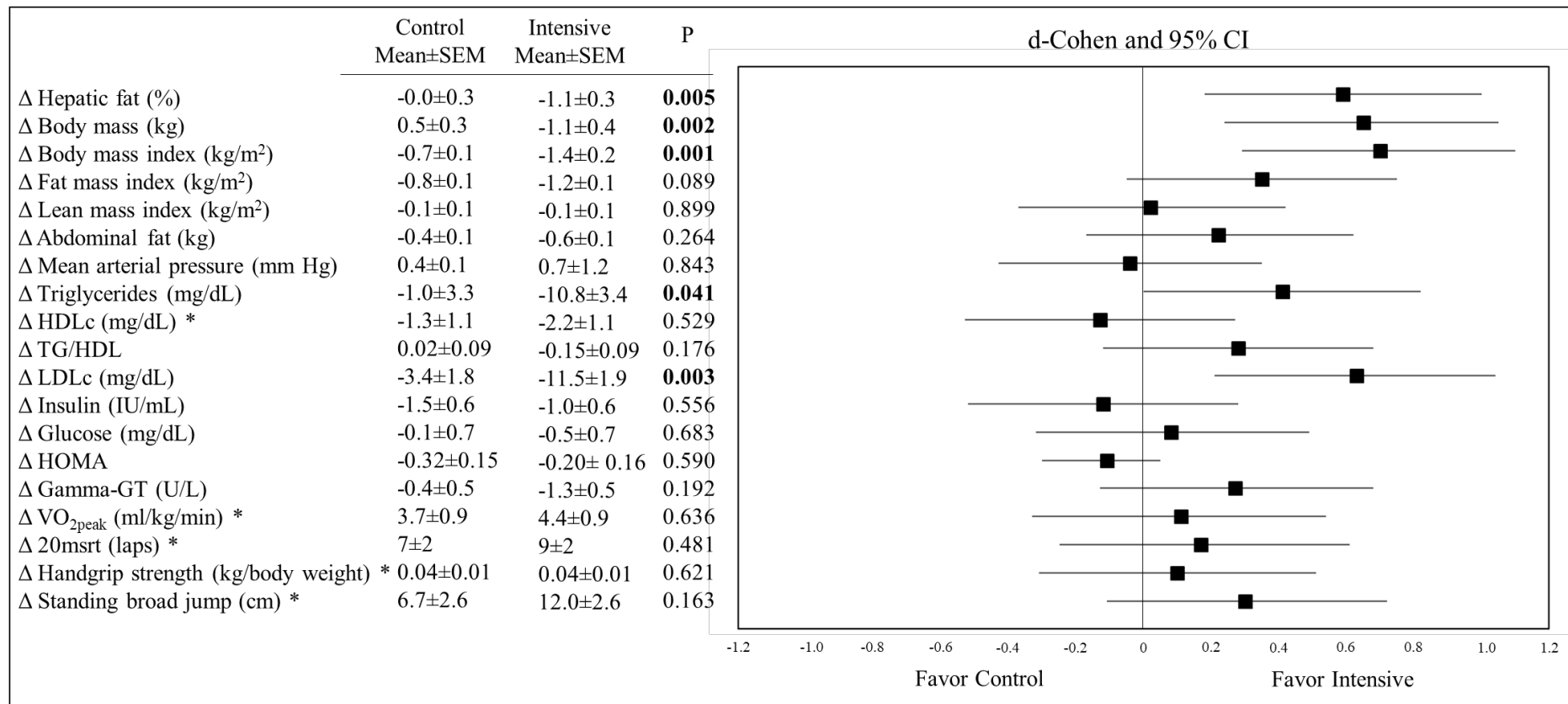
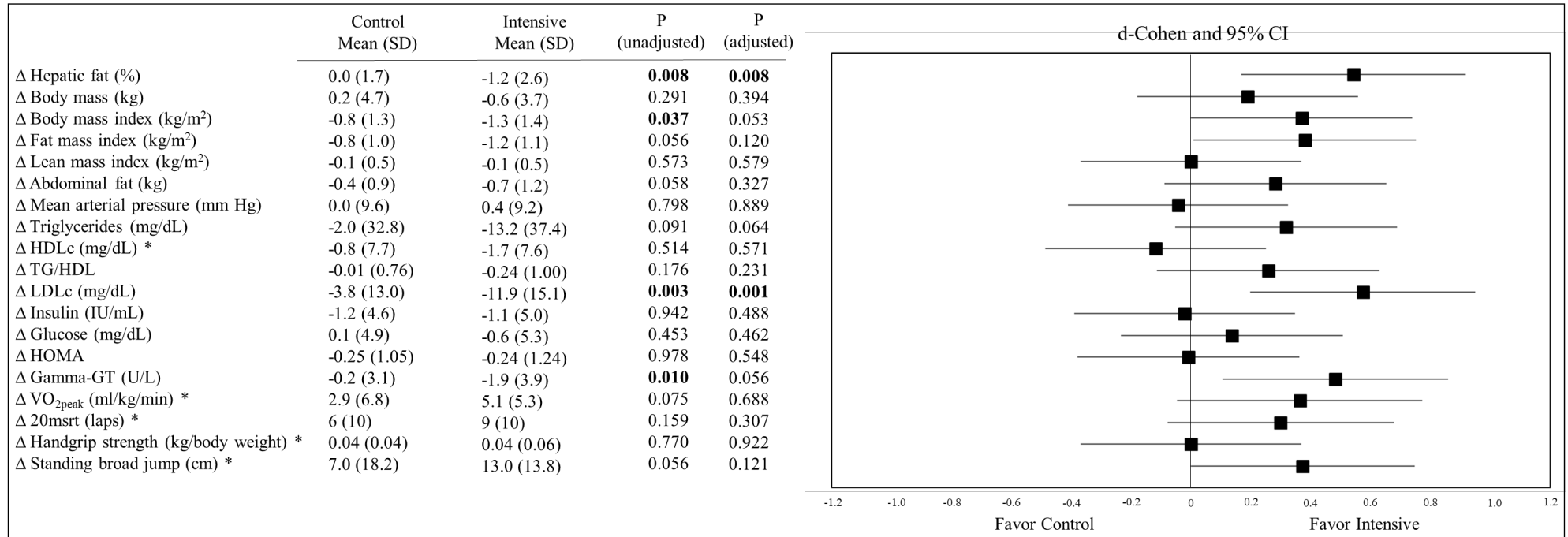


