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Table 1. Basic descriptive statistics of anthropometric, pubertal timing and metabolic characteristics by sex

	Males (n=314)		Females (n=405)	
	Mean	SD	Mean	SD
Adult age (years)	22.43	0.70	22.32	0.56
Height at adult age (cm)	179.58	7.01	166.14	6.38
Weight at adult age (kg)	77.31	14.66	63.29	12.55
BMI at adult age	23.90	3.75	22.88	4.03
Height at 11-12 years (cm)	147.03	7.48	147.64	7.50
Height at 14 years (cm)	164.24	9.39	162.02	6.43
Height at 17 years (cm)	178.53	7.05	165.53	6.18
PDS at 12 years	1.31	0.27	1.69	0.42
PDS at 14 years	2.02	0.50	2.84	0.55
<b>Plasma lipids (mmol/l)</b>				
Total cholesterol	4.45	0.79	4.85	0.86
HDL cholesterol	1.58	0.30	2.01	0.43
LDL cholesterol	1.70	0.50	1.65	0.45
HDL/LDL cholesterol	1.02	0.36	1.30	0.44
IDL cholesterol	0.65	0.15	0.68	0.15
Triglycerides	1.01	0.46	1.00	0.45
<b>Lipoprotein particle size (nm)</b>				
HDL particle size	9.84	0.21	10.11	0.24
LDL particle size	23.57	0.16	23.63	0.17
VLDL particle size	36.68	1.35	36.26	1.39
<b>HDL particle concentration (μmol/l)</b>				
Small HDL	4.66	0.38	4.80	0.54
Medium HDL	2.01	0.33	2.43	0.46
Large HDL	1.27	0.52	2.08	0.77
Total HDL	7.94	0.90	9.31	1.38
<b>LDL particle concentration (nmol/l)</b>				
Small LDL	127.83	34.57	130.23	32.54
Medium LDL	114.88	31.22	113.97	28.77
Large LDL	222.25	55.10	233.39	54.89
Total LDL	464.96	119.24	477.59	113.86

<b><i>VLDL particle concentration (nmol/l)</i></b>				
Small VLDL	49.59	16.32	49.43	17.05
Medium VLDL	13.42	7.99	11.97	7.32
Large VLDL	3.64	3.45	3.33	3.27
Total VLDL	66.64	26.29	64.74	25.54
<b><i>Apolipoproteins (g/l)</i></b>				
Apolipoprotein A1	1.62	0.22	1.86	0.23
Apolipoprotein B	0.81	0.19	0.81	0.17
ApoB/ApoA-1	0.51	0.13	0.44	0.10

SD, Standard deviation; small HDL (8.7 nm); medium HDL (10.9 nm); "large HDL" [very large HDL (14.3 nm) + large HDL (12.1 nm)]; small LDL (18.7); medium LDL (23.0 nm); "large LDL" [large LDL (25.5 nm) + IDL (28.6 nm)]; "small VLDL" [small VLDL (36.8 nm) + very small VLDL (31.3 nm)]; medium VLDL (44.5 nm); "large VLDL" [chylomicrons and extremely large VLDL particles (with particle diameters from ~75 nm upwards) + very large VLDL (mean particle diameter of 64.0 nm) + large VLDL (53.6 nm)].



Table 2. Phenotypic, genetic and environmental correlations between adult height and lipid profile

