

CASE TEACHING NOTES

for

“The Modern Caveman’s Dilemma: Who Should Eat the Paleo Diet?”

by

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INTRODUCTION / BACKGROUND

During the Paleolithic era, which covers a period from 2.6 million years ago until 10,000 years ago, the human life expectancy was only 33 years—half of what it is today (Caspari & Sang-Hee, 2004). We owe our more extended lives to better hygiene, medicines, and, with the advent of agriculture, more plentiful foods (CDC, 1999). Yet some people aspire to return to that earlier era, at least at dinnertime. The Paleolithic diet (Paleo for short) is borne out of the belief that humans are optimally adapted to the foods available to our hunter-gatherer ancestors (O’Keefe & Cordain, 2004; Cordain et al., 2007). Followers avoid products of traditional agriculture such as grains, milk, legumes, and meat from farmed animals because they believe that our bodies have not had the time to evolve to them. Instead, their diet consists of wild game meat (though free-range and grass-fed meats are often deemed acceptable), fish, nuts, seeds, and some select fruits and vegetables. How widespread is it? The book *The Paleo Solution* by Robb Wolfs is a *New York Times* best seller (Wolfs, 2010). A quick Google search using the keywords “Paleo diet” yielded 4,460,000 results. At our institution, an informal survey of dietary practices revealed that almost 10% of our students adhere to some version of this diet. One of the ways in which this diet has become popularized in recent years is through its promotion at Crossfit gyms.

This case study explores the health, environmental, athletic, and evolutionary aspects of the Paleo diet. It begins with a fictitious account of a woman who recently joined a gym and is encouraged to try the Paleo diet by her newfound athletic community. She discusses the pros and cons of this decision with her children, home from college at Thanksgiving. Each child has expertise in one field (nutrition science, exercise science, sustainability, and anthropology/evolution) and provides his or her perspective on the diet. The case is run as a jigsaw and

a role play and can be completed in 60 minutes, though a 90-minute period would allow for a fuller discussion.

This case was designed for an introductory nutrition course, but could also be used in an anthropology, evolution, human kinetics, or even introductory biology course. Students who did this case had a background in nutrition (the survey course gave them a foundation in macronutrients—carbohydrates, fats, and proteins—and micronutrients—minerals and vitamins), and while this knowledge is not strictly necessary, being able to differentiate between the three macronutrients and their roles in the body would be beneficial in understanding the case. This case was taught to a class of 20 students and can easily be adapted for larger classes.

Objectives

At the end of this case study, students will be able to:

- Describe the Paleo diet, how its food choices differ from a standard North American diet, and the health, athletic performance, and environmental implications of these food choices.
- Critically evaluate the ideological grounding of this diet (i.e., evaluate whether it is based on sound evolutionary principles and provide arguments for this conclusion).
- Weigh competing priorities and evidence in determining whether someone should follow a particular diet plan.

CLASSROOM MANAGEMENT

Overview

Part I of the case study begins with a story about Karen, who is trying to determine whether she should follow a Paleo diet. Her children are home from college for Thanksgiving, ready to provide their perspective and assist her in her decision. This section is followed by a jigsaw activity (Part II of the case), where students are directed

to become experts in one particular field (representing the academic expertise of one of the children), and where they decide how this background will affect their perspective on the diet. In their small group, all the experts in one field agree on their recommendation to their mother about the Paleo diet. The jigsaw continues in Part III by recreating a family discussion at a dinner table, with each of Karen's children (i.e., one expert from each of the jigsaw teams). The jigsaw at this point becomes a role play and a dinner conversation ensues where each student provides his or her expert perspective on the diet to help the mother reach a sound decision.

A twist is unexpectedly thrown at the students, because the instructor provides an additional consideration to the final decision (each dinner table is given a different factor to consider about the family's circumstances). Following these dinner table discussions, the whole class is reconvened. Each dinner table family reports on its final recommendation to the mother. This is followed by a whole class discussion about the health and ideological implications of the Paleo diet.

The classroom management is diagrammed below in Figure 1 to help visualize the process.

