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ORIGINAL RESEARCH

Plant-animal subsistence ratios and macronutrient energy estimations in worldwide hunter-gatherer diets - Review of the evidence

Dott. A. Colonnese[1]

1 Nutritional Biologist, Italy

1. ABSTRACT

The analyzed study indirectly reconstructed the likely energy composition of hunter-gatherer diets using an ethnographic collection of information on plant and animal subsistence sources. The authors estimated that 73% of the societies considered obtained over half of their subsistence from animal foods and projected a protein share of 19–35% of energy, with carbohydrates at 22–40%. The available material is only the abstract, so the sample size, selection criteria for the ethnographic collection, and details of the calculations are not reported.In the "The Choice to Live in Health or Illness" section by Dr. A. Colonnese and R. Panzironi, the publication contributes primarily to the description of a higher average dependence on animal sources in many hunter-gatherer societies. However, it does not demonstrate that all pre-agricultural populations had the same diet, nor does it directly compare these estimates with modern Western diets. Subsequent evidence confirms that environment, seasonal availability, and fishing activities strongly modify the ratio between plant and animal foods; genetic studies also show relatively recent human adaptations to specific dietary changes. The narrative is therefore confirmed indirectly and with significant limitations regarding generalizability.

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MISSION

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Through articles, reviews, in-depth analyses and expert contributions, the Journal champions evidence-based medicine and science, fostering a correct interpretation of scientific data and countering misinformation. Every piece of content is developed with the aim of translating the complexity of research into understandable, useful and applicable information, while keeping intact the principles of accuracy, transparency and scientific independence.

Free from political, industrial and commercial influence, the journal stands as an authoritative and independent editorial space, dedicated to promoting scientific culture, professional development and the growth of health awareness among the public.

2. ANALYZED STUDY

The research question was whether it was possible to estimate, based on ethnographic data, how much energy was derived from plant and animal foods in the traditional diets of hunter-gatherer populations distributed across different environments. The hypothesis was that, when ecological conditions allowed, animal foods provided a significant portion of energy and resulted in a diet relatively rich in protein and lower in carbohydrates.This question is relevant to the book's section because the publication was used to support a specific part of the narrative: that many hunter-gatherer societies obtained the majority of their subsistence from animal foods. The work, however, is a comparative reconstruction based on pre-existing data, not a direct measurement of the dietary intake of people who lived in the Paleolithic era. For this reason, it can describe estimates and trends in the ethnographic populations considered, but it cannot demonstrate a single diet for all pre-agricultural humans, nor can it establish which diet is optimal for the contemporary population.

3. MATERIALS AND METHODS OF THE ORIGINAL STUDY

The study used an ethnographic compilation of subsistence methods, i.e., information collected by observers on how much each population depended on gathering plants, hunting, and fishing. The authors transformed these reports into estimates of the percentage of energy obtained from different foods and simulated how the fat content of prey could modify the energy share of proteins and fats.The available text indicates that hunter-gatherer populations in ecologically diverse environments were considered and that ranges of
macronutrients—proteins, fats, and carbohydrates that provide energy—were calculated. The exact sample size, the inclusion and exclusion criteria for the societies, the historical period of the observations, the conversion formulas, and the detailed statistical analyses are not reported in the available material. No individual participants, interventions, control groups, follow-ups, or clinical outcomes are described, as this is not a human trial.

4. RESULTS

The main finding is that, according to the authors' reconstruction, animal-based foods often contributed predominantly to subsistence. Specifically, 73% of the societies considered reportedly derived over 50% of their subsistence from animal sources; the range indicated for this category was at least 56–65% of energy. Only 14% of the societies reportedly derived more than half of their subsistence from gathered plants.In simple terms, the model suggests that in many of the included populations, hunting and fishing counted for more than plant gathering in providing energy. The authors therefore estimated a protein intake equal to 19–35% of total energy and a carbohydrate intake of 22–40%. This implies a relatively high estimated protein share and a relatively contained estimated carbohydrate share in the reconstructed model.The abstract does not report statistical probability values, confidence intervals, or direct quantitative comparisons with modern Western diets. Therefore, the book's statement regarding higher protein and lower carbohydrate content compared to Western diets is biologically compatible with the estimated ranges, but it does not represent an experimental comparison performed by the original study.

5. INTERPRETATION

The most immediate significance of the study is historical-descriptive: in the ethnographic societies included, animal sources could contribute significantly, and often predominantly, to subsistence. The segment actually documented is therefore: ecological availability of animal resources greater energy contribution from hunting and fishing estimation of a diet with more protein and fewer carbohydrates compared to a diet based primarily on starch-rich plants.This interpretation requires caution. Ethnographic categories are not necessarily equivalent to individual food diaries measured using uniform methods. Furthermore, a higher proportion of animal foods does not automatically imply a diet low in plants, nor does it allow for the deduction of health effects. The publication subject to the Evidence Review does not study obesity, diabetes, cardiovascular diseases, or mortality.The second part of the book, which suggests that human metabolic

makeup has remained substantially unchanged with few exceptions, is not documented by this study: no genetic, physiological, or metabolic analyses were performed here. In fact, independent genetic evidence indicates that some populations have developed recent adaptations linked to the consumption of milk or starch-rich diets, without this implying a uniform adaptation of the entire species.