Supplemental Figure 1.



Supplemental Figure 2.



Supplemental Figure 3.

Supplemental Table 1. Percentage hepatic fat, body composition, cardiometabolic and diabetes risk factors, and physical fitness before (Pre) and after (Post) participation in the family-based lifestyle and psycho-educational intervention program (control group, CI) or the plus exercise training (intensive group, II) in children with overweight/obesity (*intention-to-treat* analysis).

	Control group (CI)						Intensive group (II)					CI vs. II		
	Pre			Post		P	Pre			Post		P	P _{pre}	P _{post}
	N	Mean	SD	Mean	SD		N	Mean	SD	Mean	SD			
Primary outcome														
Hepatic fat (%)*	57	5.3	2.9	5.2	2.6	0.901	59	6.0	4.8	4.8	3.4	0.001	0.346	0.303
Secondary outcomes														
<i>Body composition</i>														
Body mass (kg)	57	53.8	9.7	54.0	9.5	0.716	59	55.6	11.4	55.0	11.1	0.211	0.361	0.613
Body mass index (kg/m ²)	57	25.2	2.8	24.5	3.1	<0.001	59	25.8	3.7	24.5	3.5	<0.001	0.355	0.976
Fat mass index (kg/m ²)	57	9.8	2.1	9.0	2.3	<0.001	59	10.5	2.6	9.3	2.4	<0.001	0.124	0.464
Lean mass index (kg/m ²)	57	14.7	1.2	14.6	1.3	0.134	59	14.5	1.3	14.4	1.2	0.380	0.289	0.508
Abdominal fat (kg)	57	5.7	2.1	5.4	2.1	0.003	59	6.5	2.7	5.9	2.3	<0.001	0.085	0.260
<i>Cardiometabolic and diabetes risk factors</i>														
SBP (mm Hg)	57	96.8	10.3	97.3	10.3	0.799	59	96.1	10.3	95.7	11.3	0.841	0.681	0.453
DBP (mm Hg)	57	62.7	7.5	61.7	6.5	0.329	59	61.2	9.0	63.0	7.6	0.083	0.334	0.327
MAP (mm Hg)	57	85.5	8.2	85.4	7.8	0.976	59	84.4	9.0	84.8	8.8	0.733	0.522	0.707
Triglycerides (mg/dL)*	57	80.9	37.9	78.9	27.3	0.648	58	85.0	40.7	71.8	28.5	0.010	0.577	0.166
HDLc (mg/dL)	57	50.4	10.6	49.6	10.0	0.431	58	51.1	12.0	49.4	11.9	0.089	0.741	0.841
TG/HDLc	56	1.71	0.95	1.69	0.77	0.893	58	1.84	1.16	1.60	0.89	0.074	0.507	0.516
LDLc (mg/dL)	57	104.4	25.4	100.6	24.0	0.030	58	104.4	22.5	92.5	18.3	<0.001	0.998	0.035
Insulin (IU/mL)*	57	11.7	4.8	10.5	4.3	0.054	58	12.6	5.0	11.5	5.1	0.090	0.323	0.306
Glucose (mg/dL)	56	85.3	5.5	85.4	5.3	0.897	58	85.5	5.3	84.9	6.2	0.364	0.860	0.534
HOMA*	56	2.48	1.08	2.23	1.00	0.086	58	2.69	1.16	2.45	1.28	0.148	0.305	0.343
Gamma-GT (U/L)	57	15.5	4.0	15.4	3.9	0.677	56	17.1	5.2	15.2	4.3	0.001	0.070	0.618
<i>Physical fitness</i>														
VO ₂ peak treadmill test (ml/kg/min)	44	35.5	6.4	38.4	6.7	0.008	51	31.9	5.1	37.0	5.6	<0.001	0.003	0.184
Endtime treadmill test (sg)	44	597	153	663	164	0.004	51	549	143	673	141	<0.001	0.116	0.759
20msrt (laps)	55	23	12	29	11	0.001	56	20	12	29	15	<0.001	0.152	0.975

