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Comparing the Nutrient Rich Foods Index with "Go," "Slow," and "Whoa" Foods

ADAM DREWNOWSKI, PhD; VICTOR FULGONI III, PhD

ABSTRACT

The US National Heart, Lung, and Blood Institute has grouped foods and beverages into three classes: "Go," "Slow," and "Whoa," as part of a children's guide to eating right. Using nutrient composition data in the 2004 Food and Nutrient Database for Dietary Studies, this descriptive study compared the Go, Slow, and Whoa food classes to tertiles of food rankings generated by the Nutrient Rich Foods Index. A total of 1,045 foods and beverages were first assigned into Go, Slow, and Whoa classes and then ranked by the Nutrient Rich Foods Index nutrient profile model. The Nutrient Rich Foods Index model was based on nine nutrients to encourage: protein, fiber, vitamins A, C, and E, calcium, iron, magnesium, and potassium; and on three nutrients to limit: saturated fat, added sugar, and sodium, all calculated per 100 calories. Both the Go, Slow, and Whoa and the Nutrient Rich Foods Index models readily distinguished between energy-dense and nutrient-rich beverages and foods, and the three Go, Slow, and Whoa classes closely corresponded to tertiles of Nutrient Rich Foods Index scores. There were some disagreements in the class assignment of fortified cereals, some dairy products, and diet beverages. Unlike the Go, Slow, and Whoa model, the Nutrient Rich Foods Index model produced continuous scores that could be used to rank foods within a given class. The study provides an illustration of how diverse nutrient profiling systems can be used to identify healthful foods and beverages.

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The "Go, Slow, and Whoa" food classification system (1,2), developed by the National Heart, Lung, and Blood Institute, separates nutrient-dense from energy-dense foods. Designed to help children and families make smarter food choices (1,2), the Go, Slow, and Whoa system was an innovative example of nutrient profiling (3).

Assignments of foods and beverages to Go, Slow, and Whoa classes were largely based on calories, sugar, and fat. The National Heart, Lung, and Blood Institute documents described Go foods and beverages as dietary staples, low in calories and low in fat and sugar (1,2). Slow foods were higher in fat or added sugar or calories and were to be eaten sometimes, or several times a week at most. Energy-dense Whoa foods that were highest in fat or added sugar were to be eaten only once in a while or for special treats. Charts showing foods in the three Go, Slow, and Whoa classes are available online (1,2). Missing from such charts are difficult-to-assign mixed foods (1,2).

The Nutrient Rich Foods Index provides an alternative way of ranking or classifying foods (3-5). By calculating the amounts of key nutrients relative to calories, the Nutrient Rich Foods Index assesses the overall nutrient density of foods and beverages. The Nutrient Rich Foods Index algorithm is based on nine nutrients to encourage and three nutrients to limit, expressed as percent daily values per reference amount and capped at 100% (5-7). The Nutrient Rich Foods Index model was closely based on the 2005 Dietary Guidelines for Americans (8) and on the US Food and Drug Administration's criteria for allowing or disallowing health claims (9). Details of model development have been published (5-7).

This study compared the three Go, Slow, and Whoa food classes with tertiles of Nutrient Rich Foods Index scores. The hypothesis was that both models would distinguish between energy-dense and nutrient-dense foods.

METHODS

Nutrient Composition Database

Analyses in this descriptive study were based on the 2004 US Department of Agriculture Food and Nutrient Database for Dietary Studies 1.0, which includes energy and nutrient values for 6,940 foods (10). The first digit of the food code identifies one of the major food groups: milk and milk products; meat, poultry and fish; eggs; legumes, nuts and seeds; grain products; fruits; vegetables; fats and oils; and sugars, sweets, and beverages. For most foods in the database, Food and Nutrient Database for Dietary Studies 1.0 food descriptors specified the type of food (eg, fresh, frozen, canned), the mode of preparation (eg, baked, grilled, fried), and the mode of consumption (fat eaten or not). However, for some foods that information was not available (eg, "vegetables, not further specified"). Added to the present database were values for added sugars in foods obtained from the US Department of Agriculture Pyramid Equivalents Database (11) and val-

A. Drewnowski is director, Center for Public Health Nutrition, School of Public Health, University of Washington, Seattle. V. Fulgoni is senior vice president, Nutrition Impact LLC, Battle Creek, MI.

Address correspondence to: Adam Drewnowski, PhD, University of Washington, 305 Raitt Hall #353410, Seattle, WA 98195-3410. E-mail: adamdrew@u.washington.edu

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Table 1. Energy, water, and nutrient content of foods assigned into three classes by the Whoa, Slow, and Go system and by tertiles of Nutrient Rich Foods Index scores

