

Online Supplemental Material

Supplemental Table 1. Fruit and vegetable items examined in the Boston Puerto Rican Health Study, 2004–2009

Item	Fruit and fruit juice	Item	Vegetables and vegetable juice
1	Apples, applesauce, pears	1	Salad greens (e.g. lettuce, raw spinach, mixed greens)
2	Bananas	2	Mustard greens, turnip greens, collards, leafy greens
3	Oranges, tangerines	3	Spinach (cooked)
4	Grapefruit (white or pink)	4	Tomatoes, raw
5	Peaches, nectarines, apricots (fresh, canned, or frozen)	5	Tomatoes, canned or cooked
6	Plums	6	Carrots, raw
7	Grapes	7	Carrots, cooked
8	Avocado, fresh (include. guacamole)	8	String beans, green beans
9	Kiwi	9	Green peas, fresh, canned or frozen
10	Papaya	10	Corn, fresh, canned or frozen
11	Mango	11	Peppers (sweet)
12	Dried fruit (e.g. raisins, prunes, apricots)	12	Broccoli, brussel sprouts, fresh or frozen
13	Cantaloupe	13	Cauliflower
14	Honeydew melon	14	Coleslaw
15	Watermelon	15	Green cabbage (other than coleslaw)
16	Cherries	16	Red cabbage
17	Strawberries	17	Beets
18	Other berries (e.g. blueberries, raspberries)	18	Asparagus
19	Any other fruit (e.g. canned, mixed fruit, fruit cocktail)	19	Mushrooms
20	Orange juice (100% juice, regular) [†]	20	Eggplant
21	Orange juice (100% juice, fortified with calcium and/or vitamin D) [†]	21	Onions or leaks (other than fried onion rings)
22	Orange juice (100% juice, fortified with other vitamins/minerals) [†]	22	Winter squash (e.g. butternut, acorn, hubbard)
23	Grapefruit juice (100% juice)	23	Summer squash (e.g. yellow, zucchini)
24	Prune juice (100% juice)	24	Okra
25	Grape juice (100% juice)	25	Other vegetables (e.g. celery, radish, asparagus)
26	Apple juice (100% juice)	26	Tomato or vegetable juice (100%)
27	Other 100% fruit juices and/or blends		

[†] Participants were asked about how frequently they drank 100% orange juice; and in a separate question “If you drink 100% orange juice, it is usually ...?”, the options were: “regular; fortified with calcium and/or vitamin D; and fortified with other vitamins/minerals”.

Supplemental Table 2. Factor loadings of individual cognitive test scores in major cognitive function factors from the Boston Puerto Rican Health Study, 2004–2009[†]

Individual test	Factor 1 (executive function)	Factor 2 (memory)	Factor 3 (attention)
Letter fluency	0.48		0.42
Figure copying-weighted	0.64		0.25
Digit forward			0.78
Digit backward	0.28		0.71
Clock drawing	0.68		
Stroop 1	0.78		
Stroop 2	0.73		
Stroop 3	0.68		
Word list immediate recall score	0.27	0.78	
Word list delayed recognition		0.78	
Word short term recall		0.86	
Word list long term recall		0.88	
Mini-Mental State Examination, attention			0.68

[†] Values <0.25 are not shown for simplicity.

Supplemental Table 3. Factor weights (standardized scoring coefficients) for converting cognitive scores on individual test to factor scores from the Boston Puerto Rican Health Study, 2004–2009[†]

Individual test	Factor 1 (executive function)	Factor 2 (memory)	Factor 3 (attention)
Letter fluency	0.110	-0.034	0.151
Figure copying-weighted	0.248	-0.074	-0.008
Digit forward	-0.184	-0.043	0.531
Digit backward	-0.076	-0.029	0.420
Clock drawing	0.331	-0.080	-0.161
Stroop 1	0.332	-0.045	-0.122
Stroop 2	0.302	-0.065	-0.072
Stroop 3	0.266	-0.021	-0.074
Word list immediate recall score	-0.026	0.281	-0.016
Word list delayed recognition	-0.098	0.329	-0.072
Word short term recall	-0.067	0.323	-0.002
Word list long term recall	-0.077	0.337	-0.008
Mini-Mental State Examination, attention	-0.096	-0.034	0.418

[†] Factor scores for each factor for each participant are calculated as the sum of the products of the factor weights by the participant’s corresponding standardized (mean: 0, standard deviation: 1) cognitive test score.

