

Online Supplemental Material

Longitudinal trends in diet and effects of sex, race, and education on dietary quality score change: the Coronary Artery Risk Development in Young Adults study.

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Details about the investigator ratings of food groups and the CARDIA *a priori* diet score assignment derived from the investigator ratings are in **Supplemental table 1**. Between studies there exist food grouping differences, and few differences in ratings; generally the investigator opinion agreed very closely.

Black participants and those with less educational attainment generally showed more change than whites and more highly educated participants, but this pattern varied across food groups. Those demographic interactions which reached the Bonferroni corrected p-value of <0.0012 are indicated in **Supplemental table 2** we considered race and sex differences and education differences, but not race, sex, and education differences.

Differences among demographic groups, **Supplemental table 3** (by race and sex) **and 4** (by education), were especially prominent and significant for the negative rated food groups. For most food groups changes were in the same direction for both demographic groups however one demographic group showed a larger increase or decrease compared to the other demographic groups.

Supplemental Table 1
Investigator ratings of food groups and comparability to previous studies.

CARDIA FOOD GROUPS	Investigators' independent ratings				CARDIA a priori score	Previous studies' consensuses		
	FPCS	JAN	DRJ	LMS		Nettleton et.al. ¹	Lockheart et al. ²	Jacobs et al. ³
Avocado	+	+			+	+	+	+
Beans	+	+			+	+		+
Beer	+	+	+	+	+	+	+	+
Coffee	+	+	-	-	+	+	0	-
Fatty fish	+	+	+		+		+	+
Fruit	+	+	+	+	+	+	+	+
Green vegetables	+	+	+	+	+	+	+	+
Lean fish	+	+			+	+	+	+
Low fat dairy	+	+	+	+	+		+	+
Liquor	+	+	+	+	+		+	+
Oil	+	+	+	+	+	+	+	+
Other vegetables	+	+	+	+	+	+	+	+
Poultry	+	0	+	+	+	+	+	+
Seeds nuts	+	+	+	+	+	+		+
Soy products	+	+			+	+		
Tea	+	+	+	+	+	+	+	+
Tomato	+	+	+	+	+	+	+	+
Whole grains	+	+	+	+	+	+	+	+
Wine	+	+	+	+	+	+	+	+
Yellow vegetables	+	+	+	+	+	+	+	+
Butter	-	-	-	-	-		-	-
Fried poultry and fish	-	-			-			
Fried potato	-	-			-	-	-	
Grain dessert	-	-			-	-		
Organ meat	-	-	-	-	-	0	-	-
Processed meat	-	-	-	-	-	-	-	-
Regular red meat	-	-	-	-	-		-	-
Salty snacks	-	-	-	-	-	-	-	-
Sauces	0	-	+	+	-		+	+
Soft drinks	-	-	-	-	-	-	-	-
Sweet breads	-	-			-	-		-
Sweet extra's	-	-	-	-	-	-	-	-
Whole fat dairy	-	-	-	-	-	-	-	-
Chocolate	0	0			0	0	-	-

Diet soft drink	0	0	+	-,+	0	0	0	+
Eggs	0	0			0	0	0	0
Fruit juice	0	0	-	-	0		-	-
Lean red meat	+	0		+	0	0	0	+
Margarine	0	0			0			
Meal replacements	0	0			0	0		
Pickled food	0	0			0			
Potatoes	0	0			0	0	0	0
Refined grains	0	0			0	0	0	0
Shellfish	+	0			0			
Soups	0	0	+	+	0	+	+	+
Sugar substitutes	0	0			0			

¹Nettleton JA, Schulze MB, Jiang R, Jenny NS, Burke GL, Jacobs DR, Jr. *A priori*-defined dietary patterns and markers of cardiovascular disease risk in the multi-ethnic study of atherosclerosis (MESA). *Am J Clin Nutr.* 2008 Jul;88(1):185-94.

²Lockheart MS, Steffen LM, Rebnord HM, Fimreite RL, Ringstad J, Thelle DS, et al. Dietary patterns, food groups and myocardial infarction: A case-control study. *Br J Nutr.* 2007 Aug;98(2):380-7.

