

Supplementary tables and figures

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Supplementary table A Criteria for scoring each component of three diet quality scores

Component	AHEI-2010		DASH		AMED	
	Minimum score of 0	Maximum score of 10	Minimum score of 1	Maximum score of 5	Minimum score of 0	Maximum score of 1
Vegetables (excluding potatoes), servings/d	0	≥ 5	Lowest quintile	Highest quintile	Less than median	Median or greater
Fruits, servings/d	0	≥ 4	Lowest quintile	Highest quintile	Less than median	Median or greater
Whole grains, g/d			Lowest quintile	Highest quintile	Less than median	Median or greater
Women	0	75				
Men	0	90				
Sugar sweetened drinks and fruit juice, servings/d	≥ 1	0	-	-	-	-
Sugar sweetened drinks	-	-	Highest quintile	Lowest quintile	-	-
Nuts and legumes, servings/d	0	≥ 1	Lowest quintile	Highest quintile	-	-
Nuts	-	-	-	-	Less than median	Median or greater
Legumes	-	-	-	-	Less than median	Median or greater
Red and processed meats, servings/d	≥ 1.5	0	Highest quintile	Lowest quintile	Median or greater	Less than median
Fish, servings/d	-	-	-	-	Less than median	Median or greater
Low-fat dairy	-	-	Lowest quintile	Highest quintile	-	-
Trans fat, % of energy	≥ 4	≤ 0.5	-	-	-	-
Long-chain (n-3) fats, mg/d	0	250	-	-	-	-
Poly-unsaturated fatty acids, % of energy	≤ 2	≥ 10	-	-	-	-
Ratio of monounsaturated to saturated fat	-	-	-	-	Less than median	Median or greater
Sodium, mg/d	Highest decile	Lowest decile	Highest quintile	Lowest quintile	-	-
Alcohol, drinks/d						
Women	≥ 2.5	0.5-1.5	-	-	< 5 or > 15 g/d	5-15 g/d
Men	≥ 3.5	0.5-2.0	-	-	< 10 or >25 g/d	10-25 g/d
Total	0	110	8	40	0	9

AHEI-2010=Alternate Healthy Eating Index 2010; AMED=Alternate Mediterranean Diet; DASH=Dietary Approach to Stop Hypertension.

Supplementary table B Characteristics of genetic variants associated with body mass index in two cohorts

SNP	Chromosome	Nearest gene	BMI increasing allele/other allele*	Frequency of Effect allele, %	
				NHS	HPFS
77 loci reaching genome-wide significance in European-descent individuals					
rs657452	1	<i>AGBL4</i>	A/G	0.38	0.37
rs2820292	1	<i>NAVI</i>	C/A	0.53	0.52
rs11583200	1	<i>ELAVL4</i>	C/T	0.39	0.37
rs543874	1	<i>SEC16B</i>	G/A	0.21	0.19
rs3101336	1	<i>NEGR1</i>	C/T	0.63	0.64
rs12566985	1	<i>FPGT-TNNI3K</i>	G/A	0.43	0.43
rs17024393	1	<i>GNAT2</i>	C/T	0.03	0.03
rs11165643	1	<i>PTBP2</i>	T/C	0.59	0.58
rs12401738	1	<i>FUBP1</i>	A/G	0.34	0.32
rs7599312	2	<i>ERBB4</i>	G/A	0.73	0.74
rs11126666	2	<i>KCNK3</i>	A/G	0.27	0.26
rs1528435	2	<i>UBE2E3</i>	T/C	0.63	0.62
rs11688816	2	<i>EHBP1</i>	G/A	0.51	0.48
rs13021737	2	<i>TMEM18</i>	G/A	0.82	0.81
rs10182181	2	<i>ADCY3</i>	G/A	0.47	0.47
rs1016287	2	<i>FLJ30838</i>	T/C	0.29	0.30
rs2121279	2	<i>LRP1B</i>	T/C	0.13	0.14
rs2365389	3	<i>FHIT</i>	C/T	0.59	0.60
rs16851483	3	<i>RASA2</i>	T/G	0.06	0.07
rs6804842	3	<i>RARB</i>	G/A	0.57	0.59
rs3849570	3	<i>GBE1</i>	A/C	0.34	0.32
rs1516725	3	<i>ETV5</i>	C/T	0.87	0.86
rs13078960	3	<i>CADM2</i>	G/T	0.20	0.22
rs17001654	4	<i>SCARB2</i>	G/C	0.16	0.17
rs11727676	4	<i>HHIP</i>	T/C	0.92	0.91
rs10938397	4	<i>GNPDA2</i>	G/A	0.44	0.44
rs13107325	4	<i>SLC39A8</i>	T/C	0.07	0.08
rs2112347	5	<i>POC5</i>	T/G	0.64	0.63
rs13191362	6	<i>PARK2</i>	A/G	0.88	0.88
rs2033529	6	<i>TDRG1</i>	G/A	0.28	0.29
rs9400239	6	<i>FOXO3</i>	C/T	0.70	0.70
rs2207139	6	<i>TFAP2B</i>	G/A	0.17	0.17
rs205262	6	<i>C6orf106</i>	G/A	0.27	0.28
rs1167827	7	<i>HIP1</i>	G/A	0.57	0.57
rs2245368	7	<i>PMS2L11</i>	C/T	0.16	0.16
rs2033732	8	<i>RALYL</i>	C/T	0.75	0.75
rs17405819	8	<i>HNF4G</i>	T/C	0.70	0.70
rs1928295	9	<i>TLR4</i>	T/C	0.56	0.54
rs4740619	9	<i>C9orf93</i>	T/C	0.44	0.46
rs10733682	9	<i>LMX1B</i>	A/G	0.49	0.49
rs6477694	9	<i>EPB41L4B</i>	C/T	0.34	0.33
rs10968576	9	<i>LINGO2</i>	G/A	0.31	0.31
rs7903146	10	<i>TCF7L2</i>	C/T	0.70	0.70
rs17094222	10	<i>HIF1AN</i>	C/T	0.21	0.22
rs11191560	10	<i>NT5C2</i>	C/T	0.09	0.09
rs7899106	10	<i>GRID1</i>	G/A	0.05	0.05
rs12286929	11	<i>CADM1</i>	G/A	0.47	0.47
rs2176598	11	<i>HSD17B12</i>	T/C	0.25	0.25
rs11030104	11	<i>BDNF</i>	A/G	0.79	0.78
rs3817334	11	<i>MTCH2</i>	T/C	0.41	0.41

