

Supplemental Table S1: Food Frequency Questionnaire items categorized as ultraprocessed foods using strict and broad criteria

Food group	Food/beverage item	Strict UPF	Broad UPF
Beverages	Soft drinks, soda, or pop	x	x
	Meal replacement, energy, or high-protein beverages	x	x
	Fruit drinks (such as cranberry cocktail, hi-c, lemonade, or Kool-Aid, diet or regular)	x	x
	Iced tea		x
	tomato/vegetable juice		x
	orange/grapefruit juice		x
Cereals, breads, breakfast foods, and desserts	Biscuits	x	x
	Sweet muffins or dessert breads (including low-fat or fat-free)	x	x
	Donuts, sweet rolls, danish or pop tarts	x	x
	Cold (breakfast) cereals	x	x
	Cookies or brownies including low-fat or fat-free	x	x
	Pie	x	x
	Bagels, English muffins	x	x
	Applesauce	x	x
	Energy, high-protein, or breakfast bars	x	x
	Fruit crisp, cobbler, or strudel		x
	Breads/rolls as part of sandwiches		x
	Breads/rolls not as part of sandwiches		x
	Corn bread or corn muffins		x
	Pancakes, waffles, or French toast		x
Vegetables and mixed foods	French fries, home fries, hash browned potatoes, tater tots	x	x
	Pizza	x	x
	Potato salad		x
	Lasagna, stuffed shells, stuffed manicotti, ravioli, tortellini		x
	Macaroni and cheese		x
	Mexican foods (tacos, tostados, tamales, fajitas, enchiladas, quesdillas, and chimchangas)		x
	Cream soup, including chowders		x

Meat, poultry, and fish	Beef hamburgers or cheeseburgers	x	x
	turkey or chicken cold cuts (such as loaf, luncheon meat, turkey ham, turkey salami, or turkey pastrami)	x	x
	luncheon or deli-style ham	x	x
	other cold cuts or luncheon meats (such as bologna, salami, corned beef, pastrami, or others, including low-fat)	x	x
	sausage (including low-fat)	x	x
	hot dogs or frankfurters (not sausages or vegetarian hot dogs)	x	x
	fried chicken (including deep fried) or chicken nuggets		x
	Fish sticks or fried fish		x
	Beef stew, beef pot pie, beef and noodles, beef and vegetables		x
Sauces, dressings, and fats	Roast beef or pot roast (including in mixtures)		x
	mayonnaise	x	x
	ketchup	x	x
	margarine	x	x
	pancake syrup	x	x
	nondairy creamer	x	x
	gravy		x
Dairy products	salad dressing		x
	ice cream, ice cream bars or sherbet	x	x
	frozen yogurt, sorbet, or ices	x	x
	sour cream	x	x
	cream cheese	x	x
Salty snacks	crackers	x	x
	potato chips, tortilla chips, or corn chips (including low-fat, fat-free, or low-salt)	x	x
	pretzels	x	x
	popcorn		x
Confectionary	chocolate candy	x	x
	other candy	x	x

Abbreviations: UPF, ultraprocessed foods

Supplemental Table S2. Description of cohort by quartiles of ultraprocessed food intake using the broad criterion, NICHD Fetal Growth Studies-Singletons 2009-2013