Supplemental Table 4. Cognitive performance by quintile of total quantity and variety in fruit intake from the Boston Puerto Rican Health Study, 2004–2009[†]

	Fruit intake (servings/day)							Fruit variety						
	Quintile 1		Quintile 3		Quintile 5		<i>P</i> for trend [‡]	Quintile 1		Quintile 3		Quintile 5		<i>P</i> for trend [‡]
	0.3 (0.0–0.5) [‡]		1.1 (0.9–1.3)		3.1 (2.1–7.9)			11 (0–13) ^b		19 (18–20)		25 (24–27)		
Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	
Mean intake, variety	0.3	0.1	1.1	0.1	3.4	1.1		10.1	2.9	19	0.8	25.5	1.1	
MMSE score														
Model 1 [§]	23.5	0.2	23.4	0.2	23.4	0.2	0.66	23.1	0.2	23.4	0.2	23.9*	0.2	0.002
Model 2	23.5	0.2	23.4	0.2	23.3	0.2	0.45	23.2	0.2	23.4	0.2	23.7	0.2	0.034
Model 3 [¶]	23.6	0.2	23.4	0.2	23.3	0.2	0.26	23.2	0.2	23.4	0.2	23.7	0.2	0.023
Executive function														
Model 1 [§]	-0.04	0.06	-0.12	0.06	0.03	0.06	0.079	-0.20	0.06	-0.09	0.06	0.15***	0.06	<0.001
Model 2	-0.07	0.07	-0.19	0.07	-0.01	0.07	0.19	-0.22	0.07	-0.12	0.07	0.06*	0.07	<0.001
Model 3 [¶]	-0.02	0.07	-0.19	0.06	-0.04	0.07	0.48	-0.21	0.07	-0.12	0.07	0.06*	0.07	0.002
Memory														
Model 1 [§]	-0.02	0.07	-0.08	0.06	-0.03	0.07	0.43	-0.26	0.07	-0.04	0.07	0.03	0.06	0.001
Model 2	-0.01	0.08	-0.06	0.07	-0.06	0.08	0.21	-0.25	0.08	-0.06	0.08	-0.02	0.08	0.017
Model 3 [¶]	0.03	0.08	-0.07	0.07	-0.08	0.08	0.085	-0.27	0.08	-0.07	0.08	-0.01	0.08	0.008
Attention														
Model 1 [§]	0.06	0.07	0.07	0.06	0.09	0.07	0.67	-0.002	0.07	0.04	0.06	0.16	0.06	0.024
Model 2	0.05	0.08	0.09	0.07	0.07	0.08	0.68	-0.001	0.08	0.03	0.07	0.16	0.07	0.039
Model 3 [¶]	0.08	0.08	0.09	0.07	0.05	0.08	0.43	-0.01	0.08	0.03	0.08	0.16	0.07	0.03

SE, standard error; MMSE, Mini Metal State Examination.

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$ compared with the lowest quintile after Tukey's adjustment for multiple comparisons.

† Results of the omitted quintiles generally follow the pattern of those of shown the quintiles, but are not presented for simplicity;

Adjusted means (standard error) of cognitive performance scores according to quintiles of fruit intake and variety were calculated using general linear models (PROC GLM in SAS 9.2) after adjustment for covariates, respectively.

‡ P values for trend were calculated using continuous fruit intake (servings/d) and variety with PROC GLM in SAS 9.2, respectively.

§ Model 1, adjusted for age (years), sex, educational attainment (none or primary school, secondary school, high school, or college or higher), household income below threshold (yes/no), acculturation score (continuous), BMI (kg/m^2) and total energy intake (kj/d).

|| Model 2, further adjusted for smoking status (never, past smoker or current smoker), alcohol use (never, moderate or high), physical activity score (continuous), supplement use (yes/no), and taking more than 5 types of medications within the last 12 months (yes/no), activities of daily living scores (continuous), hypertension (yes/no) and diabetes (yes/no).

