

The Cost of Nutrition

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Abstract: Two studies reach different conclusions about the price for healthy eating. Let's break them down.

Depending on what report you choose to believe, America is still the fattest country in the world. Or it's a close second to Mexico. Or – in a rare bit of positive news on this topic -- it has fallen to 27th, behind seemingly healthier nations like Iceland, Chile, and the small Pacific island of Kiribati. (Better than the days when the average American could actually *eat* the small Pacific island of Kiribati.)

These reports use different criteria to define obesity, hence the varying results. And that's fine: As long as researchers clearly define their methods, it's very acceptable to let the reader decide which finding is most credible. But here at Evolution, we are more interested in the "why's" behind the numbers - which made us take notice of an article commenting on the United Nations Food and Agricultural Organization report, the one claiming Mexico now ranks #1 in obesity. In this piece, the author cited rising average income as the main culprit, and *in the very next sentence* noted that the country's poorer citizens are the ones becoming fat. We can probably blame this inconsistency on shoddy editing, but it does raise a question: What relation, if any, does income have on food choices, and by extension, obesity?

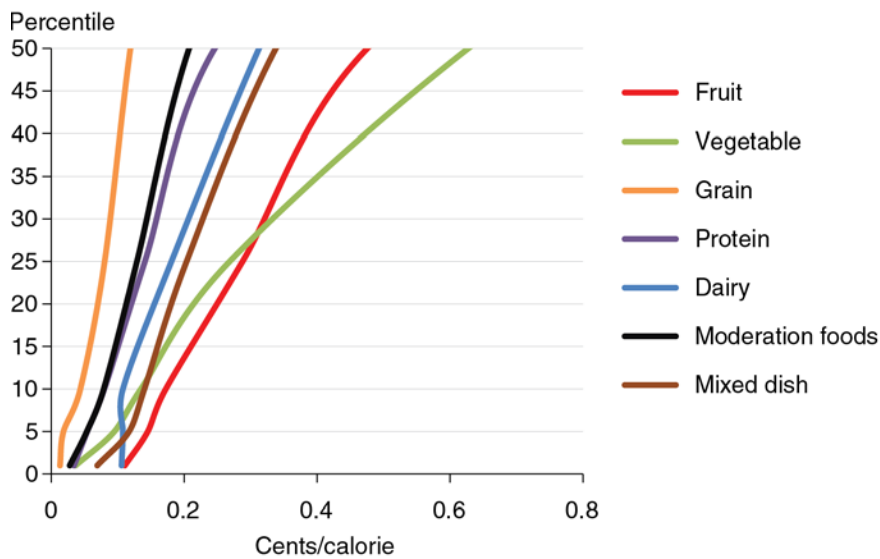
For many years, it was believed that a major obstacle in healthy eating was that foods high in nutrition tended to cost more than their unhealthy counterparts. This was most recently confirmed in a University of Washington study that collected prices on a market basket of 370 items in which – on a per-calorie basis – low-nutrition, high-energy foods were found to be **significantly** more affordable than healthy options. Indeed, the prohibitive cost of nutrition was a non-starter for many low-income families: They couldn't afford to even *consider* healthy foods, creating a spiral in which poor eating led to obesity, resulting in a lack of exercise, lethargy, and long-term health problems.

Recently the USDA conducted research that seems to debunk the notion that it costs more to eat better. Its scope was more ambitious, incorporating over 4,000 items and a more sophisticated food classification system. But the most important nuance in this study was how price was measured – not per calorie, as done by the U of W, but rather on per-weight and per-portion bases. The rationale for this approach is that a "healthy" diet is defined less by caloric intake and more by the incorporation of nutrition and balance, specifically

the presence of grains, proteins, dairy, fruits, and vegetables. Thus, with a focus on quality over quantity, any price comparison should use a “price per portion” calculus to determine food basket costs. And using this methodology, the USDA established that healthy eating can be as affordable as a diet high in junk.

Below are some of the key quantitative findings from this study. We believe this is the best evidence available to make the case that affordability is not an obstacle to a healthy diet. However, as seen in the closing comments, we also believe that these results can only be meaningful in the “real world” if individuals are disciplined and motivated to leverage them.

Distribution of food energy prices, up to 50th percentile



Source: Estimated from the NHANES 2003-04, CNPP Food Prices Database, and MyPyramid Equivalent Database 2.0.

(How to read graph: All items were ordered from lowest to highest in cost within each of their respective categories. The least expensive are plotted near the bottom of the y-axis, in their group’s lowest percentile. By definition, all the curves shown are positively-sloped, but the rate by which cents/calorie rises as you advance to higher percentiles gives an indication of category variability and overall impact on affordability.)

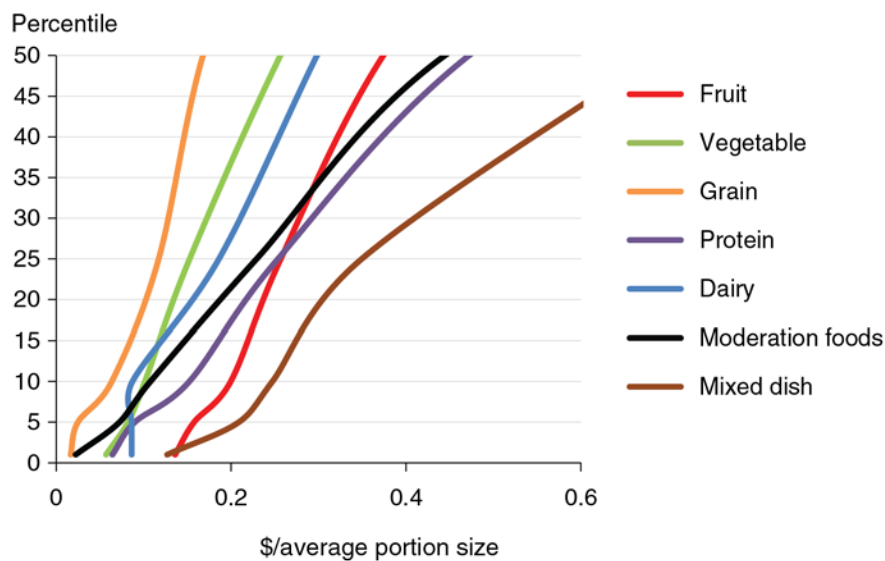
The above graph shows food energy prices (i.e., price per calorie) and confirms that on this measure “moderation foods,” or what the USDA cannot classify in any of the healthy food groups (see primer below), are among the cheapest, with only the lower-priced grains providing a lower-cost alternative. Vegetables can be affordable – those in the lower percentiles are comparable to moderation foods – but their prices rise rapidly as certain types are brought into the mix. Conversely, even the lowest-priced fruits are several times

more expensive than moderation foods, and the gap only widens as one moves up the continuum.

Moderation Foods - Primer

The USDA classifies a food as “moderation” if it has excess saturated fat per portion (4g or more for proteins, 3g or more for all other types); excess added sugars (1 teaspoon or more in an average portion); or excess sodium (at least 480 mg in an average portion). Note that nearly two-thirds of the items evaluated by the USDA for this study fell into the moderation foods group.

Distribution of price per average portion, up to 50th percentile



Source: Estimated from the NHANES 2003-04, CNPP Food Prices Database, and MyPyramid Equivalent Database 2.0.

