Group VII AD 1020–1070</td>
<td>GZ PIII</td>
<td>Mapungubwe ST; Schroda B</td>
<td>Mapungubwe ST; Schroda B; LKMK D2</td>
</tr>
<tr>
<td>Group VI AD 900–1000 (two episodes)</td>
<td></td>
<td>Point Drift IV; Schroda E</td>
<td>Point Drift IV; Schroda E;</td>
</tr>
<tr>
<td>Group V AD 750–800</td>
<td>GZ Plb</td>
<td></td>
<td>LKMK D2</td>
</tr>
<tr>
<td>Group III AD 650 (±15)</td>
<td></td>
<td></td>
<td>Lydenburg</td>
</tr>
<tr>
<td>Group II AD 550–570</td>
<td></td>
<td></td>
<td>Broederstroom B2</td>
</tr>
<tr>
<td>Group I AD 400–450</td>
<td>GZ Pla</td>
<td></td>
<td>Buhwa</td>
</tr>
</tbody>
</table>

Note: GZ: Great Zimbabwe; LKMK: Leopard’s Kopje Main Kraal (after Huffman 2010, 466, Table 1).
their rain-making abilities. There were San healers and rainmakers who went from place to place during drought periods offering to assist local communities in coping with the weather (Mathias Guenther, personal communication, 2018). Rainmaking and rituals to promote better environmental conditions were practiced extensively across the Kalahari and eastern Botswana and South Africa in the 19th, 20th, and 21st centuries (Landau 1993; Marshall 1976, 61–3, 179; Schapera 1971). Contemporary informants point out that rain-related rituals were practiced widely in southern Africa during the severe regional drought in 2015-2016 (Hitchcock, field data, 2016). Some of these rituals involved engaging in trance and other kinds of dances in which participants were wearing ostrich eggshell bead items and were carrying canes, some of them decorated with ostrich egg beads.

Beads and archaeology in the North American Great Plains

The North American Great Plains encompass more than 2.6 million sq. km (1 million sq. miles) of the continent’s interior. Significantly, this vast interior steppe or semiarid continental grassland is sharply demarcated along its western boundary by the Rocky Mountains. The land surface gradually slopes downward from an altitude of 1520 m near the mountain front to 760 m along its eastern edge. This region is referred to as the turbulent heartland of North America where intrusive air masses from the Pacific, the Arctic and the Gulf of Mexico clash. Winters are cold, windy and dry and summers are warm to hot. Near the front range of the Rocky Mountains, evaporation usually exceeds precipitation creating an arid steppe. Precipitation decreases from north-to-south and from east-to-west. Winter snows along the Rocky Mountains are often melted by chinooks or adiabatically warmed winds that descend the eastern Front Range.

Beads

Bone, shell, and seed beads have been recovered from a number of residential and mortuary sites throughout the Great Plains—particularly the Central Plains sub-area including the states of Nebraska, Kansas and eastern Colorado. A number of sites contain beads fashioned from marine shells from the Gulf of Mexico and the Pacific Ocean. The present study focuses primarily upon tubular bone beads made from the long bones of birds (including turkey), rodents, rabbits, and, in some cases, domesticated dogs. These beads were then made from readily available raw materials and did not have to be acquired via travel, exchange, or trade. As we have seen in the ethnographic accounts of the San in the Kalahari Desert, we can expect that beads were used in a number of ways including necklaces, headbands, arm band, bracelets, anklets, as well as decorations on clothing, bags, pouches, and satchels (Silerbauer 1981, 227).