	Males			Females		
	$r_P$	$r_A$ (CI)	$r_E$ (CI)	$r_P$	$r_A$ (CI)	$r_E$ (CI)
<b>Plasma lipids</b>						
Total cholesterol	<b>-0.18**</b>	<b>-0.21(-0.38,-0.05)</b>	0.13(-0.15,0.40)	-0.07	-0.12(-0.28,0.04)	0.03 (-0.19,0.24)
HDL cholesterol	-0.12	-0.12(-0.28,0.03)	0.17(-0.10,0.43)	0.03	0.00(-0.15,0.16)	0.04(-0.18,0.26)
LDL cholesterol	<b>-0.17**</b>	<b>-0.18(-0.33,-0.01)</b>	-0.02(-0.30,0.26)	<b>-0.11*</b>	<b>-0.17(-0.32,-0.01)</b>	-0.02(-0.24,0.20)
HDL/LDL cholesterol	0.07	0.06(-0.09,0.22)	0.13(-0.15,0.39)	<b>0.11*</b>	0.13(-0.02,0.28)	0.04(-0.18,0.26)
IDL cholesterol	<b>-0.18**</b>	<b>-0.21(-0.38,-0.04)</b>	0.10(-0.19,0.38)	<b>-0.12*</b>	<b>-0.19(-0.34,-0.03)</b>	0.05(-0.18,0.26)
Triglycerides	-0.03	-0.04(-0.21,0.12)	-0.05(-0.33,0.23)	-0.06	-0.11(-0.27,0.05)	0.02(-0.20,0.23)
<b>Lipoprotein particle size</b>						
HDL particle size	-0.05	-0.05(-0.21,0.11)	0.10(-0.18,0.36)	0.07	0.06(-0.09,0.20)	-0.02(-0.24,0.20)
LDL particle size	-0.01	-0.06(-0.31,0.16)	0.08(-0.21,0.35)	-0.07	-0.11(-0.29,0.08)	0.05(-0.17,0.25)
VLDL particle size	0.06	0.07(-0.10,0.25)	-0.04(-0.31,0.24)	0.03	0.02(-0.15,0.19)	0.05(-0.16,0.27)
<b>HDL particle concentration</b>						
Small HDL	<b>-0.13*</b>	-0.15(-0.33,0.02)	0.14(-0.17,0.42)	-0.07	-0.12(-0.28,0.04)	0.07(-0.15,0.28)
Medium HDL	<b>-0.15*</b>	<b>-0.21(-0.38,-0.04)</b>	0.17(-0.11,0.42)	-0.06	-0.13(-0.29,0.04)	0.11(-0.11,0.32)
Large HDL	-0.09	-0.09(-0.25,0.07)	0.08(-0.20,0.34)	0.04	0.02(-0.14,0.17)	0.02(-0.20,0.24)
Total HDL	<b>-0.14*</b>	<b>-0.17(-0.33,-0.01)</b>	0.19(-0.09,0.44)	-0.01	-0.06(-0.22,0.10)	-0.06(-0.16,0.27)
<b>LDL particle concentration</b>						
Small LDL	<b>-0.17**</b>	<b>-0.18(-0.33,-0.02)</b>	-0.01(-0.28,0.27)	-0.10	-0.16(-0.32,0.00)	-0.02(-0.24,0.20)
Medium LDL	<b>-0.17**</b>	<b>-0.17(-0.33,-0.01)</b>	-0.03(-0.31,0.25)	<b>-0.11*</b>	<b>-0.17(-0.32,-0.01)</b>	-0.03(-0.25,0.19)
Large LDL	<b>-0.19**</b>	<b>-0.21(-0.36,-0.05)</b>	0.03(-0.25,0.31)	<b>-0.13**</b>	<b>-0.21(-0.36,-0.05)</b>	0.00(-0.22,0.22)
Total LDL	<b>-0.18**</b>	<b>-0.19(-0.35,-0.04)</b>	0.00(-0.28,0.28)	<b>-0.12*</b>	<b>-0.19(-0.34,-0.03)</b>	-0.01(-0.23,0.21)
<b>VLDL particle concentration</b>						
Small VLDL	-0.07	-0.11(-0.27,0.05)	-0.02(-0.30,0.26)	-0.10	-0.15(-0.31,0.01)	0.01(-0.21,0.23)
Medium VLDL	0.01	-0.00(-0.17,0.17)	-0.05(-0.32,0.23)	-0.03	-0.06(-0.23,0.11)	0.06(-0.16,0.27)
Large VLDL	0.03	0.03(-0.16,0.23)	-0.02(-0.40,0.38)	-0.03	-0.08(-0.26,0.10)	0.06(-0.17,0.29)
Total VLDL	-0.04	-0.07(-0.23,0.09)	-0.02(-0.30,0.26)	-0.08	-0.12(-0.28,0.04)	0.02(-0.20,0.24)
<b>Apolipoproteins</b>						
Apolipoprotein A1	<b>-0.17**</b>	<b>-0.20(-0.36,-0.04)</b>	0.16(-0.11,0.42)	0.02	-0.00(-0.18,0.18)	0.00(-0.24,0.24)
Apolipoprotein B	-0.09	-0.12(-0.28,0.04)	0.08(-0.20,0.36)	-0.09	-0.11(-0.27,0.05)	-0.02(-0.25,0.22)
ApoB/ApoA-1	0.01	-0.01(-0.16,0.15)	-0.03(-0.31,0.24)	-0.11	-0.11(-0.26,0.05)	-0.03(-0.26,0.21)

Phenotypic correlations ( $r_P$ ) were estimated using Pearson's correlation method. Genetic ( $r_A$ ) and environmental ( $r_E$ ) correlations between height and each of the analyzed lipids and lipoproteins were obtained from the multivariate Cholesky model, which decomposes phenotypic covariation into uncorrelated genetic and environmental factors. In each multivariate model five phenotypes were included: height at 11-12, 14, 17 years and young adulthood, and one lipoprotein. CI, 95% confidence interval for  $r_A$  and  $r_E$ . \* $P < 0.05$ ; \*\* $P < 0.01$ .