Handgrip strength (kg/body mass)	56	0.34	0.06	0.38	0.07	< 0.001	59	0.32	0.06	0.36	0.07	< 0.001	0.173	0.348
Standing broad jump (cm)	55	103.5	15.7	110.5	23.1	0.008	59	96.6	18.8	109.7	20.1	< 0.001	0.100	0.794

SBP: systolic blood pressure; DBP: diastolic blood pressure; MAP: mean arterial pressure calculated as diastolic pressure + $[0.333 \times (\text{systolic blood pressure} - \text{diastolic pressure})]$; HDLc: high density lipoprotein cholesterol; LDLc: low density lipoprotein cholesterol; TG/HDL: triglycerides to high density lipoprotein cholesterol ratio; HOMA: homeostasis model assessment; Gamma-GT: gamma-glutamyl transferase. 20msrt: 20 meters shuttle run test.

*Analyzed with log (ln) transformed values, but non-transformed data are shown in table. P indicates statistical differences between Pre and Post values (paired Student t test). P_{pre} indicates statistical differences in baseline values (Student t test). P_{post} indicates statistical differences in Post-intervention values between the control and the intensive intervention groups (Student t test).

Supplemental Table 2. Associations of changes in physical fitness with changes in percentage hepatic fat in children with overweight/obesity after their participation in the family-based lifestyle and psycho-educational intervention program (control group, CI) and the same plus exercise training (intensive group, II) (*per protocol* analyses).

	Δ Percentage hepatic fat					
	Control group (CI)			Intensive group (II)		
	Unadjusted Model			Unadjusted Model		
	Adjusted Model*			Adjusted Model*		
	N	β	P	N	β	P
Δ VO ₂ peak treadmill test (ml/kg/min)	41	-0.002	0.988	-0.007	0.972	
Δ 20msrt (laps)	44	0.098	0.541	-0.012	0.949	
Δ Handgrip strength (kg/body mass)	52	-0.294	0.057	-0.270	0.064	
Δ Standing broad jump (cm)	46	0.050	0.748	-0.041	0.796	
	44	0.061	0.697	-0.057	0.696	
	47	-0.359	0.023	-0.291	0.006	
	49	0.152	0.318	-0.069	0.589	
	46	0.007	0.964	-0.135	0.272	

*Regression analyses were adjusted with baseline physical fitness and percentage hepatic fat. β : unstandardized regression coefficient. Δ : Changes calculated as Post intervention-Pre intervention values.

Supplemental Table 3. Associations of changes in physical fitness with changes in percentage hepatic fat in children with overweight/obesity after their participation in the family-based lifestyle and psycho-educational intervention program (control group, CI) and the same plus exercise training (intensive group, II) (*intention-to-treat* analyses).

	Δ Percentage hepatic fat										
	Control group (CI)					Intensive group (II)					
	Unadjusted Model			Adjusted Model*		Unadjusted Model			Adjusted Model*		
	N	β	P	β	P	N	β	P	N	β	P
Δ VO ₂ peak treadmill test (ml/kg/min)	44	-0.011	0.943	0.002	0.991	51	0.024	0.869	-0.038	0.734	
Δ 20msrt (laps)	55	0.049	0.727	-0.056	0.697	56	-0.219	0.122	-0.180	0.051	
Δ Handgrip strength (kg/body mass)	56	-0.267	0.048	-0.203	0.107	59	0.174	0.187	-0.004	0.968	
Δ Standing broad jump (cm)	55	0.058	0.678	-0.062	0.620	59	0.036	0.785	-0.077	0.417	

*Regression analyses were adjusted with baseline physical fitness and baseline percentage hepatic fat. β : unstandardized regression coefficient. Δ : Changes calculated as Post intervention-Pre intervention values.