rs4256980	11	<i>TRIM66</i>	G/C	0.64	0.63
rs11057405	12	<i>CLIP1</i>	G/A	0.90	0.92
rs7138803	12	<i>BCDIN3D</i>	A/G	0.38	0.40
rs12429545	13	<i>OLFM4</i>	A/G	0.13	0.13
rs12016871	13	<i>MTIF3</i>	T/C	0.19	0.18
rs10132280	14	<i>STXBP6</i>	C/A	0.69	0.67
rs12885454	14	<i>PRKD1</i>	C/A	0.66	0.59
rs7141420	14	<i>NRXN3</i>	T/C	0.53	0.48
rs11847697	14	<i>PRKD1</i>	T/C	0.05	0.04
rs3736485	15	<i>DMXL2</i>	A/G	0.46	0.45
rs16951275	15	<i>MAP2K5</i>	T/C	0.77	0.75
rs758747	16	<i>NLRC3</i>	T/C	0.27	0.29
rs9925964	16	<i>KAT8</i>	A/G	0.63	0.61
rs2650492	16	<i>SBK1</i>	A/G	0.32	0.32
rs1558902	16	<i>FTO</i>	A/T	0.42	0.44
rs3888190	16	<i>ATP2A1</i>	A/C	0.39	0.37
rs12446632	16	<i>GPRC5B</i>	G/A	0.86	0.86
rs1000940	17	<i>RABEP1</i>	G/A	0.28	0.28
rs12940622	17	<i>RPTOR</i>	G/A	0.57	0.58
rs7243357	18	<i>GRP</i>	T/G	0.83	0.83
rs6567160	18	<i>MC4R</i>	C/T	0.24	0.24
rs1808579	18	<i>C18orf8</i>	C/T	0.46	0.44
rs17724992	19	<i>PGPEP1</i>	A/G	0.74	0.73
rs2287019	19	<i>QPCTL</i>	C/T	0.82	0.82
rs3810291	19	<i>ZC3H4</i>	A/G	0.32	0.33
rs2075650	19	<i>TOMM40</i>	A/G	0.88	0.90
rs29941	19	<i>KCTD15</i>	G/A	0.68	0.68
20 loci reaching genome-wide significance with inclusion of non-European-descent individuals					
rs977747	1	<i>TAL1</i>	T/G	0.40	0.38
rs17203016	2	<i>CREB1</i>	G/A	0.19	0.17
rs1460676	2	<i>FIGN</i>	C/T	0.17	0.17
rs2176040	2	<i>LOC646736</i>	A/G	0.36	0.34
rs492400	2	<i>PLCD4</i>	C/T	0.43	0.42
rs7715256	5	<i>GALNT10</i>	G/T	0.43	0.44
rs13201877	6	<i>IFNGR1</i>	G/A	0.13	0.13
rs9374842	6	<i>LOC285762</i>	T/C	0.76	0.77
rs6465468	7	<i>ASB4</i>	T/G	0.31	0.29
rs9641123	7	<i>CALCR</i>	C/G	0.43	0.42
rs16907751	8	<i>ZBTB10</i>	C/T	0.96	0.96
rs1441264	13	<i>MIR548A2</i>	A/G	0.60	0.62
rs9540493	13	<i>MIR548X2</i>	A/G	0.44	0.44
rs7164727	15	<i>LOC100287559</i>	T/C	0.67	0.68
rs2080454	16	<i>CBLN1</i>	C/A	0.36	0.34
rs4787491	16	<i>MAPK3</i>	G/A	0.54	0.54
rs9914578	17	<i>SMG6</i>	G/C	0.22	0.19
rs7239883	18	<i>LOC284260</i>	G/A	0.38	0.39
rs6091540	20	<i>ZFP64</i>	C/T	0.70	0.72
rs2836754	21	<i>ETS2</i>	C/T	0.63	0.63