In 2003, bone beads were recovered during the excavation of two small houses at the Felis Concolor Site (25SM20) in central Nebraska (Fig. 9.4). A total of 21 complete tubular bone beads and 7 fragments were found. Beads represented the third largest component of the artefacts assemblage other than potsherds and lithic debitage. Field observations at 25SM20 suggested that the occupants of these two houses were undergoing a range of stresses. For example, one house was a small earthlodge and support posts exhibited small diameters perhaps reflecting greater wood scarcity and minimized labour investment. Faunal remains were scant and high muscle mass portions of larger mammals (e.g. bison and deer) were not represented. Macrobotanical remains included a small quantity of corn (Zea mays). Both arrow points...
and hide scrapers had been resharpened repeatedly and depleted. Sub-floor food storage pits contained very little debris and sheet middens appeared to be absent. Two radiometric dates from the central hearth feature in this small earthlodge are Cal AD 1280 (Cal BP 670) and Cal AD 1300 (Cal BP 650); they happen to fall within a 38 year-long drought (Cal AD 1276-1313) documented in dendrochronologies of western Nebraska (Wedel 1986, 45, Table 3.2). At this point, the question arose ‘Was body adornment during this time relied upon to enhance more extensive, far-reaching social interactions that may have been a response to extensive drought(s) in this region?’

Spatial and temporal distribution of beads
A preliminary survey of the published literature has identified 79 prehistoric residential and mortuary sites that contained a minimum of 4419 complete and 109 fragmentary bone beads (Fig. 9.5). Bone and shell beads were most numerous in mortuary sites with totals reaching up to 670 bone beads and 600 shell disk beads in single sites. Tubular beads have been found in various stages of production based upon the ‘groove-and snap’ technique. The ends of the tubular bead were frequently smoothed and polished. Bone beads, in some cases, were decorated with parallel, shallow grooves encircling the tubular bone beads. Based upon this sample, tubular bone beads ranged in length from 2–58 mm (mean equals 20 mm) and bead diameters range from with diameters ranging from 5–8 mm (mean 6.48 mm).

Twenty six sites have radiometric dates; 22 of these sites fall within the Medieval Climatic Anomaly (MCA; AD 900–1400; Fig. 9.6). This time span includes the latter part of the Plains Woodland Tradition and the entirety of the Central Plains Traditions (Hoard & Banks 2006; Wood 1998). Single houses (rectangular earthlodges) and small settlements were located along streams and tributaries where variable quantities of corn, beans, and squash were grown and a range of ungulates were hunted including antelope, deer, and bison. Roper (2007, 55) suggested that Central Plains
Tradition groups relied upon a ‘low level food production’ system (e.g. 30–50 per cent of food energy derived from domesticated plants).

**Droughts and megadroughts**

These prehistoric groups in the Central Plains would have been significantly impacted by droughts and particularly megadroughts that occurred throughout the Central Plains of North America during the MCA (AD 900–1400) (Hoard & Banks 2006; Wood 1998; Woodhouse & Overpeck 1998). Megadroughts in the Great Plains persist for more than one decade and have been linked to sea surface temperatures (SSTs) associated with La Niña events in the tropical Pacific Ocean (Cook et al. 2007; Cook et al. 2016; Graham et al. 2007; Halfen et al. 2012; Pu et al. 2016). Five of the most severe megadroughts occurred in succession during the MCA (Coats et al. 2016). Several droughts that occurred during the MCA in the Central Plains persisted for 40–50 years, as noted by Layzell (2012). Layzell (2012) utilized Palmer Drought Severity Indices (PDSI) based upon 835 tree-ring chronologies to study drought and climatic variability in Kansas between AD 900–2000. He identified four to nine megadroughts across Kansas between AD 850–1500 (Medieval Climatic Anomaly, AD 900–1400).

Two megadroughts occurred between AD 862–1074 and AD 1122–1299 (Cook et al. 2016). The second megadrought covered much of the Central Plains. These megadroughts are reflected in dendrochronological records as well as by episodes of dune activation and aeolian deposition (Cook et al. 2013; Cook et al. 2016; Forman et al. 2001; Halfen et al. 2012; Hanson et al. 2010; Schmeisser McKean et al. 2015). Recent studies indicate that major episodes of dust (loess) deposition during the latter portion of the MCA (AD 1100–1400) amplified megadroughts initiated by shifts in SSTs (Cook et al. 2013, 4420). The primary variables involved in amplifying megadroughts in the Central Plains during the MCA include stronger winds, aeolian erosion and dust aerosol (Cook et al. 2013, 4425–6).