¶ Model 3, further adjusted for fruit variety or fruit intake and vice versa.

Supplemental Table 5. Cognitive performance by quintile of total quantity and variety in vegetable intake from the Boston Puerto Rican Health Study, 2004–2009†

	Vegetable intake (servings/day)						<i>P</i> for trend‡	Vegetable variety						<i>P</i> for trend‡
	Quintile 1		Quintile 3		Quintile 5			Quintile 1		Quintile 3		Quintile 5		
	0.7 (0.0–1.0)‡		2.0 (1.6–2.3)		4.0 (3.3–13.0)			6 (0–8) ^b		13 (12–14)		20 (18–25)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE		
Mean intake, variety	0.7	0.2	2.0	0.2	4.4	1.3		5.9	1.9	13.0	0.8	20.4	2.0	
MMSE score														
Model 1 [§]	23.3	0.2	23.6	0.2	24.0*	0.2	0.011	23.2	0.2	23.4	0.2	24.0	0.2	0.001
Model 2	23.3	0.2	23.4	0.2	23.9	0.2	0.07	23.2	0.2	23.3	0.2	23.8	0.2	0.024
Model 3 [¶]	23.4	0.2	23.4	0.2	23.8	0.2	0.21	23.3	0.2	23.3	0.2	23.7	0.2	0.065
Executive function														
Model 1 [§]	-0.09	0.06	-0.11	0.06	0.03	0.06	0.031	-0.08	0.06	-0.16	0.06	0.18*	0.06	<0.001
Model 2	-0.11	0.07	-0.18	0.07	-0.05	0.07	0.16	-0.09	0.07	-0.22	0.06	0.09	0.07	0.002
Model 3 [¶]	-0.08	0.07	-0.19	0.07	-0.09	0.07	0.60	-0.08	0.07	-0.22	0.06	0.09	0.07	0.004
Memory														
Model 1 [§]	-0.09	0.07	0.01	0.07	-0.02	0.07	0.49	-0.17	0.07	-0.08	0.06	0.06	0.07	0.009
Model 2	-0.06	0.08	-0.02	0.08	-0.06	0.08	0.86	-0.14	0.08	-0.09	0.07	0.02	0.08	0.07
Model 3 [¶]	-0.03	0.08	-0.03	0.08	-0.09	0.08	0.73	-0.15	0.08	-0.09	0.07	0.02	0.08	0.067
Attention														
Model 1 [§]	0.07	0.06	0.07	0.06	0.09	0.06	0.89	-0.02	0.07	0.10	0.06	0.23	0.06	0.013
Model 2	0.10	0.08	0.04	0.08	0.08	0.08	0.70	-0.03	0.08	0.09	0.07	0.20	0.08	0.054
Model 3 [¶]	0.13	0.08	0.04	0.07	0.05	0.08	0.33	-0.04	0.08	0.09	0.07	0.21	0.08	0.034

SE, standard error; MMSE, Mini Metal State Examination.

* $P < 0.05$ compared with the lowest quintile after Tukey's adjustment for multiple comparisons.

† Results of the omitted quintiles generally follow the pattern of those of shown the quintiles, but are not presented for simplicity;

Adjusted means (standard error) of cognitive performance scores according to quintiles of vegetable intake and variety were calculated using general linear models (PROC GLM in SAS 9.2) after adjustment for covariates, respectively.

‡ P values for trend were calculated using continuous vegetable intake (servings/d) and variety with PROC GLM in SAS 9.2, respectively.

§ Model 1, adjusted for age (years), sex, educational attainment (none or primary school, secondary school, high school, or college or higher), household income below threshold (yes/no), acculturation score (continuous), BMI (kg/m^2) and total energy intake (kj/d).

|| Model 2, further adjusted for smoking status (never, past smoker or current smoker), alcohol use (never, moderate or high), physical activity score (continuous), supplement use (yes/no), and taking more than 5 types of medications within the last 12 months (yes/no), activities of daily living scores (continuous), hypertension (yes/no) and diabetes (yes/no).

¶ Model 3, further adjusted for vegetable variety or vegetable intake and vice versa.