AHEI-2010=Alternate Healthy Eating Index 2010; AMED=Alternate Mediterranean Diet; BMI, body mass index; DASH=Dietary Approach to Stop Hypertension; HPFS=Health Professionals Follow-up Study; NHS=Nurses' Health Study; SNP, single nucleotide polymorphism.

*Allele coding based on the forward strand. Effect allele is the one associated with high BMI; and the other is the reference allele.

Supplementary table C Main associations of genetic risk score and changes in diet quality scores with change in body mass index every four years*

Cohort	Genetic risk score†		AHEI-2010‡		DASH‡		AMED‡	
	β (SE)	P	β (SE)	P	β (SE)	P	β (SE)	P
NHS	0.02 (0.01)	0.14	-0.17 (0.01)	<0.001	-0.17 (0.01)	<0.001	-0.05 (0.01)	<0.001
HPFS	0.03 (0.01)	0.06	-0.12 (0.01)	<0.001	-0.13 (0.01)	<0.001	-0.05 (0.01)	<0.001
Pooled results§	0.02 (0.01)	0.02	-0.15 (0.01)	<0.001	-0.15 (0.01)	<0.001	-0.05 (0.01)	<0.001

AHEI-2010=Alternate Healthy Eating Index 2010; AMED=Alternate Mediterranean Diet;
DASH=Dietary Approach to Stop Hypertension; HPFS=Health Professionals Follow-up Study;
NHS=Nurses' Health Study.

*Data were derived from repeated measurements analyses for women in the NHS (five intervals of four years from 1986 to 2006) and men in the HPFS (five intervals of four years from 1986 to 2006). Results were adjusted for age, genotyping source, and baseline body mass index (fifths) at the beginning of each interval.

†Results are change in body mass index per additional 10 risk allele of genetic risk score.

‡Results are change in body mass index per additional 1 SD of respective diet quality score.

§Results for two cohorts were pooled by means of inverse variance weighted fixed effects meta-analysis.

Supplementary table D Main associations of genetic risk score and changes in diet quality scores with weight change every four years*

Cohort	Genetic risk score†		AHEI-2010‡		DASH‡		AMED‡	
	β (SE)	P	β (SE)	P	β (SE)	P	β (SE)	P
NHS	0.03 (0.03)	0.43	-0.43 (0.03)	<0.001	-0.44 (0.03)	<0.001	-0.12 (0.03)	<0.001
HPFS	0.08 (0.04)	0.09	-0.37 (0.03)	<0.001	-0.39 (0.03)	<0.001	-0.15 (0.03)	<0.001
Pooled results§	0.05 (0.03)	0.09	-0.40 (0.02)	<0.001	-0.42 (0.02)	<0.001	-0.14 (0.02)	<0.001

AHEI-2010=Alternate Healthy Eating Index 2010; AMED=Alternate Mediterranean Diet;
DASH=Dietary Approach to Stop Hypertension; HPFS=Health Professionals Follow-up Study;
NHS=Nurses' Health Study.

*Data were derived from repeated measurements analyses for women in the NHS (five intervals of four years from 1986 to 2006) and men in the HPFS (five intervals of four years from 1986 to 2006). Results were adjusted for age, genotyping source, and baseline body mass index (fifths) at the beginning of each interval.

†Results are weight change per additional 10 risk allele of genetic risk score.

‡Results are weight change per additional 1 SD of respective diet quality score.