Table 3. Phenotypic, genetic and environmental correlations between PDS at 14 years and lipid profile

	Males			Females		
	$r_P$	$r_A$ (CI)	$r_E$ (CI)	$r_P$	$r_A$ (CI)	$r_E$ (CI)
HDL cholesterol	-0.01	-0.09(-0.32,0.11)	0.22(-0.08,0.48)	<b>0.20***</b>	0.17(-0.09,0.42)	0.21(-0.04,0.43)
HDL/LDL cholesterol	-0.07	-0.18(-0.39,0.02)	<b>0.36(0.09,0.57)</b>	<b>0.19***</b>	0.16(-0.06,0.36)	0.16(-0.07,0.37)
HDL particle size	0.01	0.01(-0.18,0.20)	0.16(-0.11,0.41)	<b>0.21***</b>	0.18(-0.01,0.37)	<b>0.23(0.01,0.43)</b>
Medium HDL	-0.07	-0.03(-0.30,0.23)	0.02(-0.26,0.29)	<b>0.13*</b>	<b>0.34(0.06,0.65)</b>	-0.02(-0.24,0.21)
Large HDL	0.01	-0.04(-1.00,0.20)	0.17(-0.16,0.79)	<b>0.20***</b>	<b>0.39(0.04,1.00)</b>	0.04(-0.51,0.32)
Total HDL	-0.05	-0.15(-0.41,0.08)	0.17(-0.13,0.44)	<b>0.18***</b>	0.22(-0.07,0.53)	0.12(-0.13,0.35)
Apolipoprotein A1	-0.01	-0.06(-0.28,0.16)	0.07(-0.22,0.35)	<b>0.11*</b>	0.08(-0.26,0.44)	0.11(-0.14,0.35)
ApoB/ApoA-1	0.03	0.19(-0.02,0.44)	<b>-0.36(-0.60,-0.07)</b>	<b>-0.16**</b>	0.03(-0.29,0.24)	-0.19(-0.42,0.07)

Phenotypic correlations ( $r_P$ ) were estimated using Pearson's correlation method. Genetic ( $r_A$ ) and environmental ( $r_E$ ) correlations between pubertal timing and each of the analyzed lipids and lipoproteins were obtained from the multivariate Cholesky model, which decomposes phenotypic covariation into uncorrelated genetic and environmental factors. In each multivariate model two phenotypes were included: PDS14 and one lipoprotein. CI, 95% confidence interval for  $r_A$  and  $r_E$ . \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

Table 4. Phenotypic, genetic and environmental correlations of HD:SDS12 and HD:SDS14 with lipid profile