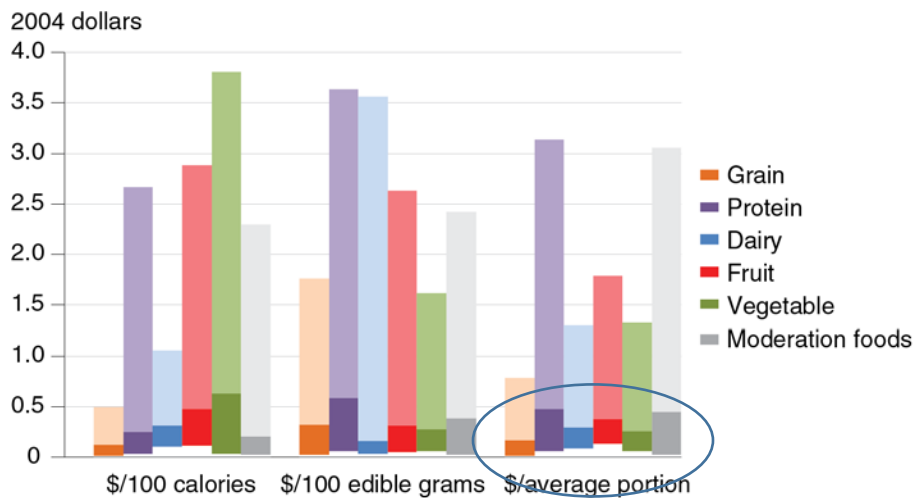
When price per portion is taken into account, a different story emerges. Here, moderation foods – while still being affordable at the lower end of the spectrum – increase at a high rate as costlier options are brought into the mix. (Note that mixed dishes are foods that meet the definition of more than one group and typically are a hybrid of moderation foods and one other category; hence, these exhibit characteristics of the moderation group.) Using this measure, the case can be made that healthy eating is just as affordable as unhealthy consumption, particularly as more elaborate variations on the latter are introduced.

So which study is more credible? The USDA’s argument that price per portion is the better metric is reasonable, as guidelines for consumption of fruits and vegetables are always based on a specific number of servings per day. (Rarely do you hear a directive to ingest,

say, 200 calories worth of broccoli as part of a balanced meal.) Similarly, standardizing total diet costs to a set number of calories ignores the fact that individuals with the same dietary goals can consume different amounts of calories, depending on metabolism, exercise levels, etc. Thus, assuming that an individual strives to adhere to the USDA food pattern in which consumption of each food group is defined in terms of cup- and ounce-equivalents per day, the argument that cost should be defined in terms of servings/portions is sensible.

The only caveat we would put forth is that, even within the general guidelines of a healthy diet, enough variations exist that a blanket statement asserting healthy eating is as affordable as unhealthy eating would be potentially misleading. See for example the following chart from the USDA study:

The prices of healthy versus less healthy foods vary with the measurement method



Notes: The dark areas of each bar represent the price range for the cheaper half of the foods in the category, while the lighter areas are the price ranges for the higher cost foods. White space at the bottom of the bars represents the start of the price range.

Moderation foods are foods that are high in sodium, added sugars, or saturated fat, or that did not contain foods from a food group.

Ostensibly, this graph is included to reinforce the point that when \$/average portion is considered, moderation foods become much more expensive than those deemed healthy. But take note of the dark areas in those bars under the per-portion aggregate (circled). These represent the cheaper half of items in each category. For moderation foods, these cheaper alternatives – which presumably would be sought by low-income families that lack unrestricted access to healthy foods – are less expensive than over two-thirds of the vegetables and 80% of the fruit in the USDA basket, even when measured on a per-portion

basis. Thus, when making the “affordability of healthy eating” case, it is vital to identify exactly what healthy foods are included in the calculation, and the number of servings required to meet dietary standards. While corn tortillas and raw carrots might be evidentiary, avocados at 2 for \$5 would clearly undermine the argument. The following table lists selected healthy foods and their price ranking within the USDA basket.