§Results for two cohorts were pooled by means of inverse variance weighted fixed effects meta-analysis.

Supplementary table E Weight change every four years per 10 risk allele increment according to changes in diet quality scores in thirds*

Analysis	Thirds of changes in diet quality scores			P for interaction
	1 (Decrease)	2 (Stable)	3 (Increase)	
AHEI-2010				
NHS	0.12 (0.07)	-0.05 (0.07)	0.002 (0.07)	0.001
HPFS	0.20 (0.08)	0.09 (0.08)	-0.04 (0.08)	0.01
Pooled results†	0.16 (0.05)	0.01 (0.05)	-0.02 (0.05)	<0.001
DASH				
NHS	0.05 (0.07)	0.03 (0.07)	-0.02 (0.08)	0.008
HPFS	0.09 (0.09)	0.12 (0.07)	0.02 (0.08)	0.26
Pooled results†	0.07 (0.06)	0.07 (0.05)	-0.01 (0.06)	0.004
AMED				
NHS	-0.03 (0.07)	0.004 (0.07)	0.12 (0.08)	0.46
HPFS	0.14 (0.08)	0.003 (0.08)	0.08 (0.08)	0.35
Pooled results†	0.04 (0.05)	0.003 (0.05)	0.10 (0.05)	0.78

AHEI-2010=Alternate Healthy Eating Index 2010; AMED=Alternate Mediterranean Diet; DASH=Dietary Approach to Stop Hypertension; HPFS=Health Professionals Follow-up Study; NHS=Nurses' Health Study.

*Plus-minus values are β coefficient (SE). Data were derived from repeated measurements analyses for women in NHS (five intervals of four years from 1986 to 2006) and men in HPFS (five intervals of four years from 1986 to 2006). Results were adjusted for same set of variables as in Table 2.

†Results for two cohorts were pooled by means of inverse variance weighted fixed effects meta-analysis.

Supplementary table F Main associations of genetic risk score and diet quality scores with change in body mass index every four years in participants younger than 65 years and in those who had never smoked throughout the follow-up period*

Analysis	Sample size	Genetic risk score†		AHEI-2010‡		DASH‡		AMED‡	
		β (SE)	P	β (SE)	P	β (SE)	P	β (SE)	P
Participants younger than 65 years									
NHS	8820	0.03 (0.03)	0.09	-0.23 (0.01)	<0.001	-0.23 (0.02)	<0.001	-0.07 (0.01)	<0.001
HPFS	4471	0.02 (0.02)	0.20	-0.15 (0.02)	<0.001	-0.16 (0.02)	<0.001	-0.06 (0.01)	<0.001
Pooled results§		0.03 (0.01)	0.03	-0.19 (0.01)	<0.001	-0.20 (0.01)	<0.001	-0.06 (0.01)	<0.001
Participants who had never smoked									
NHS	3972	0.001 (0.02)	0.92	-0.19 (0.02)	<0.001	-0.20 (0.02)	<0.001	-0.05 (0.02)	<0.001
HPFS	2444	0.03 (0.02)	0.08	-0.11 (0.02)	<0.001	-0.11 (0.02)	<0.001	-0.04 (0.01)	<0.001
Pooled results§		0.02 (0.01)	0.20	-0.15 (0.01)	<0.001	-0.15 (0.01)	<0.001	-0.05 (0.01)	<0.001

AHEI-2010=Alternate Healthy Eating Index 2010; AMED=Alternate Mediterranean Diet; DASH=Dietary Approach to Stop Hypertension; HPFS=Health Professionals Follow-up Study; NHS=Nurses' Health Study.

*Data were derived from repeated measurements analyses for women in the NHS (five intervals of four years from 1986 to 2006) and men in the HPFS (five intervals of four years from 1986 to 2006). Results were adjusted for age, genotyping source, and baseline body mass index (fifths) at the beginning of each interval.

†Results are change in body mass index per additional 10 risk allele of genetic risk score.

‡Results are change in body mass index per additional 1 SD of respective diet quality score.

§Results for two cohorts were pooled by means of inverse variance weighted fixed effects meta-analysis.