Variables	Periconception and First Trimester Ultraprocessed Food Intake			
	Quartile 1	Variables	Quartile 1	Variables
Range (grams/day)	223.6 - 2323.1	2324.0- 3064.0	3067.0 - 3788.7	3789.9 - 7919.9
N	400	400	401	400
Age, years	29.13 (5.23)	28.48 (5.51)	27.98 (5.64)	26.83 (5.73)
Race				
Non-Hispanic white	48 (12.00)	101 (25.25)	100 (24.94)	84 (21.00)
Non-Hispanic black	51 (12.75)	98 (24.50)	134 (33.42)	193 (48.25)
Hispanic	156 (39.00)	128 (32.00)	113 (28.18)	89 (22.25)
Asian/Pacific Islander	145 (36.25)	73 (18.25)	54 (13.47)	34 (8.50)
Married or living with partner	324 (81.20)	307 (76.75)	293 (73.07)	251 (62.75)
Education				
<High school	59 (14.75)	47 (11.75)	37 (9.23)	39 (9.75)
High school or equivalent	69 (17.25)	70 (17.50)	76 (18.95)	97 (24.25)
Some college/associate	110 (27.50)	120 (30.00)	123 (30.67)	146 (36.50)
College undergraduate	95 (23.75)	90 (22.50)	94 (23.44)	69 (17.25)
Postgraduate	67 (16.75)	73 (18.25)	71 (17.71)	49 (12.25)
Income, thousands (US dollars)				
< 30	102 (33.12)	102 (30.18)	94 (27.65)	146 (40.44)
30-39	33 (10.71)	32 (9.47)	28 (8.24)	27 (7.48)
40-49	25 (8.12)	26 (7.69)	28 (8.24)	33 (9.14)
50-75	37 (12.01)	38 (11.24)	48 (14.12)	48 (13.30)
75-99	32 (10.39)	46 (13.61)	48 (14.12)	48 (13.30)
≥ 100	79 (25.65)	94 (27.81)	94 (27.65)	59 (16.34)
Full-time school or work	244 (61.00)	270 (67.50)	295 (73.57)	295 (73.75)
Insurance (private/managed care)	250 (64.27)	225 (58.44)	245 (62.66)	205 (52.97)
Parity				
0	180 (45.00)	190 (47.50)	190 (47.38)	177 (44.25)
1+	220 (55.00)	210 (52.50)	211 (52.62)	223 (55.75)
Sleep duration (hours/day)				

	5 to 6	63 (15.75)	57 (14.32)	50 (12.47)	75 (18.80)
	7	59 (14.75)	57 (14.32)	58 (14.46)	51 (12.78)
	8 to 9	171 (42.75)	190 (47.74)	183 (45.64)	160 (40.10)
	≥ 10	107 (26.75)	94 (23.62)	110 (27.43)	113 (28.32)
Pre-pregnancy BMI, kg/m <sup>2</sup>		24.42 (4.58)	25.07 (4.71)	25.66 (5.41)	26.12 (5.47)
Moderate and vigorous physical activity*, MET min/week		105.33 (93.50)	127.89 (103.38)	127.52 (113.07)	136.83 (115.72)
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Dietary Variables					
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Daily total energy, kcal/day		1689.9 (747.6)	1956.9 (828.9)	2183.0(952.4)	2832(1195.0)
Carbohydrates, % energy		54.9 (9.9)	53.2 (9.0)	52.7 (9.5)	53.4 (9.2)
Protein, % energy		16.2 (3.8)	16.1 (3.3)	15.8 (3.4)	15.1 (3.3)
Fat, % energy		31.4 (7.6)	32.4 (6.8)	33.5 (7.0)	33.3 (6.6)
Saturated fat, % energy		9.5 (2.6)	10.6 (2.6)	10.8 (2.4)	11.0 (2.4)
MUFA, % energy		12.3 (3.8)	12.8 (3.5)	13.0 (3.4)	12.7 (2.9)
PUFA, % energy		7.0 (2.5)	6.9 (1.9)	7.1 (2.0)	7.0 (1.8)
HEI-2010 (max. 100 points)		68.6 (9.4)	65.9 (11.0)	64.3 (10.1)	61.5 (9.4)
Self-defined vegetarianism†					
	yes	36 (9.28)	29 (7.36)	16 (4.05)	13 (3.34)
	no	352 (90.72)	365 (92.64)	379 (95.95)	376 (96.66)
Whole grain (servings/day)		0.7 (0.7)	0.9 (0.7)	1 (0.8)	1.1 (0.8)
Non-whole grain (servings/day)		4 (2.5)	4.5 (2.5)	4.8 (2.5)	6.3 (3.2)
Dark green vegetable (servings/day)		0.4 (0.6)	0.3 (0.5)	0.3 (0.5)	0.3 (0.3)
Tomato (servings/day)		0.3 (0.4)	0.3 (0.4)	0.3 (0.3)	0.4 (0.3)
Orange vegetable (servings/day)		0.2 (0.2)	0.1 (0.2)	0.1 (0.2)	0.1 (0.2)
White potato (servings/day)		0.2 (0.2)	0.2 (0.2)	0.3 (0.4)	0.5 (0.4)
Other starchy vegetable (servings/day)		0.2 (0.2)	0.2 (0.2)	0.2 (0.2)	0.2 (0.4)
Other vegetable (servings/day)		0.8 (0.7)	0.7 (0.6)	0.8 (0.7)	0.8 (0.6)
Citrus, melon, berry (servings/day)		1.1 (1.6)	1.2 (1.4)	1.3 (1.8)	1.6 (1.8)
Other fruit (servings/day)		1.7 (1.6)	1.6 (1.4)	1.7 (1.8)	2.3 (2.3)
Milk (servings/day)		0.9 (1.1)	1.1 (1.3)	1.2 (1.5)	1.2 (1.2)
Yogurt (servings/day)		0.2 (0.3)	0.2 (0.3)	0.2 (0.3)	0.2 (0.3)
Cheese (servings/day)		0.3 (0.4)	0.5 (0.5)	0.6 (0.5)	0.7 (0.6)