6. INDEPENDENT CONFIRMING EVIDENCE

A first independent line of research clarifies the second part of the book's paragraph regarding dietary adaptations. In a comparative genetic study, Perry and colleagues observed that populations traditionally exposed to starch-rich diets possessed, on average, more copies of the *AMY1* gene, which is associated with a higher quantity of salivary amylase, the enzyme that begins starch digestion in the mouth. The result supports the existence of diet-related adaptations, but it is an association between populations and does not prove that the shift to agriculture is the sole cause of the genetic difference [1].A review on lactase persistence—the ability to digest lactose in adulthood—documents another example of recent evolution linked to dietary and pastoral practices. The genetic variants associated with this trait emerged and were selected for in certain populations, showing significant geographical differences. This evidence confirms that the exceptions cited in the book are real, but it makes the idea of a metabolically static genome over the last ten thousand years seem overly simplistic [2].Regarding the dietary core of the narrative, an integrated review of ecological, ethnographic, and nutritional data concludes that humans generally consume more meat than other primates and that animal foods take on greater importance in cold climates or where fishing and livestock farming are significant. However, the same review notes that among contemporary hunter-gatherers in warm climates, an average ratio close to 50% plant-based and 50% animal-based is common. It therefore confirms that animal sources can be central, but it does not validate a universal prevalence of animal-based diets [3].

7. CONFLICTING EVIDENCE

A critical review specifically dedicated to hunter-gatherer nutrition identifies significant limitations in global estimates derived from historical ethnographic collections. The original sources did not always use the same unit of measurement: in some cases, subsistence dependence could refer to food weight, in others to energy, or to categories that were not perfectly comparable. This heterogeneity makes conversion into uniform energy percentages uncertain.The authors also report that, outside of circumpolar regions, some well-studied groups obtained a large portion of their diet from wild plants: approximately 60–80% among the !Kung and approximately 50–65% among the Hadza, with seasonal variations. This does not refute the fact that many populations made intensive use of animal resources; however, it contradicts the generalization of an ancestral diet universally dominated by animal foods and low in carbohydrates [4].No directly conflicting evidence sufficiently relevant to the descriptive data that hunting and fishing played an important role in numerous societies has been identified; this does not prove the absence of contrary findings. The main element of uncertainty concerns, rather, how reliable it is to transform non-standardized ethnographic data into a single, global estimate of the Paleolithic diet.

8. QUADRO COMPARATIVO E SINTESI DELLE EVIDENZE

The table distinguishes the publication under review from independent evidence. Global estimates regarding hunter-gatherer diets require particular caution because they depend on heterogeneous ethnographic data.

Quadro comparativo

Reference	Study type	Population or model	Main result	Direction of evidence	Strength of evidence
Original study	Comparative ethnographic analysis with nutritional estimates	Hunter-gatherer societies; sample size not reported in available material	73% of societies reportedly obtained over half of their subsistence from animal foods; protein estimated at 19–35% of energy	direct confirmation	moderate
[1]	Observational comparative genetic study	Human populations traditionally exposed to diets with varying starch content	Populations with high traditional starch consumption had, on average, more AMY1 copies and more salivary amylase	indirect confirmation	moderate
[2]	Genetic-evolutionary narrative review	Human populations with different histories of pastoralism and milk consumption	Lactase persistence is an example of recent and geographically variable genetic adaptation	indirect confirmation	moderate
[3]	Integrated review of ecological, ethnographic, and nutritional data	Hunter-gatherers and other small-scale societies	Animal sources are more important in cold climates, but in warm-climate groups, the average plant-to-animal ratio is close to 50/50	biologically consistent evidence	moderate
[4]	Interdisciplinary critical review	Ethnographic and nutritional data from hunter-gatherer populations	Non-standardized global estimates may overestimate animal contribution; many groups rely heavily on plants	discordant evidence	moderate

9. SINTESI EDITORIALE E CONCLUSIONI

CONCLUSIONS

The study analyzed directly supports the fact that, in the ethnographic collection used by the authors, many hunter-gatherer societies relied predominantly on animal foods and exhibited relatively high protein estimates. This conclusion is useful for describing a trend within the sample, but it requires caution because it is derived from indirect reconstructions rather than standardized dietary measurements.The book's narrative is moderately supported regarding the often significant role of animal foods, but not regarding the idea of a uniform ancestral diet or substantial human metabolic immobility. Available evidence indicates broad ecological variability and population-specific genetic adaptations. The connection is therefore confirmed indirectly and requires a contextualized formulation.

Aggiornato al 17/11/2026. Questo contenuto riflette una sintesi divulgativa delle evidenze scientifiche al momento della pubblicazione e non sostituisce il parere medico.

10. TRANSPARENCY AND SCIENTIFIC RESPONSIBILITY

Artificial Intelligence was used solely as a tool for editorial and documentary support. All content, interpretations, bibliographic citations and conclusions have been verified, reviewed and approved by the author, who assumes full scientific responsibility for them.

The manuscript was also subjected to independent peer review prior to publication.

To ensure the greatest transparency, the complete history of the article, including the dates of submission, revision, acceptance and publication, as well as information on the peer review process, is available on the dedicated Article History page.

11. RIFERIMENTI BIBLIOGRAFICI

[1] **Diet and the evolution of human amylase gene copy number variation**
Perry et al., 2007
Nature Genetics
DOI: https://doi.org/10.1038/ng2123

[2] **On the Evolution of Lactase Persistence in Humans**
Ségurel et al., 2017
Annual Review of Genomics and Human Genetics
DOI: https://doi.org/10.1146/annurev-genom-091416-035340

[3] **Effects of Evolution, Ecology, and Economy on Human Diet: Insights from Hunter-Gatherers and Other Small-Scale Societies**
Pontzer et al., 2021
Annual Review of Nutrition
DOI: https://doi.org/10.1146/annurev-nutr-111120-105520

[4] **Current views on hunter gatherer nutrition and the evolution of the human diet**
Crittenden et al., 2017
American Journal of Physical Anthropology
DOI: https://doi.org/10.1002/ajpa.23148