Rankings by price metric for selected foods

Food description	Ranking based on			Weight of average portion (g)
	\$/100 calories	\$/100 edible grams	\$/portion	
Healthy foods				
Vegetables				
Carrots, raw	3,658	1,254	560	47.66
Tomatoes, raw	4,365	2,390	1,309	56.36
Pinto, calico/red/Mex. beans; dry, cooked, fat added	67	138	189	119.98
Refried beans	965	827	1,553	146.17
Lettuce, raw	4,251	985	309	45.07
Onions, mature, raw (include red onions)	3,147	603	180	45.07
Romaine lettuce, endive, chicory, or escarole, raw	4,371	2,505	1,727	67.10
White potato, french fries, not specified as to fresh/frozen (not deep fried)	621	1,535	1,417	91.39
White potato, mashed, not further specified	673	310	811	161.56
Fruits				
Apple, raw	3,264	1,080	1,578	126.18
Banana, raw	1,671	645	1,068	126.18
Orange juice, canned, bottled, or in a carton	987	122	654	260.06
Grains				
Bread, multigrain	602	1,455	476	44.48
Oatmeal, cooked, regular, no fat added	936	227	727	199.36
Cheerios	1,627	3,243	1,605	43.86
Bread, white	398	1,045	441	52.39

Explanation: Lower rankings indicate that the food is less expensive, and higher rankings indicate that it is more expensive. While most healthy foods improve in rank when shown as \$/portion, certain ones become relatively costlier once they are re-framed as part of a meal, e.g., romaine lettuce, refried beans.

Again, this reinforces the point: Healthy eating *can*, in theory, be made affordable if the appropriate mix is defined. But without perfect information on prices and portions, consumers lack the knowledge to fully exploit the potential cost advantages identified in this study.

Comparison of The Two Food Cost Studies

Conclusion	Healthy Diet: More Expensive	Unhealthy Diet: More Expensive
Research conducted by	Center for Public Health Nutrition, University of Washington. Results reported in the Journal of the American Dietetic Association	Economic research arm of the US Dept. of Agriculture. Published in article: <i>Are Healthy Foods Really More Expensive? It Depends on How You measure the Price.</i>
Date of research	2011	2013
Methodology	The authors gathered the costs of 370 foods sold at supermarkets in the Seattle area	The authors estimated the cost of 4,439 food items by their price per calorie, per edible gram, and per average portion consumed. The study drew from three data sets (see * below)
Approach	The authors compared the price of a calorie of junk food to one consumed in a healthier meal. The underlying assumption is that consumers will seek to eat a stable number of calories per day, irrespective of the types of food consumed	The authors used weight and portion size as the guides, with the latter used as the comparator. "How much do you have to pay to put something on your plate?"
Key Finding	High-calorie foods are the better bargain. Energy-dense munchies cost on average \$1.76 per 1000 calories, compared to \$18.16 per 1000 calories of low-energy but nutritious foods	When measured on the basis of edible weight or average portion size, grains, vegetables, fruit and dairy foods are less expensive than most protein foods and foods high in saturated fat, added sugars, and/or sodium
Secondary Finding	The survey also showed that low-calorie foods were more likely to increase in price, surging 19.5% over the two-year study period. High-calorie foods remained a relative bargain, dropping by 1.8%	When following typical dietary guidelines, it is less costly to meet the grains, dairy and fruit recommendations than those for vegetables or protein foods
Caveat	It is easier to 'cheat' on junk food, both because it tastes good and because greater volumes are required for eaters to feel satisfied. Still, even those who consume twice as much in junk food calories are spending far less than healthy eaters	A 'healthy' diet, as defined here, requires the consumer to possess far more knowledge of its components than does an unhealthy diet. Thus, while in theory a healthy basket of foods could be comparable in p[rice to an unhealthy one, in practice such cost parity might be difficult to attain

* Datasets used for USDA study: The National Health and Nutrition Examination Survey (NHANES) to estimate the types and quantities of foods consumed; the USDA's Center for Nutrition Policy and Promotion (CNPP) food prices database for food prices; and the USDA Food Pattern Equivalent Database for information on food group classification, saturated fat, added sugars, and sodium content