Supplementary table G Interactions between genetic risk score and changes in diet quality scores on change in body mass index in participants younger than 65 years and in those who had never smoked throughout the follow-up period*

Analysis	Sample size	Change in AHEI-2010		Change in DASH		Change in AMED	
		β (SE)	P for interaction	β (SE)	P for interaction	β (SE)	P for interaction
Participants younger than 65 years							
NHS	8820	-0.09 (0.03)	<0.001	-0.07 (0.03)	0.01	0.02 (0.03)	0.48
HPFS	4471	-0.03 (0.03)	0.27	-0.04 (0.03)	0.12	-0.03 (0.02)	0.16
Pooled results [†]		-0.06 (0.02)	0.001	-0.06 (0.02)	0.004	-0.01 (0.02)	0.62
Participants who had never smoked							
NHS	3972	-0.07 (0.03)	0.02	-0.05 (0.03)	0.13	0.03 (0.03)	0.34
HPFS	2444	0.003 (0.03)	0.90	0.001 (0.03)	0.97	-0.02 (0.03)	0.54
Pooled results [†]		-0.03 (0.02)	0.12	-0.02 (0.02)	0.33	0.01 (0.02)	0.82

AHEI-2010=Alternate Healthy Eating Index 2010; AMED=Alternate Mediterranean Diet; DASH=Dietary Approach to Stop Hypertension; HPFS=Health Professionals Follow-up Study; NHS=Nurses' Health Study.

*Plus-minus values are β coefficient (SE). Data were derived from repeated measurements analyses for women in NHS (five intervals of four years from 1986 to 2006) and men in HPFS (five intervals of four years from 1986 to 2006). Results were adjusted for same set of variables as in Table 2.

[†]Results for two cohorts were pooled by means of inverse variance weighted fixed effects meta-analysis.

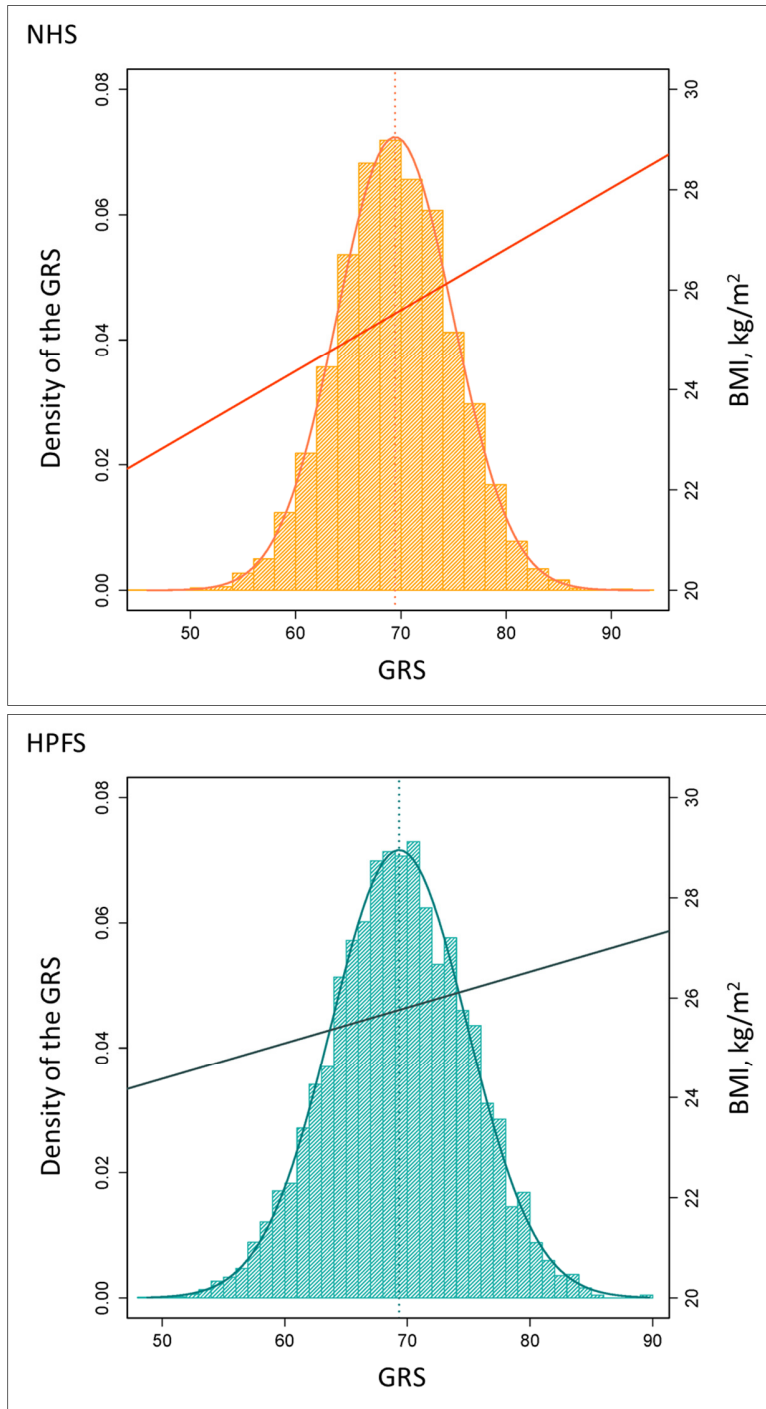
Supplementary table H Genetic associations and interactions of the genetic risk score comprising 97 single nucleotide polymorphisms with changes in diet quality scores and dietary components on change in body mass index every four years in two cohorts combined*