**Responses to megadroughts**

Cultivators relied upon domesticates that were more drought-sensitive and consequently would have been forced to become more dependent upon foraging or find more mesic ‘refugia’ better suited for cultivation. Benedict (1999, 10) proposed that hunter-gatherers made greater use of the short grass plains and the foothills regions along the eastern edge of the Rocky Mountains between AD 990 and 1230 during the MCA. These shifts in population may reflect forager responses to megadroughts on the Great Plains during the Medieval Climatic Anomaly. One can expect that prehistoric foragers and cultivators in the Central Plains as well as the Great Plains in general, would have had to expand their social networks. Consequently, such groups would be expected to shift from local, kin-based societies that relied upon social recognition for sharing information to regionally extensive populations that made use of quality...
signals to enhance social interaction. Kelly, Pelton and Robinson (this volume) suggest that a marked shift in obsidian sources circa 650 years ago in the Carson Desert of Nevada might reflect such an expansion of regional networks among hunter-gatherers coupled with resource sharing. The geographic distribution of tubular bone beads within the Central Plains coincides with portions of Kansas, Oklahoma, Colorado, and Nebraska that experienced a series of consecutive megadroughts during the MCA (Cook et al. 2016; Layzell 2012). In addition, there are a number of sites along the boundary between the short grass plains and the foot hills along the eastern margins of the Rocky Mountains (Fig. 9.3).

Discussion and conclusions

Archaeologists have during the past two decades devoted considerable attention to the discoveries of early beads in Africa and Europe. Sites such as Grotte des Pigeons in Morocco, Gobi Buticha in Ethiopia, and Blombos Cave in Africa’s Southern Cape have been viewed as providing evidence for quantum leaps in the cognitive development (e.g. symboling, identity, and aesthetic expression) of humans. In addition, some investigators have proposed that pigments, beads, and parietal art were components of information sharing and communication strategies (e.g. Barton et al. 1994; Binford 1983; Kuhn & Stiner 2007; Stiner 2014; Whallon 2006; Kelly 2015, 49–50).

Preceding these developments in anthropology and archaeology, ecologists and animal ethologists carried out extensive studies of animal communication based upon signalling that involves both phenotypic and behavioural expressions. Sheehan & Bergman (2016) have proposed a behavioural ecological model for a shift in animal communication strategies from small local group interaction based upon social recognition to larger, more extensive populations that make use of quality signals. Animals exhibit phenotypic variation that serves as quality signals that enhance information flow and communication. This model may also enable us to gain greater insights into human communication including the use of quality signals such as body adornment (e.g. beads).

The San in the Kalahari Desert devote a great deal of time and energy in maintaining social ties with more distant groups by traveling and visiting. These face-to-face interactions would certainly favour continued reliance on social recognition. Whallon (2006) would characterize San traveling and visiting as ‘non-utilitarian mobility’. Silberbauer (1981) describes visits between various G/mi bands in the Central Kalahari. Some of these visits lasted eight weeks and may have been in response to an abundance of tsa melons in one place or to a local drought in another. Whallon (2006) emphasizes that hunter-gatherers require the ‘establishment and maintenance of regional and longer social ties’ in order to adapt to uncertain environments. In this context, he discusses ‘non-utilitarian’ mobility that involves wide-ranging social and ceremonial ties. Interestingly, Whallon (2006, 261) states, ‘The establishment and reaffirmation of social ties in the context of these movements often involve actions and elements that symbolize the ties, frequently through gift giving or exchange, and sometimes with ceremony and ritual.’ Whallon (2006, 263) proposes that social gatherings and ceremonial events encourage long distance travel, aggregation, visiting, and ceremonial observances.