Meat (servings/day)	1.1 (1)	1.4 (1.2)	1.6 (1.5)	2.3 (1.6)
Organ meat (servings/day)	0 (0.1)	0 (0)	0 (0.1)	0 (0.1)
Cured meat (servings/day)	0.2 (0.3)	0.4 (0.6)	0.5 (0.6)	0.8 (0.8)
Poultry (servings/day)	0.9 (1.3)	1.1 (1.1)	1.2 (1.4)	1.6 (1.5)
Seafood high in omega-3s (servings/day)	0.5 (0.7)	0.4 (0.5)	0.4 (0.4)	0.4 (0.4)
Seafood low in omega-3s (servings/day)	0.8 (1.1)	0.8 (0.8)	0.7 (0.7)	0.9 (0.8)
Eggs (servings/day)	0.5 (0.5)	0.5 (0.5)	0.6 (0.6)	0.6 (0.5)
Soy products (servings/day)	0.2 (0.5)	0.1 (0.4)	0.1 (0.3)	0.1 (0.3)
Nuts and seeds (servings/day)	0.6 (1.1)	0.6 (0.9)	0.7 (1)	0.8 (1)
Legumes (servings/day)	0.1 (0.2)	0.1 (0.2)	0.1 (0.2)	0.1 (0.2)
Oil (servings/day)	18.5 (15.2)	20.1 (13.6)	22.5 (14.4)	26.8 (14.4)
Solid fat (servings/day)	26.9 (15.6)	35.9 (18.6)	40.4 (20.3)	55.8 (28.1)
Added sugar (servings/day)	9.2 (7)	13 (14.7)	17.2 (19.1)	24.7 (21.1)

Abbreviations: BMI: body mass index, MET: metabolic equivalent of task, MUFA: Monounsaturated fat, PUFA: Polyunsaturated fat, HEI-2010: Healthy Eating Index-2010

P-values were derived using ANOVA for continuous variables and chi-squared test for categorical variables

\* Physical activity in the past year was assessed using Pregnancy Physical Activity Questionnaire (PPAQ) at 8-13 weeks of gestation

† Self-defined vegetarians answered yes to the question “ For ALL of the past 3 months, have you followed a vegetarian diet?”

Foods and food groups based on MyPyramid Equivalents Database (MPED) serving units. Missing data: n=35 for self-defined vegetarianism, n=2 for physical activity , n=254 for income, n=1 for marriage, n= 49 for insurance, n=3 for sleep duration.

Ultraprocessed foods defined using broad criterion (see Supplemental Table S1)