³Jacobs DR Jr, Sluik D, Rokling-Andersen MH, Anderssen SA, Drevon CA. Association of 1-y changes in diet pattern with cardiovascular disease risk factors and adipokines: results from the 1-y randomized Oslo Diet and Exercise Study. *Am J Clin Nutr.* 2009 Feb;89(2):509-17. Epub 2008 Dec 30.

Supplemental Table 2

Changes in food groups, grouped according to their rating in the *a priori* diet score, with notations of substantial race-sex and educational attainment differences in change pattern, CARDIA 1985-86 to 2005-06

Food group	mean sv/d y0	mean sv/d y7	mean sv/d y20	mean change (20 -0)	% change 20 -0/ 0	p-trend	Demographic groups showing exceptions to the overall trend (p<0.0012 for interaction)
Positively rated							
Avocado	0.08	0.08	0.15	0.07	88%	<0.0001	Race-sex: White ♀ 0.12, others 0.04
Beans	0.21	0.26	0.25	0.04	19%	<0.0001	Race: White 0.07, Black 0.01 Education: 13+ 0.05, ≤13 -0.04
Beer	0.52	0.49	0.31	-0.21	-40%	<0.0001	Sex: ♂ -0.36, ♀ -0.06
Coffee	1.12	1.22	1.47	0.35	31%	<0.0001	Sex: ♂ 0.5, ♀ 0.22
Fatty fish	0.04	0.05	0.02	-0.02	-50%	<0.0001	
Fruit	1.43	1.66	1.67	0.24	17%	<0.0001	Sex: ♂ 0.13, ♀ 0.32
Green vegetables	0.37	0.54	0.79	0.42	114%	<0.0001	Sex: ♂ 0.35, ♀ 0.47
Lean fish	0.70	0.66	0.76	0.06	9%	0.0160	
Low fat dairy	1.16	1.37	1.30	0.14	12%	0.0003	
Liquor	0.20	0.18	0.20	0.00	0%	0.6400	
Oil	1.46	3.25	2.75	1.29	88%	<0.0001	
Other vegetables	2.10	2.32	2.03	-0.07	-3%	0.1200	
Poultry	1.24	1.47	1.45	0.21	17%	<0.0001	
Seeds nuts	0.80	0.76	1.15	0.35	44%	<0.0001	
Soy products	0.23	0.63	0.79	0.56	243%	<0.0001	Sex: ♂ 0.42, ♀ 0.65
Tea	0.61	0.47	0.69	0.08	13%	0.3100	
Tomato	0.49	0.64	0.54	0.05	10%	0.0002	Sex: ♂ 0.01, ♀ 0.08
Whole grains	1.52	1.89	1.61	0.09	6%	0.0030	Race-Sex: White ♀ 0.29, others 0.02
Wine	0.16	0.15	0.28	0.12	75%	<0.0001	Race: White 0.25, Black -0.01 Education: 13+ 0.15, ≤13 0.0
Yellow vegetables	0.26	0.25	0.25	-0.01	-4%	0.2000	

Negatively rated

Butter	4.78	3.88	2.11	-2.67	-56%	<0.0001	Race: White -1.7, Black -3.5 Sex: ♂ -3.5 ♀ -2.0 Education: 13+ -2.2, ≤13 -4.3
Fried poultry and fish	4.69	3.13	2.39	-2.30	-49%	<0.0001	Sex: ♂ -2.8 ♀ -1.8
Fried potato	2.37	2.03	1.40	-0.97	-41%	<0.0001	Race: White -0.7, Black -1.2 Sex: ♂ -1.2 ♀ -0.8
Grain dessert	2.07	1.46	1.18	-0.89	-43%	<0.0001	Race: White -0.6, Black -1.2 Sex: ♂ -1.3 ♀ -0.6
Organ meat	1.60	1.41	0.95	-0.65	-41%	<0.0001	Race: White -0.5, Black -0.8
Processed meat	1.00	0.9	0.77	-0.23	-23%	<0.0001	Race: White -0.1, Black -0.4 Sex: ♂ -0.4 ♀ -0.1
Regular red meat	0.36	0.29	0.18	-0.18	-50%	<0.0001	Race: White -0.1, Black -0.2 Sex: ♂ -0.2 ♀ -0.1
Salty snacks	0.69	0.77	0.62	-0.07	-10%	0.0040	
Sauces	0.05	0.04	0.02	-0.03	-60%	<0.0001	
Soft drinks	0.90	0.81	0.92	0.02	2%	0.0050	Race: White 0.23, Black -0.16 Education: 13+0.12, ≤13 -0.25
Sweet breads	0.11	0.26	0.20	0.09	82%	<0.0001	Race: White -0.04, Black 0.22
Sweet extra's	1.78	1.59	1.87	0.09	5%	0.0070	Education: 13+0.22, ≤13 -0.29
Whole fat dairy	0.04	0.20	0.24	0.20	500%	<0.0001	

Neutrally rated

Chocolate	4.55	5.30	3.55	-1.00	-22%	<0.0001	Race: White -0.7, Black -1.3 Sex: ♂ -1.4 ♀ -0.7
Diet soft drink	1.95	1.54	1.06	-0.89	-46%	<0.0001	
Eggs	1.72	2.08	0.88	-0.84	-49%	<0.0001	
Fruit juice	0.82	0.54	0.44	-0.38	-46%	<0.0001	Race: White -0.2, Black -0.6 Sex: ♂ -0.8 ♀ -0.4 Education: 13+ -0.3, ≤13 -0.7
Lean red meat	0.42	0.54	0.29	-0.13	-31%	<0.0001	
Margarine	0.68	0.57	0.61	-0.07	-10%	0.0400	Sex: ♂ -0.4 ♀ -0.2

Meal replacements	0.19	0.19	0.19	0.00	0%	0.8700	
Pickled food	0.23	0.24	0.24	0.01	4%	0.1100	
Potatoes	0.04	0.05	0.05	0.01	25%	<0.0001	Education: 13+ 0.02, ≤13 0.0
Refined grains	0.35	0.37	0.45	0.10	29%	<0.0001	
Shellfish	0.01	0.05	0.14	0.13	1300%	<0.0001	Race: White 0.09, Black 0.16 Sex: ♂ 0.21 ♀ 0.06
Soups	0.38	0.72	0.64	0.26	68%	<0.0001	Sex: ♂ 0.48 ♀ -0.08
Sugar substitutes	0.06	0.13	0.66	0.60	1000%	<0.0001	Race: White 0.4, Black 0.8 Sex: ♂ 0.5 ♀ 0.7

Whole grains	1.75	1.07	1.99	1.41	0.07	0.08	-0.09	0.29	0.0035	0.8744	0.0114
Wine	0.14	0.12	0.15	0.21	-0.04	0.01	0.25	0.25	0.2682	<0.0001	0.2469
Yellow vegetables	0.19	0.19	0.29	0.36	0.00	0.00	-0.05	-0.01	0.4334	0.1135	0.3343
Negatively rated											
Butter	7.54	4.43	4.69	2.82	-4.56	-2.64	-2.33	-1.17	0.0182	<0.0001	<0.0001
Fried poultry and fish	0.10	0.08	0.18	0.10	0.29	0.18	-0.05	-0.03	0.0098	<0.0001	0.1145
Fried potato	0.55	0.34	0.37	0.20	-0.26	-0.17	-0.18	-0.09	0.5511	<0.0001	<0.0001
Grain dessert	0.96	0.64	0.71	0.49	-0.02	-0.16	0.01	-0.03	0.1696	0.0662	0.0605
Organ meat	0.07	0.07	0.03	0.02	-0.02	-0.03	-0.02	-0.01	0.1293	0.0166	0.3857
Processed meat	1.59	0.89	0.82	0.39	-0.18	-0.11	0.25	0.21	0.4047	<0.0001	0.9513
Regular red meat	3.48	2.08	2.61	1.50	-1.42	-0.92	-0.90	-0.56	0.4361	<0.0001	<0.0001
Salty snacks	0.04	0.02	0.05	0.05	0.21	0.14	0.23	0.23	0.1512	0.0263	0.0833
Sauces	5.82	4.07	5.35	3.78	-2.75	-1.76	-2.80	-1.86	0.9159	0.9546	<0.0001
Soft drinks	2.29	1.89	1.41	0.83	-0.70	-0.75	-0.56	-0.39	0.1258	0.0034	0.5266
Sweet breads	1.65	0.88	0.99	0.58	-0.46	-0.26	-0.17	0.03	0.7995	<0.0001	<0.0001
Sweet extra's	2.56	1.76	1.85	1.05	0.16	0.20	-0.09	0.28	0.2538	0.5873	0.1220
Whole fat dairy	2.85	1.79	2.28	1.49	-1.51	-0.85	-1.01	-0.26	0.7620	<0.0001	<0.0001
Neutrally rated											
Chocolate	0.20	0.20	0.18	0.18	0.00	-0.05	0.06	0.01	0.6672	0.0047	0.0114
Diet soft drink	0.10	0.15	0.43	0.85	0.20	0.14	0.54	0.09	0.0013	0.0920	<0.0001
Eggs	1.07	0.58	0.68	0.44	-0.14	-0.03	-0.11	0.05	0.2433	0.0202	0.0001
Fruit juice	2.69	2.04	1.78	1.33	-0.99	-0.94	-0.68	-0.77	0.5109	0.0181	0.7050
Lean red meat	1.28	0.63	0.99	0.48	-0.80	-0.33	-0.39	-0.06	0.1171	<0.0001	<0.0001
Margarine	2.14	1.65	1.79	1.36	-0.85	-0.71	-1.01	-0.73	0.1437	0.1896	0.0758
Meal replacements	0.02	0.00	0.03	0.01	0.29	0.08	0.14	0.04	0.0038	<0.0001	<0.0001
Pickled food	0.35	0.30	0.44	0.33	0.05	0.09	0.07	0.17	0.3567	0.1715	0.0502
Potatoes	0.50	0.37	0.52	0.32	-0.15	-0.12	-0.17	-0.08	0.1174	0.9251	0.0669
Refined grains	6.37	3.97	5.16	3.06	-1.52	-0.90	-1.07	-0.35	0.4246	0.0002	<0.0001
Shellfish	0.24	0.21	0.28	0.19	0.04	0.02	-0.03	0.01	0.1200	0.0516	0.7904
Soups	0.03	0.03	0.05	0.04	0.02	0.01	0.02	0.02	0.2407	0.0693	0.3845
Sugar substitutes	0.01	0.05	0.06	0.12	0.25	0.49	0.61	0.91	0.6444	<0.0001	<0.0001

Supplemental table 4

Changes in food groups, grouped according to their rating in the *a priori* diet score, by educational attainment (<13 vs 13+ years of education), CARDIA 1985-86 to 2005-06