Supplemental Table 4. Main lifestyle and psychological variables before (Pre) and after (Post) participation in the family-based lifestyle and psycho-educational intervention program (control group, CI), and the same plus exercise training (intensive group, II) in children with overweight/obesity (*per protocol* analysis).

	Control group (CI)				Intensive group (II)				CI vs. II		
	N	Pre	Post	P	N	Pre	Post	P	P _{pre}	P _{post}	P _{group*time}
<i>Dietary and physical activity outcomes</i>											
Energy intake (kcal/day)*	53	1828 (428)	1695 (425)	0.039	49	1785 (408)	1595 (332)	0.007	0.625	0.165	0.641
Fat intake (g/day)*	53	81 (26)	72 (27)	0.033	49	81 (26)	65 (21)	<0.001	0.929	0.193	0.224
Fruits and vegetables (g/day)*	53	239 (142)	343 (210)	0.001	49	237 (189)	314 (216)	0.034	0.590	0.283	0.402
Sugar intake (g/day)*	53	88 (32)	79 (26)	0.061	49	81 (30)	72 (25)	0.055	0.194	0.118	0.953
Sugar-sweetened beverages (g/day)*	53	80 (144)	50 (92)	0.179	49	57 (90)	25 (84)	0.073	0.392	0.097	0.962
Physical activity (counts/min)	47	3689 (697)	3575 (827)	0.126	35	3536 (620)	3615 (699)	0.370	0.606	0.825	0.394
MVPA (min/day)	47	92 (26)	89 (29)	0.392	35	88 (22)	90 (26)	0.618	0.930	0.929	0.348
Sedentary time (min/day)	47	515 (63)	517 (76)	0.744	35	531 (78)	496 (76)	0.026	0.313	0.212	0.018
Sleep time (min/day)	50	464 (31)	458 (44)	0.259	43	460 (45)	457 (30)	0.561	0.710	0.882	0.697
<i>Psychological outcomes</i>											
<i>Self-concept</i>											
Academic self-concept	37	8.3 (1.9)	8.0 (1.7)	0.316	37	8.1 (1.0)	7.9 (1.7)	0.300	0.762	0.717	0.980
Social self-concept	37	7.8 (1.5)	8.1 (1.5)	0.202	38	7.9 (1.4)	7.8 (1.7)	0.902	0.812	0.381	0.284
Emotional self-concept	37	5.9 (2.1)	6.8 (2.1)	0.032	38	5.1 (2.1)	5.9 (2.4)	0.036	0.168	0.122	0.838
Family self-concept	37	9.3 (1.0)	9.4 (0.7)	0.325	38	8.9 (1.4)	9.2 (1.1)	0.150	0.138	0.273	0.497
Physical self-concept	37	6.6 (1.9)	7.2 (2.1)	0.036	38	5.8 (2.0)	6.4 (2.3)	0.089	0.068	0.126	0.893
Total Depression	35	10.3 (6.6)	7.9 (4.6)	0.008	33	6.2 (3.8)	5.6 (3.1)	0.071	0.917	0.489	0.601
Dysphoria	36	4.0 (3.4)	2.7 (2.4)	0.004	33	4.1 (3.6)	3.1 (3.0)	0.056	0.919	0.521	0.638
Negative Self-Esteem	35	6.2 (3.7)	5.2 (2.7)	0.056	37	6.2 (3.8)	5.6 (3.1)	0.223	0.892	0.459	0.585
Total Stress	34	6.1 (3.3)	5.2 (3.1)	0.073	31	6.2 (4.3)	6.0 (4.0)	0.629	0.923	0.732	0.343
Health problems	36	2.4 (1.8)	2.0 (1.7)	0.094	34	2.8 (1.9)	2.2 (1.9)	0.063	0.557	0.614	0.829
School stress	36	2.0 (1.5)	1.9 (1.5)	0.906	34	1.9 (1.6)	2.3 (1.5)	0.276	0.888	0.764	0.335
Family stress	36	1.9 (1.3)	1.4 (1.0)	0.017	34	1.5 (1.5)	1.5 (1.4)	0.891	0.319	0.722	0.130
Trait-Anxiety	35	34.0 (7.6)	31.9 (6.3)	0.030	36	34.5 (7.8)	32.8 (8.7)	0.083	0.481	0.746	0.786

*Analyzed with logarithmically transformed data.

P indicates statistical differences between Pre and Post values (paired Student t test). P_{pre} indicates statistical differences in baseline values between the control and the intensive intervention groups (Student t test); P_{post} indicates statistical differences in Post-intervention values between the control and the intensive intervention groups (Student t test). $P_{group*time}$ indicates statistical differences between groups in changes (before and after values)(ANOVA).