					Nutrient Rich Food Index			
	Whoa (n=481)	Slow (n=253)	Go (n=311)	*P* value[a]	First tertile (n=348)	Second tertile (n=349)	Third tertile (n=348)	*P* value[a]
	← *mean±standard deviation* →				← *mean±standard deviation* →			
Energy (kcal/100 g)	309±150	230±169	108±82	<0.001	304±162	265±145	121±120	<0.001
Water (g/100 g)	38.9±29.7	52.1±30.6	74.4±17.8	<0.001	40.5±29.6	46.6±27.0	70.8±27.4	<0.001
Total fat (g/100 g)	15.3±14.6	10.5±15.9	3.0±4.4	<0.001	15.8±16.0	12.3±13.8	3.3±6.9	<0.001
Saturated fat (g/100 g)	5.4±6.7	2.2±3.0	0.9±1.7	<0.001	5.7±7.2	3.4±4.1	0.8±1.2	<0.001
Total sugar (g/100 g)	20.0±22.5	5.9±8.2	5.0±6.8	<0.001	24.7±23.5	5.9±10.1	5.9±8.0	<0.001
Added sugar (g/100 g)	18.5±22.3	3.3±7.1	1.6±4.5	<0.001	23.0±23.1	3.9±9.1	2.3±7.2	<0.001
Protein (g/100 g)	8.0±8.8	7.5±7.4	6.6±9.0	<0.067	5.4±6.5	10.8±9.2	6.1±8.7	<0.001
Fiber (g/100 kcal)	0.4±0.5	1.4±1.7	3.2±3.2	<0.001	0.4±0.5	0.8±0.9	3.3±3.1	<0.001
Vitamin A (μg/100 kcal	33±14	62±200	126±385	<0.001	15±27	27±46	163±410	<0.001
Vitamin C (mg/100 kcal)	3±13	8±32	38±86	<0.001	1±2	2±4	42±85	<0.001
Vitamin E (mg/100 kcal)	0.3±0.7	0.6±1.0	0.8±1.4	<0.001	0.2±0.4	0.3±0.3	1.0±1.7	<0.001
Calcium (mg/100 kcal)	32±65	39±60	66±97	<0.001	20±31	40±54	72±111	<0.001
Iron (mg/100 kcal)	0.7±1.5	1.0±1.4	1.3±1.5	<0.001	0.4±0.3	0.8±0.7	1.8±2.3	<0.001
Potassium (mg/100 kcal)	70±64	140±151	370±391	<0.001	57±64	98±80	375±375	<0.001
Magnesium (mg/100 kcal)	8±6	17±20	30±31	<0.001	6±5	12±9	32±32	<0.001

[a]*P* values are for main effects of one-way analyses of variance.

ues for Reference Amounts Customarily Consumed as defined by the US Food and Drug Administration (9).

Exclusion Criteria

Analyses were limited to foods that were listed >20 times on the first day of the 2001 National Health and Nutrition Examination Survey (n=1,364). Excluded were baby foods, infant formula, alcoholic beverages, powdered sweeteners, and dry cake mixes. Nutrient Rich Foods Index calculations were forced to exclude water and diet beverages (<10 kcal/100 g) to avoid dividing by zero.

Go, Slow, and Whoa Foods

Foods that were incompletely described were difficult to classify by the Go, Slow, and Whoa scheme. When the amount of fat and sugar added during preparation was not specified, that food could not be assigned to a Go, Slow, and Whoa class. Mixed foods were difficult to classify. Published Go, Slow, and Whoa charts (1,2) generally omit mixed foods such as soups, pizzas, and meat dishes. A total of 1,045 foods in the Food and Nutrient Database for Dietary Studies 1.0 database could be assigned to one of the Go, Slow, and Whoa classes by health professionals.

Fat-free and 1% milk were assigned to the Go class; 2% milk was Slow, and whole milk was in the Whoa class. Extra-lean ground beef was in the Go class; lean ground beef was Slow, and regular ground beef was Whoa. Broiled, baked, steamed, or grilled fish, poultry without skin, and trimmed beef and pork were all in the Go class, and fried seafood, fried chicken, and fatty meats were in the Whoa class. Steamed, boiled, or grilled vegetables were in the Go class; those cooked with fat, such as oil or butter, were Slow, and french fries, hash browns, and other deep-fried vegetables were in the Whoa class. Fresh and frozen fruit were Go; fruit in light syrup was Slow, and fruit in heavy syrup was Whoa. Sugar-free and diet beverages were Go; fruit juices (100%) were Slow, and sweetened beverages were Whoa. No sweets or snacks were Go; low-fat desserts and oven-baked chips were Slow, and cakes, cookies, chips, candy, and ice cream were all in the Whoa class.

The Nutrient Rich Foods Index

The Nutrient Rich Foods Index is an alternative nutrient profile model, one that has been validated against healthful diets (4-7). The Nutrient Rich Foods Index algorithm is the sum of percent daily values for nine nutrients to encourage (protein, fiber, vitamins A, C, and E, calcium, iron, potassium, and magnesium) minus the sum of percent daily values for three nutrients to limit (saturated fat, added sugar, and sodium). All percent daily values were calculated per 100 kcal and capped at 100% (4-7).

Statistical Analyses

Analyses were performed using the Statistical Package for the Social Sciences (SPSS version 11.0.1, 2001, SPSS Inc, Chicago, IL). Comparisons of energy and nutrient intakes by food category were conducted using one-way analysis of variance. An α level of .05 was used to determine statistical significance.

RESULTS AND DISCUSSION

The Go, Slow, and Whoa scheme achieved its stated goal of separating energy-dense from nutrient-dense foods, as shown in Table 1. Energy (kcal), water (g), fiber (g), and