	year 0		year 7		year 20		absolute change <13	absolute change 13+	p value interaction <13 vs 13+
	mean sv/d <13	mean sv/d 13+	mean sv/d <13	mean sv/d 13+	mean sv/d <13	mean sv/d 13+			
Positively rated									
Avocado	0.04	0.09	0.04	0.09	0.07	0.16	0.03	0.07	0.1685
Beans	0.27	0.20	0.30	0.25	0.23	0.25	-0.04	0.05	0.0014
Beer	0.81	0.44	0.91	0.40	0.60	0.26	-0.21	-0.18	0.5568
Coffee	1.04	1.15	1.20	1.22	1.30	1.50	0.26	0.35	0.1604
Fatty fish	0.04	0.04	0.04	0.06	0.02	0.02	-0.02	-0.02	0.5961
Fruit	1.42	1.43	1.43	1.71	1.40	1.72	-0.02	0.29	0.0055
Green vegetables	0.26	0.41	0.41	0.57	0.53	0.84	0.27	0.43	0.0012
Lean fish	0.66	0.71	0.69	0.66	0.73	0.77	0.07	0.06	0.5444
Low fat dairy	1.04	1.19	1.22	1.40	1.14	1.33	0.10	0.14	0.8740
Liquor	0.27	0.18	0.31	0.15	0.26	0.19	-0.01	0.01	0.7610
Oil	1.33	1.50	3.34	3.23	2.65	2.77	1.32	1.27	0.3422
Other vegetables	2.20	2.08	2.26	2.33	1.96	2.04	-0.24	-0.04	0.0376
Poultry	1.28	1.23	1.53	1.46	1.43	1.46	0.15	0.23	0.3460
Seeds nuts	0.78	0.81	0.96	0.72	0.96	1.19	0.18	0.38	0.1215
Soy products	0.24	0.23	0.80	0.59	0.90	0.77	0.66	0.54	0.1475
Tea	0.51	0.64	0.39	0.48	0.51	0.72	0.00	0.08	0.4010
Tomato	0.46	0.49	0.58	0.65	0.48	0.55	0.02	0.06	0.8663
Whole grains	1.41	1.55	1.64	1.95	1.37	1.66	-0.04	0.11	0.6243
Wine	0.12	0.17	0.08	0.17	0.12	0.32	0.00	0.15	0.0018
Yellow vegetables	0.20	0.27	0.18	0.26	0.19	0.26	-0.01	-0.01	0.9574
Negatively rated									
Butter	6.47	4.31	5.50	3.53	2.18	2.09	-4.29	-2.22	<0.0001
Fried poultry and fish	0.16	0.10	0.44	0.22	0.26	0.18	0.10	0.08	0.4496
Fried potato	0.49	0.32	0.41	0.27	0.25	0.16	-0.24	-0.16	0.2088

Grain dessert	0.79	0.66	0.87	0.75	0.79	0.58	0.00	-0.08	0.0686
Organ meat	0.07	0.04	0.07	0.03	0.04	0.02	-0.03	-0.02	0.2845
Processed meat	1.44	0.75	1.25	0.71	1.19	0.87	-0.25	0.12	<0.0001
Regular red meat	3.09	2.17	2.98	1.83	1.79	1.32	-1.30	-0.85	0.0245
Salty snacks	0.04	0.04	0.15	0.21	0.29	0.23	0.25	0.19	0.0016
Sauces	5.13	4.57	3.78	2.99	2.57	2.36	-2.56	-2.21	0.2393
Soft drinks	2.52	1.34	2.21	1.24	1.66	0.82	-0.86	-0.52	0.0157
Sweet breads	1.33	0.91	1.09	0.85	0.85	0.75	-0.48	-0.16	0.0020
Sweet extra's	2.33	1.62	2.07	1.48	2.04	1.84	-0.29	0.22	0.0013
Whole fat dairy	2.58	1.92	1.78	1.39	1.15	1.18	-1.43	-0.74	<0.0001
Neutrally rated									
Chocolate	0.24	0.18	0.23	0.18	0.19	0.19	-0.05	0.01	0.0284
Diet soft drink	0.15	0.45	0.49	0.77	0.44	0.68	0.29	0.23	0.1290
Eggs	0.92	0.61	0.89	0.50	0.75	0.58	-0.17	-0.03	0.0342
Fruit juice	2.11	1.90	1.52	1.55	1.21	1.03	-0.90	-0.87	0.9473
Lean red meat	1.11	0.74	0.76	0.50	0.39	0.45	-0.72	-0.29	<0.0001
Margarine	2.09	1.61	2.55	1.98	1.05	0.85	-1.04	-0.76	0.1667
Meal replacements	0.02	0.01	0.03	0.05	0.20	0.12	0.18	0.11	0.2217
Pickled food	0.37	0.35	0.41	0.36	0.40	0.46	0.03	0.11	0.1538
Potatoes	0.54	0.39	0.63	0.52	0.35	0.28	-0.19	-0.11	0.0752
Refined grains	5.82	4.20	6.64	5.02	4.24	3.41	-1.58	-0.79	0.0294
Shellfish	0.21	0.23	0.20	0.25	0.17	0.25	-0.04	0.02	0.0495
Soups	0.04	0.04	0.05	0.05	0.04	0.06	0.00	0.02	<0.0001
Sugar substitutes	0.04	0.07	0.07	0.15	0.45	0.70	0.41	0.63	0.1368