	Genetic association	
	β (SE)	P
Each increment of 10 risk allele	0.03 (0.01)	0.005
Interaction		
	β (SE)	P for interaction
Each 1 SD increment in diet quality scores		
AHEI-2010	-0.05 (0.01)	<0.001
DASH	-0.03 (0.01)	0.007
AMED	-0.01 (0.01)	0.34
Each 1 SD increment in dietary components		
Vegetables (excluding potatoes)	-0.04 (0.01)	0.002
Fruits	-0.04 (0.01)	0.002
Whole grains	-0.02 (0.01)	0.11
Sugar sweetened drinks and fruit juice	0.02 (0.01)	0.13
Nuts	-0.01 (0.01)	0.59
Legumes	-0.01 (0.01)	0.38
Red and processed meats	-0.002 (0.01)	0.85
Fish	-0.01 (0.01)	0.39
Low-fat dairy	-0.02 (0.01)	0.18
Trans fat	0.03 (0.01)	0.037
Long-chain (n-3) fats	-0.02 (0.01)	0.045
Poly-unsaturated fatty acids	0.005 (0.01)	0.67
Ratio of monounsaturated to saturated fat	-0.01 (0.01)	0.62
Sodium	-0.01 (0.01)	0.47
Alcohol	0.003 (0.01)	0.79

AHEI-2010=Alternate Healthy Eating Index 2010; AMED=Alternate Mediterranean Diet; DASH=Dietary Approach to Stop Hypertension.

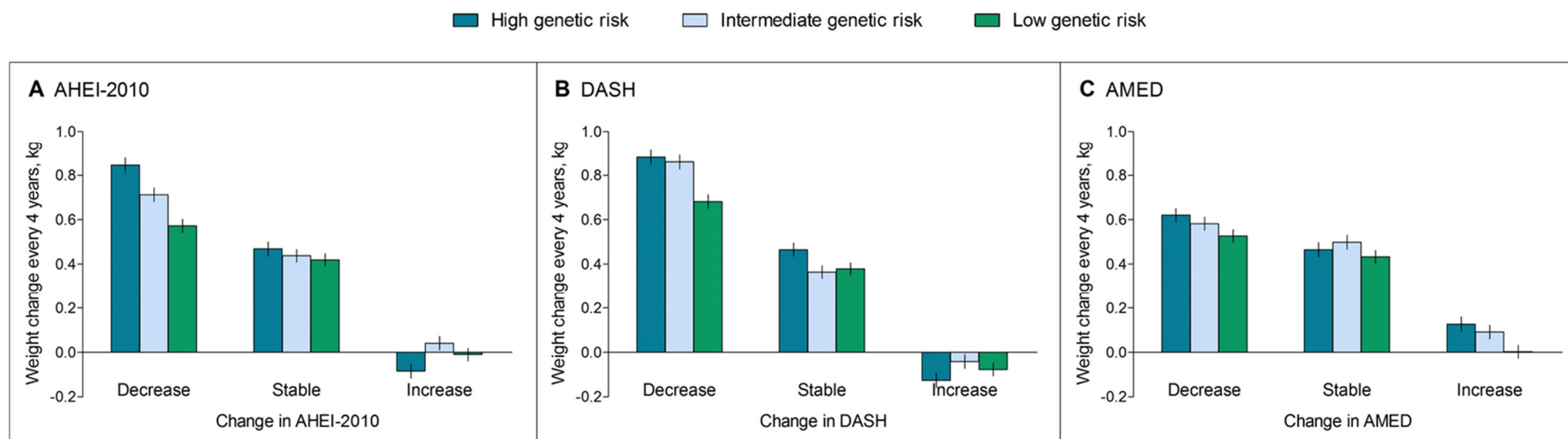
*Data were derived from repeated measurements analyses for women in Nurses' Health Study (five intervals of four years from 1986 to 2006) and men in Health Professionals Follow-up Study (five intervals of four years from 1986 to 2006). Results were adjusted for same set of variables as in table 2. Results for two cohorts were pooled by means of inverse variance weighted fixed effects meta-analysis