One might ask at this point what are the archaeological correlates of social interaction and extensive networks that may have been responses to increased environmental uncertainty. Excavations at the Felis Concolor Site (25SM20) in central Nebraska revealed two small lodge floors that were constructed c. AD 1300. Archaeological evidence (e.g. small lodges, exhausted stone tools, low ranked prey, and very sparse midden deposits) suggests that the inhabitants of this site were stressed. Interestingly, tubular bone beads were among the most numerous artefacts recovered from the excavations. Radiometric dates from a central hearth feature indicate that this site was occupied during a megadrought in the Central Plains. A preliminary inventory of Central Plains archaeology revealed 79 prehistoric sites that contained more than 4500 tubular bone beads. Most of these bone beads were found at residential and mortuary sites within the Central Plains (Kansas, Nebraska, southeastern Wyoming, and eastern Colorado; see Wedel 1961). Perhaps body adornment during periods of severe, protracted drought would have served as quality signals to facilitate social interaction across this vast region.

We would expect to observe regional level social networks develop in response to megadroughts in both the Kalahari Desert in Botswana and the North American Great Plains. Such extensive social networks may be reflected by the spatiotemporal distribution of quality signals (beads and other forms of body adornment). It is interesting to point out that the megadroughts in the Kalahari Desert are causally linked to intensive El Niño-Southern Oscillation (ENSO) events that originate between the Indian and Pacific Oceans (Huffman 2010). On the other hand, megadroughts in the North American Great Plains are related to La Niña events that are initiated within the same region. In both cases, hunter-gatherers, cultivators, and pasto-
ralists would have all faced the challenges presented by megadroughts. Sharing networks expanded and contracted over time, in part as a response to social and environmental conditions. It appears that the gift-giving and information sharing were especially important during periods when there were megadroughts, and that social and material exchanges and signaling represented essential means of coping with uncertainty.

Acknowledgements
An earlier version of this paper was presented at the McDonald Institute for Archaeological Research Conference titled Sharing: The Archaeology & Anthropology of Hunter-Gatherers, University of Cambridge, Cambridge, United Kingdom, 20–21 September 2016. Support of some of the research was provided by the U.S. National Science Foundation (Grant No. BCS 1122932), the University of Nebraska-Omaha, the University of Nebraska-Lincoln, the Nebraska State Museum, the Nebraska State Historical Society, the Bureau of Reclamation, the Nebraska Game and Parks Commission, the University of New Mexico, the governments of Botswana, Namibia, and Zimbabwe, the National Museum, Monuments, and Art Gallery of Botswana, and the International Work Group for Indigenous Affairs (IWGIA). We thank Mabuse Abel Abdenico, Wayne Babchuk, Grace Babutsi, Alan Barnard, Larry Bartram, Megan Biesele, Alison Brooks, Tsamkxao Ciqae, Aron Crowell, Ute Dieckmann, Jim Denbow, David Friesem, Jumanda Gakelebone, Tom Huffman, Kazunobu Ikeya, Bob Kelly, Melinda Kelly, /Kunta Bo, Ui Kxunta, Leon Tsamkxao, Noa Lavi, Megan Laws, Richard Lee, Mike Main, Fred Morton, Michael Murphy, Tsamkxao Oma, Ozzie Pearson, Beth Ritter, Larry Robbins, Maria Sapignoli, Alineh Segobye, Roy Sesana, Nancy Stone, Elizabeth Marshall Thomas, Leon Tsamkxao, Hessel Visser, Nick Walker, George Wenzel, Thomas Widlok, Polly Wiessner, John Yellen, and the late Alec Campbell, Milani Manyake, S.G. Masimega, Gakemodimo Mosi, Isaac Schapera, George Silberbauer, and Carlos Valiente-Noailles for their ideas, suggestions, and assistance. Ralph Hartley referred us to behavioural ecological research concerning quality signals. David Friesem and Noa Lavi and an anonymous reviewer provided useful editorial comments and recommendations.

References


Information sharing in times of scarcity