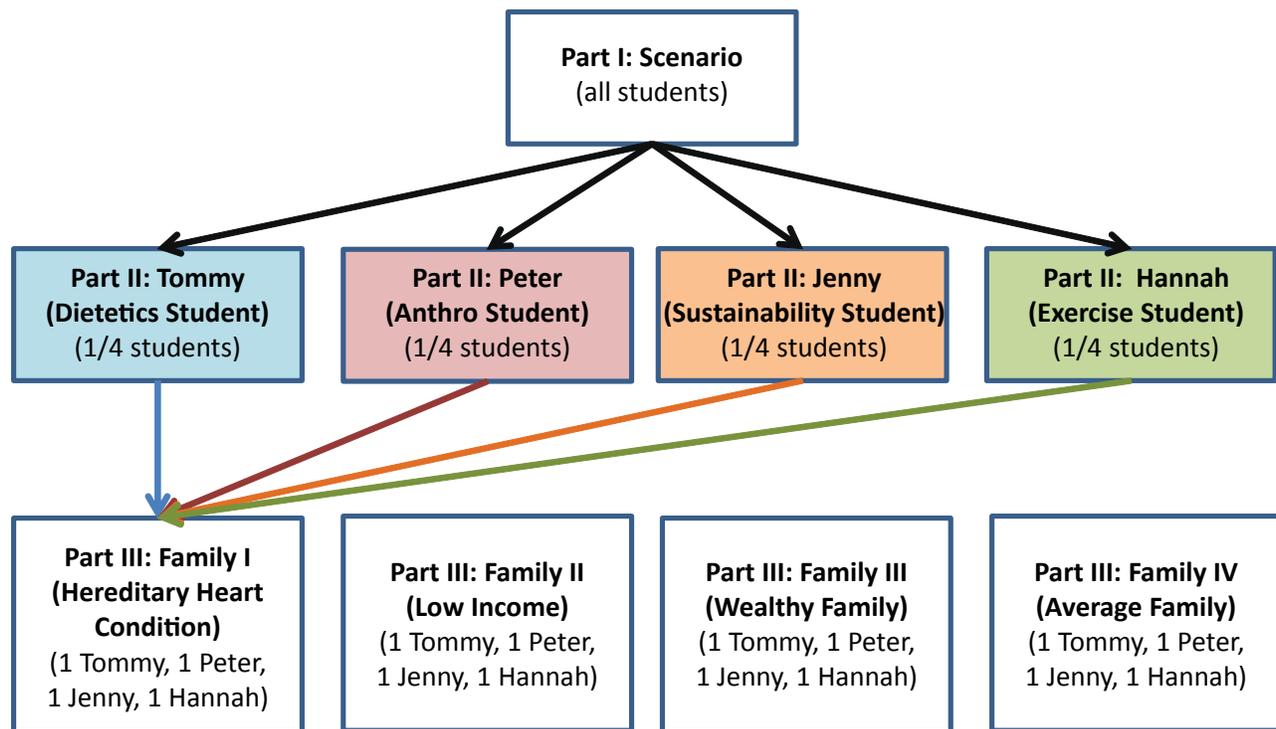


Figure 1. Classroom management for this case study. All students begin with a common scenario in Part I. In Part II, students are split up into four groups, with each group representing one of Karen's children (Tommy, Peter, Jenny, and Hannah). Since each sibling has a background in a different discipline, students in each team are given a role-play sheet for that character that includes information about how an expert in that discipline might view the Paleo diet. In Part III, one person from each of the sibling groups come together to recreate a family dinner (with one Tommy, one Peter, one Jenny, and one Hannah making up the family). For clarity, only one such recreated family (Family I) is diagrammed, but a similar process generates family II, III, and IV. Each family is given a slightly different context (e.g., Family II is low income), and the four siblings are asked to combine their newly acquired expertise to tackle the central question of whether Karen should adopt a Paleo diet. This is followed by each family reporting their decision and a whole class discussion in Part IV, which is not shown.

Part I: Is the Cavemen Diet Right for Karen? (5 min)

This first section of the case introduces the Paleo diet, presents the dilemma of the main character (should Karen become a Paleo dieter?), and sets the scene for the activities that will ensue. There are several ways to go about doing this section. A case study hand-out may be distributed to all students and one volunteer may be asked to read this scenario aloud to the whole class. Alternatively, each student could be asked to read this part quietly and individually. This section requires only that students read the scenario. It should take no more than 5 minutes to complete.

Part II: Sibling Analysis (20 min)

This section is the start of the jigsaw format and gives students expertise in one of four different fields.

The first step is to assign students to one of four groups. This can be done in one of several ways: by pre-assigning students to specific teams (and writing the team assignments on the board), or by going around the classroom and asking students to “count off” (the first one saying “1,” the next saying aloud “2,” the next “3,” the next “4,” and the next “1” again, then “2,” etc., until each student has been assigned to one of the four teams). The important thing is to break the students evenly among four different groups. The groups should be of a size that can work together collaboratively (a team of five students works quite well). If the class is very large, it may be necessary to break the four teams into smaller sub-groups (i.e., have multiple groups labeled as “team 2” that work in parallel).

Each group will take on the role of one of the siblings in the family (i.e., a student in anthropology, a dietetic student, an exercise science student, and a student concerned about environmental sustainability). The instructor gives a different role-play fact sheet representing the knowledge that that family member has on the subject to each team. In other words, the instructor provides the hand-out Role Play Sheet for Tommy to one of the teams, the hand-out Role Play Sheet for Peter to another team, and so on. Each team must go over the fact sheet and answer the questions provided at the end of the hand-out. These questions direct students to use their new knowledge to come to a consensus about their perspective on the Paleo diet and their recommendation to their mother. Students should develop an argument, based on the evidence provided, that will convince Karen and their siblings that their perspective on the Paleo diet is the correct one. At this

point, they should not share their knowledge with any of the other teams (the other siblings).

The instructor should visit each group to answer questions that arise. Note that the Answer Key contains some of the main lines of argument and conclusions that each team is expected to reach based on the evidence provided (i.e., each team’s answers to the questions at the bottom of the hand-out).

Students have 20 minutes to complete this section.

Part III: Family Dinner Role Play (25 min)

Having acquired the expertise and the perspective of one family member, students assemble into re-formed groups to complete the jigsaw. Teams of four students assemble to recreate a complete “family,” with one of each sibling represented in every group. In other words, each team will have a Tommy, a Peter, a Hannah, and a Jenny. In our experience, we pre-assigned each student to a family and wrote the new teams on the board. This process could be performed more ad hoc by directing students from each expert team to stand in one corner of the room, and then asking one person from each team to advance forward, thereby creating a family team. If there is an unequal number of students from one of the expert teams, two students of one expert group may join a family team (e.g., if there is a surplus of Tommys, one family may have two Tommys at its dinner table).

Over dinner, the task of the students is to discuss whether their mother Karen should follow the Paleo diet. Each person should try to convince his or her siblings that his or her opinion of the Paleo diet is the most logical. The whole family should agree on a final decision and justify it. They may select a spokesperson to report on their decision to the whole class.

As an added twist, each family is given (at the beginning of this task) an additional factor to consider in its decision. The instructor should give each team one of the four conditions (provided as Part III of case): one family has a father with a cardio-vascular condition, one is a low income family, one is a wealthy family whose income comes from processed foods, and the last one has no particular conditions imposed on its discussion.

The instructor should visit each group to answer any questions that students may have.

Students have 15–20 minutes to discuss their recommendations in their team. Once each family has had the opportunity to discuss the factors involved and made a decision about their recommendations to their mother, a spokesperson for each family should quickly

report to the whole class on its family's decision and the main arguments that have led to this conclusion. This reporting should take a further 5–10 minutes.

Part IV: Whole Class Discussion (10–20 min)

If any of the groups missed some of the main points during their presentation, now is the time for the students or the teacher to address them (the instructor can decide what the “main points” are, though suggested topics can be found in the Answer Key since the questions at the end of each section were designed to bring these up). Discuss why these points were not brought up by the team. Were they deemed unimportant? Why? Were some characters less passionate about their views?

As a way to wrap up this case study, the instructor can ask the following questions to the class.

- It seems that on health, environmental, and exercise performance grounds, the Paleo diet is neither particularly advantageous, nor particularly detrimental, compared to a standard North American diet. Perhaps the most compelling reason for Karen to consider this diet is social. Her new circle of friends organize social events (e.g., dinners) based on this diet, and eating with them would allow her to participate in the group. Given the benefits and drawbacks of this diet, is this a good enough reason for Karen to alter her diet? Why or why not?
- The evolutionary “story” used to sell the Paleo diet may be appealing, but it is perpetuating misunderstandings of the evolutionary process. Does it matter if the Paleo diet uses a (false) evolutionary ideology to market itself? Why or why not?

The instructor can spend at least 10 minutes in this whole class discussion.

Follow-Up / Extension Activities

Independent Research Project

The information provided in the hand-outs for each sibling is highly summarized. Students should select one of the arguments and explore it in greater depth. For example, what is the relationship between low carb diets and exercise performance? What are examples of recent human evolution? Students can research this in the scientific literature and then write a review paper summarizing their conclusion. This review paper should cite no fewer than 10 primary sources.