Supplementary figure A Distribution of genetic risk score in Nurses' Health Study and Health Professionals Follow-up Study



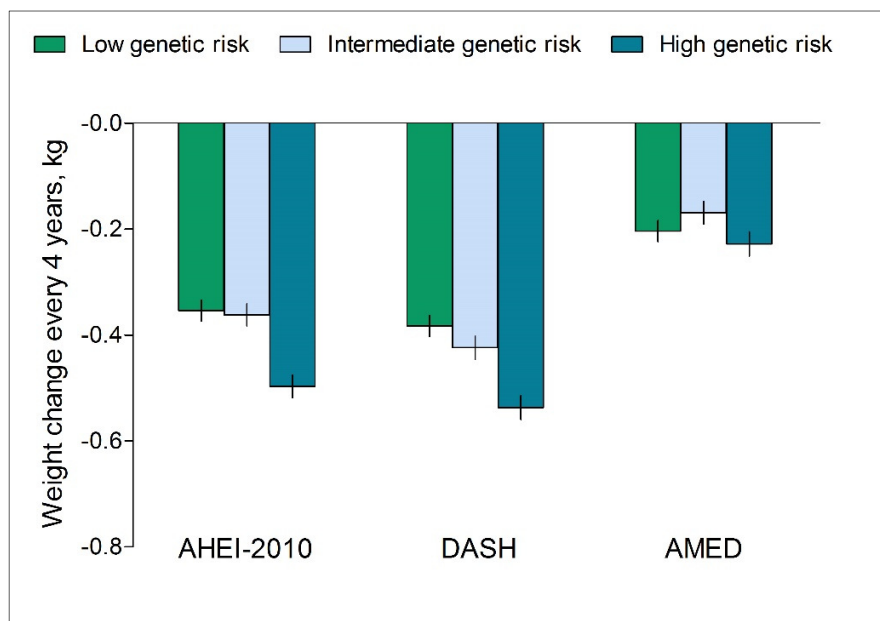
BMI=body mass index; GRS=genetic risk score; NHS=Nurses' Health Study; HPFS=Health Professionals Follow-up Study. The solid line represents correlation between GRS and baseline BMI: $BMI=0.12*GRS + 17.05$ in the NHS; $BMI=0.07*GRS + 20.80$ in the HPFS.

Supplementary figure B Pooled, multivariable adjusted means of weight change every four years, according to joint categories of genetic risk and changes in diet quality scores in thirds