		Males			Females		
		$r_P$	$r_A$ (CI)	$r_E$ (CI)	$r_P$	$r_A$ (CI)	$r_E$ (CI)
Total cholesterol	HD:SDS12	<b>-0,19***</b>	<b>-0.27(-0.44,-0.10)</b>	0.04(-0.25,0.32)	-0.03	-0.09(-0.25,0.08)	-0.03(-0.24,0.19)
	HD:SDS14	<b>-0,15*</b>	<b>-0.23(-0.41,-0.05)</b>	0.17(-0.11,0.43)	-0.09	-0.11(-0.28,0.08)	-0.13(-0.35,0.09)
HDL cholesterol	HD:SDS12	-0,08	-0.11(-0.27,0.05)	-0.15(-0.41,0.13)	0.02	0.05(-0.12,0.21)	-0.12(-0.33,0.11)
	HD:SDS14	-0,09	-0.14(-0.30,0.03)	-0.06(-0.32,0.22)	<b>-0.11*</b>	-0.06(-0.23,0.12)	-0.20(-0.40,0.02)
LDL cholesterol	HD:SDS12	<b>-0,17**</b>	<b>-0.22(-0.39,-0.04)</b>	0.02(-0.28,0.31)	-0.02	-0.09(-0.26,0.08)	-0.00(-0.22,0.22)
	HD:SDS14	<b>-0,14*</b>	<b>-0.21(-0.39,-0.04)</b>	0.17(-0.11,0.43)	-0.03	-0.11(-0.29,0.07)	0.03(-0.20,0.26)
IDL cholesterol	HD:SDS12	<b>-0,18**</b>	<b>-0.27(-0.44,-0.09)</b>	0.10(-0.20,0.38)	-0.03	-0.12(-0.28,0.05)	0.06(-0.16,0.27)
	HD:SDS14	<b>-0,13*</b>	<b>-0.23(-0.41,-0.05)</b>	0.24(-0.05,0.49)	-0.05	-0.12(-0.30,0.05)	0.06(-0.18,0.29)
Medium HDL	HD:SDS12	-0,12	-0.16(-0.34,0.03)	-0.11(-0.38,0.17)	-0.01	0.01(-0.17,0.18)	-0.13(-0.33,0.09)
	HD:SDS14	-0,11	-0.17(-0.35,0.02)	0.08(-0.19,0.34)	<b>-0.11*</b>	-0.07(-0.25,0.11)	-0.12(-0.33,0.10)
Total HDL	HD:SDS12	-0,11	-0.15(-0.32,0.03)	-0.15(-0.41,0.13)	-0.01	0.02(-0.16,0.19)	-0.13(-0.33,0.09)
	HD:SDS14	-0,11	-0.16(-0.33,0.02)	0.03(-0.25,0.30)	<b>-0.13*</b>	-0.07(-0.25,0.11)	-0.18(-0.39,0.04)
Small LDL	HD:SDS12	-0,09	<b>-0.24(-0.40,-0.07)</b>	0.04(-0.25,0.32)	<b>-0.13*</b>	-0.10(-0.27,0.07)	-0.07(-0.28,0.15)
	HD:SDS14	<b>-0,14*</b>	<b>-0.22(-0.39,-0.05)</b>	0.17(-0.11,0.42)	-0.06	-0.13(-0.30,0.05)	-0.03(-0.25,0.19)
Medium LDL	HD:SDS12	<b>-0,17**</b>	<b>-0.22(-0.39,-0.05)</b>	0.02(-0.27,0.31)	-0.03	-0.10(-0.26,0.07)	-0.04(-0.25,0.18)
	HD:SDS14	<b>-0,14*</b>	<b>-0.22(-0.39,-0.04)</b>	0.18(-0.10,0.43)	-0.04	-0.12(-0.29,0.06)	0.01(-0.22,0.23)
Large LDL	HD:SDS12	<b>-0,19**</b>	<b>-0.26(-0.42,-0.09)</b>	0.05(-0.25,0.33)	-0.04	-0.12(-0.28,0.05)	-0.01(-0.23,0.21)
	HD:SDS14	<b>-0,15*</b>	<b>-0.23(-0.40,-0.06)</b>	0.22(-0.06,0.47)	-0.06	-0.14(-0.32,0.03)	0.06(-0.18,0.30)
Total LDL	HD:SDS12	<b>-0,18**</b>	<b>-0.25(-0.41,-0.08)</b>	0.04(-0.26,0.33)	-0.04	-0.11(-0.27,0.06)	-0.04(-0.25,0.18)
	HD:SDS14	<b>-0,15*</b>	<b>-0.23(-0.39,-0.06)</b>	0.20(-0.08,0.45)	-0.06	-0.14(-0.31,0.04)	0.02(-0.21,0.25)
Apolipoprotein A1	HD:SDS12	-0,13	<b>-0.18(-0.35,-0.01)</b>	-0.11(-0.38,0.17)	0.04	0.10(-0.10,0.30)	-0.14(-0.36,0.10)
	HD:SDS14	-0,14	<b>-0.20(-0.37,-0.02)</b>	0.05(-0.23,0.32)	-0.03	0.04(-0.18,0.27)	-0.13(-0.36,0.11)
Apolipoprotein B	HD:SDS12	<b>-0,14*</b>	<b>-0.20(-0.36,-0.02)</b>	0.09(-0.20,0.37)	-0.03	-0.11(-0.28,0.07)	-0.03(-0.26,0.21)
	HD:SDS14	-0,08	-0.12(-0.30,0.06)	0.21(-0.07,0.46)	-0.01	-0.06(-0.24,0.13)	0.04(-0.20,0.28)

Phenotypic correlations ( $r_P$ ) were estimated using Pearson's correlation method. Genetic ( $r_A$ ) and environmental ( $r_E$ ) correlations between pubertal timing and each of the analyzed lipids and lipoproteins were obtained from the multivariate Cholesky model, which decomposes phenotypic covariation into uncorrelated genetic and environmental factors. In each multivariate model three phenotypes were included: HD:SDS12, HD:SDS14 and one lipoprotein. CI, 95% confidence interval for  $r_A$  and  $r_E$ . \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .