

Introduction to *Food Research:* *Nutritional Anthropology and* *Archaeological Methods*

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Volume and Section Overviews: Introduction and Sections I and II

Section I: Introduction and Ethics

This volume, the first in the three-volume set *Research Methods for Anthropological Studies of Food and Nutrition*, begins with a discussion of the volume followed by a chapter on research ethics by Sharon Devine and John Brett. Their chapter will be reproduced in all three volumes because all researchers must understand ethics, and consideration of the ethics of methods used to collect, analyze, store, and publish must be an essential and initial element of the planning of any project. In their chapter they expand the idea of research ethics beyond publication and permissions to include the ethics of study design, recruitment, enrollment, and obtaining informed consent. They present a brief history of the research problems that led to current ethics regulation requirements as well as a primer on the principles that guide ethical research: respect for persons, beneficence, and justice. They conclude with two short case studies highlighting application of these ethical principles in hypothetical food studies.

Section II: Nutritional Anthropology

Section II covers nutritional anthropology using a biocultural approach that can be considered the historical “mother” framework of nutritional anthropology and underlies almost all basic and applied research. Though new frameworks and perspectives have emerged over the last two decades, the biocultural perspective continues to influence much of the research in food and nutritional anthropology. The chap-

ters in this section cover classic topics within the field, including anthropometry, biological measurements, physical activity and energy expenditure, and dietary analyses on the individual and group levels. Darna Dufour and Barbara Piperata provide an overview of this section along with an introduction to nutritional anthropology methods and study design. They explicitly situate such research as biocultural: it seeks to understand how biological and cultural forces work together to channel human food use and nutritional status. They review the design of three studies, considering the kinds of questions asked, the type of data needed to answer the questions, and the methods used, and then evaluate the strengths and weakness of each design. Study design—as the conceptual starting point and first potential stumbling block—is probably one of the most difficult aspects of research, so this chapter will be a valuable addition to the canon on biocultural research.

In the next chapter, Leslie Sue Lieberman addresses that other mainstay of nutritional anthropology: body composition and anthropometry. She discusses the background theory and design protocols for composition studies and provides a comprehensive overview of how to assess nutritional status, growth and developmental patterns in body mass, composition, size, and shape. Lieberman also discusses the use of composition studies in nutritional anthropology for surveillance and monitoring of populations, assessing the impact of nutritional and other types of health, sanitation, economic, and educational interventions, and describes their use in predicting risk for acute and chronic illnesses and death. Finally, she reviews the many websites and materials that provide instruction on these methods as well as the use of reference data sets and standards in interpreting measurements for both individuals and populations. Mark Jenike then focuses on measuring energy expenditure. While this has long been a favorite and even foundational focus in nutritional anthropology, technological advances have introduced a wealth of possible devices and analytical options that make measuring physical activity and energy use both easier and more perplexing. Jenike presents an overview of key concepts and established methods for measuring total daily energy expenditure in humans, and reviews currently available devices for recording physical activity and energy expenditure among free-living populations.

As a rational companion piece to those two assessment methods, the following chapter by Andrea Wiley examines dietary analysis methods. Dietary data are a core part of almost all research in nutritional anthropology, whether biological or biocultural, yet inaccuracies in data collection and analysis are common and caused by both random error and collection bias. Wiley describes likely sources of error with self-report methods for measuring food intake as well as effective observational methods for field and/or community-based research, and compares the benefits of each method and the kinds of research questions to which each is suited. She tackles food frequency questionnaires and compositional tables, and reviews methods for assessing nutritional status, including biomarkers, anthropometric indices, and reference standards. This chapter, when paired with Leslie Sue Lieberman's, provides researchers at all levels with up-to-the minute reviews of the latest incarnations of core methods for dietary health assessment.

The final three chapters in this section cover applied nutritional assessment, primate studies, and measurement of commensality. Sera Young and Emily Tuthill contribute a chapter on using ethnography for evaluation in public health nutrition. While it may be natural for an anthropologist to use ethnographic techniques, it is not natural for many people who practice public health, public health nutrition or community nutrition. In this chapter they describe why and how to bring ethnographic methods into program planning and assessment. They describe how ethnography can be incorporated into public health projects, and discuss doing so with a case study on infant feeding. They then analyze how core concepts of ethnographic work, such as ecology, biocultural modeling and an emic/etic framework, can bring new insights to programs for infant and young child feeding practices. Their conclusion provides examples of application and evaluation using ethnographic and mixed methods in programming for public health nutrition as well as a set of questions that researchers and program designers will want to ask prior to beginning a new protocol. Their methodological look at public health ethnography is destined to be core reading for anyone planning to implement a program for nutrition improvement, especially in infants and children.

In a departure from human studies but still within biological/biocultural nutritional anthropology, the next chapter, contributed by Jessica Rothman and Caley Johnson, is about methods for collecting data on primate diet. They discuss the assessment of primate diets, focusing on how to collect and process primate foods and measure the content of macro- and micronutrients as well as secondary compounds. To conclude, they reappraise the methodologies that inform the various frameworks for understanding primate diets and foraging patterns. The section's final chapter explores how anthropologists and others have measured commensality in relation to health, well-being, and social function variables. Here Janet Chrzan outlines the theory, methods, and history of research about social eating, discussing how different disciplines conceive of the variables that contextualize commensality, and what outcomes each deems important. She divides the studies into three broad categories—social facilitation, correlation, and direct connections between commensality and dependent outcome—and discusses the strengths, weaknesses and methods of each. She concludes with a case study from her own research of maternal and child health and provides tables that itemize the methods used in current research in this area. Together, these seven chapters cover almost the entire range of methods used to collect and analyze the human and nonhuman primate diets that are the basis of most biocultural research. They thus serve as an excellent and up-to-date primer on conducting food and nutritional research in the field.

Section III: Archaeological Study of Food and Food Habits

The study of past food use and habits has changed greatly in the last two decades as new discoveries and technologies have enhanced our understanding of the archaeology of food and increased the means by which to collect, analyze,

and understand past diet. The essays in this section cover all aspects of past diet retrieval and analysis, from identification of food remains (through taphonomy, zooarchaeology, archaeobotany, lithic analysis, and palynology) to analysis of the indirect evidence of diet, such as bone chemistry, structural analysis, dental microwear, and population health.

At the outset of Section III, Patti Jo Wright provides an introduction to methods in archeological research, highlighting that compared to past studies, current research benefits from greater sophistication in research methods and from a holistic, integrated approach that allows for analysis of many lines of evidence. She describes the kinds of evidence that can now be collected, from old standards (bones, seeds, etc.) to trace residuals of lipids, DNA, and isotopes, and discusses the methods and techniques used to sample, collect, process, identify, and quantify these remains. She also includes a discussion of research design and several case studies to encourage readers to think about how they “think through” their research. In the next chapter Wright focuses her attention on the retrieval of plant remains and the various approaches (macroscopic, microscopic, chemical, and molecular) to analysis of these data. She then examines research design, consideration of research questions, and biases in preservation, and concludes with a discussion of current perspectives on research fundamentals for the study of plant remains.

Bethany Turner and Sarah Livengood contribute a chapter on diet reconstruction via bioarchaeology and human osteology, providing a philosophical approach to the subject and a thorough overview of current methods and research design. They point out that these methods are direct—they indicate exactly what past humans ate and how their health was affected by diet—rather than indirect, that is, reliant on inferred relationships between human eating patterns and environmental evidence such as pollen, soil, or artifact assemblages. Situating their focus in microscopic and chemical studies, they cover the theoretical issues involved in these analyses as well as practical concerns and basic methodologies for dental microscopy, stable isotope analysis, and trace element analysis. They assert that when bioarcheological studies of this sort are analyzed in relation to other (direct and indirect) data, a wide range of questions about social organization and resource use can be inferred. Alan Goodman next tackles a difficult task: the assessment of nutritional status in past populations. He reviews current issues in the study of nutritional stress in archeological studies and examines how stress indicators in bone and teeth (linear bone growth, linear enamel hypoplasias, and porotic hyperostosis) indicate the functional consequences of nutritional deprivation. He reminds us that stress indicators linked to bone and teeth can be difficult to interpret because they are amorphous in timing, duration, and cause and may obscure the reasons for morbidity and mortality. Regardless, paleo-nutritional studies have provided many insights into human social changes including the transition from gathering-hunting to horticulture.

In the following chapter, Katherine Moore also examines bones, but in this case those of animals found in the assemblages associated with past human diet. She highlights that transitions in human social organization have been identified via analysis of animal and food remains, including the domestication of animals, changes in foraging patterns, and the origins of stratified societies. In her chapter she describes how bones and other animal remains are used to understand past cuisine and the nutritional consequences of past diets, and examines how taphonomy, the changes that occur to bones and other assemblages after death, can affect interpretation. She also discusses how zooarchaeologists infer dietary intake from animal remains using models from social anthropology, ecology, and veterinary anatomy. She concludes with an analysis of how archeologists can use the full archeological assemblage—what is present, what is missing, how the bones were butchered and cooked—to derive a picture of past human diet, especially in reference to the social habits of our species.

In the next chapter of this section, Janet Monge discusses how evolution and foodways are connected and how they can be studied together to better understand how food use may have influenced evolutionary change. She identifies a central question: “Can an understanding of the diet of our ancestors give us insights into modern human diets and the adequacy of these diets for the maintenance of long-term health?” To answer this question, she provides background on five stages of human evolution: generalized omnivory, shifts in food types due to hominid ancestors’ movement into novel environments, the development of social eating and cooking in conjunction with the integration of higher quality protein from animal sources, the expansion of agriculture and the domestication of animals, and the now globalized food trade that introduces human populations to a larger range of potential comestibles. She details the evidence for each stage and points the reader to studies that define good practices for research in these areas.

The final chapter in this section, by Karen Bescherer Metheny, pulls together how we know what we think we know, how we found the evidence, how it has been analyzed, and appropriate inferences that can be drawn about diet and evolution. It is a fitting conclusion, allowing us to think through the various processes that are used to create, analyze, and report our biocultural data. Metheny points out that research in past foodways is informed by experimental archeology as well as ethnoarcheology; the former shifts research paradigms from inductive to deductive methods of reasoning. Past archeological methods more typically relied on the description of observations to lead to inferences about behavior, the classic inductive model. Newer archeological methods propose specific hypotheses which are tested using the evidence uncovered. Similarly, ethnoarcheology allows researchers to propose specific questions about behavior and to test if living human groups (with cultures presumed similar to those of the past) create similar assemblages of artifacts. Metheny then provides examples of research using ex-

perimental archeology and ethnoarcheology, and analyzes how such studies lead to increased understanding of past foodways.

Volume One of *Research Methods for Anthropological Studies of Food And Nutrition* is designed to provide readers with a grounding in the research, theory and methods that allow for data collection and analysis in the biocultural anthropology of food. This approach allows for students and advanced researchers to think through the full range of anthropological query relating to biological and archaeological studies; Volumes Two and Three cover sociological, linguistic, and applied research.