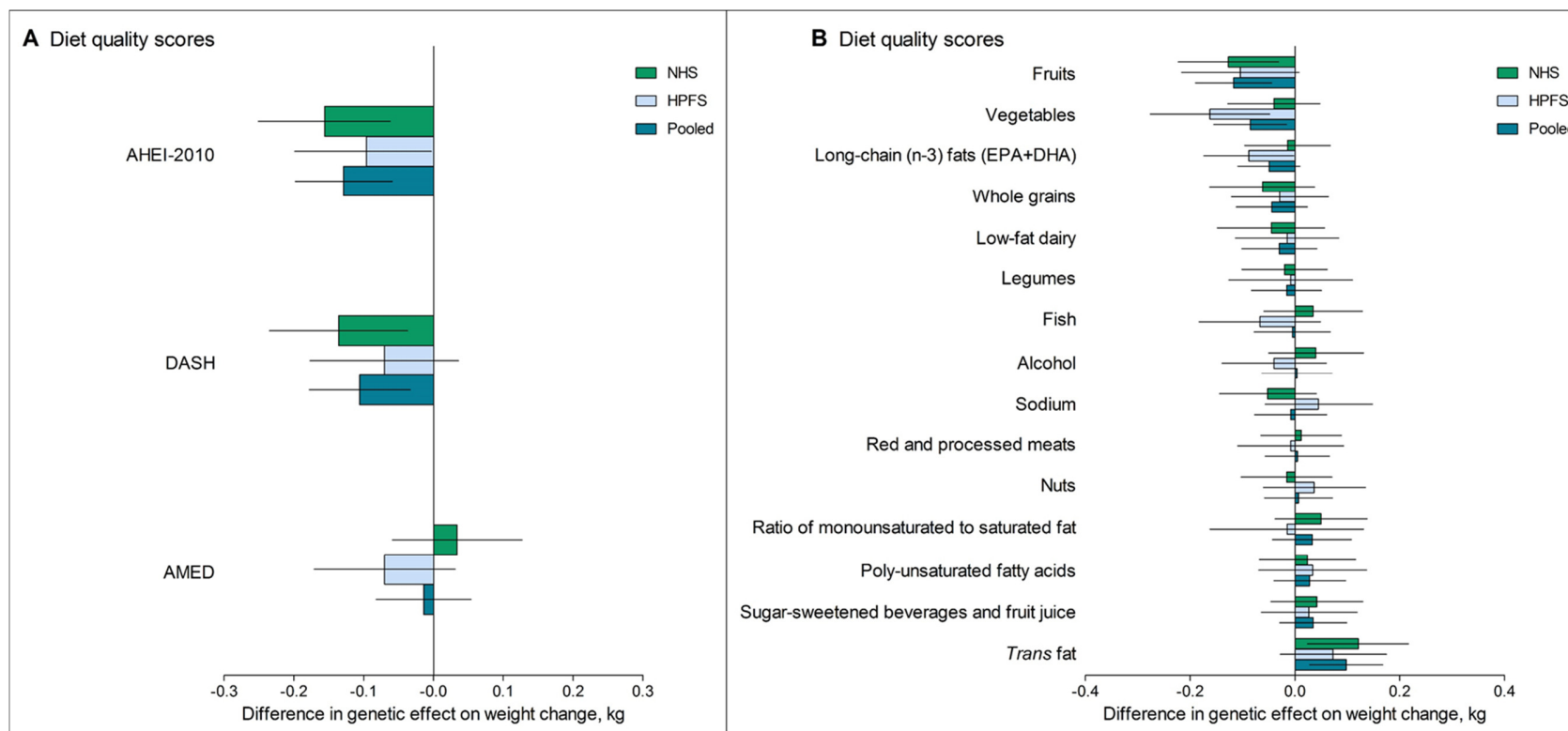
AHEI-2010=Alternate Healthy Eating Index 2010; AMED=Alternate Mediterranean Diet; DASH=Dietary Approach to Stop Hypertension. Histograms and bars are means and SEs. Decreased, stable, and increased adherence to each diet quality score refers to third 1, 2, and 3 of each score, respectively. Data were derived from repeated measurements analyses for women in Nurses' Health Study (five intervals of four years from 1986 to 2006) and men in Health Professionals Follow-up Study (five intervals of four years from 1986 to 2006). Results were adjusted for same set of variables as in table 2. Results for two cohorts were pooled by means of inverse variance weighted fixed effects meta-analysis

Supplementary figure C Pooled, multivariable adjusted weight change every four years per 1 SD increment of each diet quality score, according to genetic risk



AHEI-2010=Alternate Healthy Eating Index 2010; AMED=Alternate Mediterranean Diet; DASH=Dietary Approach to Stop Hypertension. Histograms and bars are β coefficients and SEs. Value of 1 SD: AHEI-2010: 8.38; DASH: 3.71; AMED: 1.72. Data were derived from repeated measurements analyses for women in Nurses' Health Study (five intervals of four years from 1986 to 2006) and men in Health Professionals Follow-up Study (five intervals of four years from 1986 to 2006). Results were adjusted for the same set of variables as in table 2. Results for two cohorts were pooled by means of inverse variance weighted fixed effects meta-analysis.

Supplementary figure D Interaction of genetic risk score with changes in diet quality scores and dietary components on weight change every four years



AHEI-2010=Alternate Healthy Eating Index 2010; AMED=Alternate Mediterranean Diet; DASH=Dietary Approach to Stop Hypertension; NHS=Nurses' Health Study; HPFS=Health Professionals Follow-up Study. Histograms and bars are β coefficients and 95% CIs for interactions between genetic risk score (per 10-risk allele) and changes in the diet quality scores and dietary components (per 1 SD increment) on weight change. Value of 1 SD: AHEI-2010: 8.38; DASH: 3.71; AMED: 1.72; fruits (servings/d): 1.12; vegetables (servings/d): 2.06; long chain (n-3) fats (mg/d): 300.7; whole grains (g/d): 17.34; low fat dairy (servings/d): 0.88; legumes (servings/d): 0.27; fish (servings/d): 0.38; alcohol (drinks/d): 0.70; sodium (mg/d): 3.10; red and processed meats (servings/d): 0.26; nuts (servings/d): 0.52; ratio of monounsaturated to saturated fat: 0.21; polyunsaturated fatty acids (% of energy): 1.68; sugar sweetened drinks and fruit juice (servings/d): 0.92; trans fat (% of energy): 0.01. Data were derived from repeated measurements analyses for women in NHS (five intervals of four years from 1986 to 2006) and men in HPFS (five intervals

of four years from 1986 to 2006). Results were adjusted for the same set of variables as in table 2. Results for two cohorts were pooled by means of inverse variance weighted fixed effects meta-analysis.