Which is the Best Diet?

Students select 3–5 popular diets and explore the scientific literature to determine which is the best one according to one of the categories explored in this case (health, environmental, sports performance—it could also include cost). The conclusions are written in the form of a short essay evaluating, comparing, and contrasting the 3–5 diets according to this criterion.

Paleo versus Paleolithic

Students are guided to read one of the articles published by Cordain on the rationale for the Paleo diet (O'Keefe & Cordain, 2004; Cordain et al., 2007). In addition, they are invited to watch the one-hour lecture by Marlene Zuk in which she summarizes her book *Paleofantasy* and the arguments she makes in her work (Zuk, 2013b). The assignment is to compare and contrast the two works, and to find places where the two clash and where they agree. Students can prepare a presentation or an essay on this analysis.

Paleofantasy Book Report

Students read the book *Paleofantasy*, in which the author explores some of the myths about our Paleolithic ancestors, including diet, exercise, and evolutionary adaptations (Zuk, 2013a). The assignment is to write a book report in the following format. For each chapter, the student must write a one-paragraph summary (300 ± 50 words), and include a descriptive title that summarizes the chapter. In addition, students must provide an abstract for the book and a critical reflection in which the student analyzes the strengths and weaknesses of the book and what they liked and didn't like about it.

Your Inner Fish Book Report

Marlene Zuk's book *Paleofantasy* (Zuk, 2013a) addresses the fallacy that what evolution produces is the best solution; rather, she makes the point that evolution builds and is constrained by previous adaptations and that an adaptation only needs to be “good enough”—it doesn't need to be the best solution. Another work which makes this point is Neil Shubin's book *Your Inner Fish*, in which the author uses examples from human anatomy to make these same points (Shubin, 2009). If this case study is used in an evolutionary biology section of a course, then one possible assignment is a book report (see format for the proposed assignment above) for the book *Your Inner Fish*. This book was made into a PBS documentary of the same name in the spring of

2014, so other assignments could be devised using the video instead.

Suggestion for Shortening the Case

If time is in short supply, then it is relatively easy to modify this case. At the end of class, allow students time to read Part I together and assign each student to a team. As a homework assignment, students must read the hand-out appropriate to their role. When they return to class, they convene with their team to discuss the information provided on the handout. This is followed by the role play. This format should cut out about 20 minutes of the case necessary for reading and absorbing information for the role play and uses class time for collaborative activities such as discussions and resolution of the case.

ANSWER KEY

Answers to the questions posed in the case study are provided in a separate answer key to the case. Those answers are password-protected. To access the answers for this case, go to **the key**. You will be prompted for a username and password. If you have not yet registered with us, you can see whether you are eligible for an account by reviewing our **password policy and then apply online** or write to **answerkey@sciencecases.org**.

REFERENCES

- Caspari, R., and Sang-Hee, L. 2004. Older age becomes common late in human evolution. *Proceedings of the National Academy of Sciences* 101 (20): 10895–10900.
- CDC. 1999. Ten great public health achievements—United States, 1900–1999. *JAMA*. 281(16): 1481.
- Cordain, L., Eaton, S.B., Sebastian, A., Mann, N., Lindeberg, S., Watkins, B.A., O’Keefe, J.H., and Brand-Miller, J. 2007. Origins and evolution of the Western diet: health implications for the 21st century. *American Journal of Clinical Nutrition* 81: 341–354.
- O’Keefe, J.H. Jr, and Cordain, L. 2004. Cardiovascular disease resulting from a diet and lifestyle at odds with our Paleolithic genome: how to become a 21st-century hunter-gatherer. *Mayo Clin Proc.* 79(1): 101–108.
- Shubin, N. 2009. *Your Inner Fish: A Journey into the 3.5-Billion-Year History of the Human Body*. Vintage.
- Wolfs, R. 2010. *The Paleo Solution: The Original Human Diet*. Victory Belt Publishing.
- Zuk, M. 2013a. *Paleofantasy: What Evolution Really Tells*

Us About Sex, Diet, and How We Live. WW Norton and Company.

Zuk, M. 2013b. *Paleofantasy: What Evolution Really Tells Us about Sex, Diet, and How We Live*. Lecture recorded at the Harvard Museum of Natural History, April 10, 2013. Retrieved <http://vimeo.com/65250040> on 17 December 2013.



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