

Supplementary material

Table S1 Correlation coefficients resulting from the univariate correlation analysis for demographics, physical activity, subjective motor performance, and motor and cognitive performance

		Age	Sex	BMI	Exercise	MABC AB	MABC C	VO ₂ max
ST gait speed		-.341**	.041	-.140	-.061	.033	.277*	.114
straight pathway (m/s)								
	DT gait speed	-.090	.054	-.120	.073	-.075	.229	.128
Information processing	CCR ST	.102	-.091	.112	.173	-.172	-.253*	.081
speed	CCR DT	-.152	-.108	-.052	-.120	.296	.152	-.072
(Auditory Motor Task)	DTE motor	.340*	.032	.070	.203	-.215	-.115	-.061
	DTE cognitive	-.226	-.030	-.087	-.125	.308*	.147	-.121
	DT gait speed	-.012	.139	-.246	.078	-.109	.110	.153
Verbal WM	CCR ST	.029	-.273*	.160	.272*	-.100	-.078	.391**
(Serial Subtraction Task)	CCR DT	-.025	-.308*	-.030	.062	-.056	-.063	.390**
	DTE motor	.362**	.088	-.054	.175	-.239*	-.214	.046
	DTE cognitive	-.070	-.126	-.076	-.229	.018	.024	-.040
	DT gait speed	.146	.093	.148	.246	-.121	.032	.076
Auditory WM	CCR ST	.333**	.026	.099	.187	-.009	-.007	.138
(Auditory 2-Back Task)	CCR DT	.008	-.064	.048	.013	-.023	.085	.028
	DTE motor	.583**	.070	.310*	.354**	-.203	-.257*	.001
	DTE cognitive	-.386**	-.044	-.147	-.157	.132	-.051	-.237
	DT gait speed	.156	.226	.086	.175	-.035	.093	.014
Visuo-spatial WM	CCR ST	-.430**	-.237	-.168	-.026	.085	.024	.081
(Clock Task)	CCR DT	-.349**	.123	-.157	.008	.077	.144	-.226
	DTE motor	.571**	.188	.297*	.278*	-.100	-.283*	-.075

		Age	Sex	BMI	Exercise	MABC AB	MABC C	VO ₂ max
	DTE cognitive	.094	.308*	.025	.088	.014	.113	-.211
	DT gait speed	.245	.034	.140	.188	-.039	.218	.114
Response inhibition (Auditory Stroop Task)	CCR ST	.249*	.158	.146	.209	-.165	-.035	.045
	CCR DT	-.020	.105	.118	-.137	.048	.035	-.168
	DTE motor	.514**	.018	.234	.259*	-.166	-.106	-.021
	DTE cognitive	-.433**	.021	-.093	-.319*	.169	.175	-.340**
ST gait speed								
COD-pathway (m/s)		.245*	.034	.140	.188	-.039	.218	.114
Information processing speed (TMT A [cm/s] / TWT-2 [m/s])	DT tracing speed	.267*	.195	.218	.126	-.255	-.217	-.165
	DT gait speed	.078	.024	-.003	.058	.122	.196	.004
	DTE motor	-.156	.057	-.120	-.177	.152	.046	-.077
	DTE cognitive	-.165	-.236	-.144	-.014	.173	.193	.177
Cognitive flexibility (TMT B [cm/s] / TWT-3 [m/s])	DT tracing speed	.344**	-.004	-.013	.280*	-.135	.116	.244*
	DT gait speed	.077	.061	.129	-.031	.114	.189	-.017
	DTE motor	-.067	-.026	.052	-.081	.213	.020	-.009
	DTE cognitive	-.184	.087	-.005	-.157	.188	.032	-.121

Notes: BMI Body Mass Index; MABC Movement Assessment Battery; ST Single Task; DT Dual Task; DTE Dual Task Effects; CCR correct cognitive response; * indicates $p < .05$; ** indicates $p < .05$; significant results in bold

Table S2 Results from the multiple regression analysis with stepwise regression

			Standardized beta	t	p	Partial R ²	R ²	Significance of model
ST gait speed								
straight pathway (m/s)								
		age	-.320	-2.59	.012	.087	.087	.012
	DT gait speed	-	-	-	-	-	-	-
Information processing	CCR ST	-	-	-	-	-	-	-
speed	CCR DT	-	-	-	-	-	-	-
(Auditory Motor Task)	DTE motor	age	.390	3.26	.002	.152	.138	.002
	DTE cognitive	MABC AB	.313	2.40	.020	.098	.081	.020
	DT gait speed	-	-	-	-	-	-	-
	CCR ST	VO ₂ max	.438	3.70	.001	.155	.186	.001
		BMI	.244	2.06	.044	.058		
Verbal WM	CCR DT	VO ₂ max	.357	2.91	.005	.128	.113	.005
(Serial Subtraction Task)	DTE motor	age	.428	3.34	.001	.144	.110	.004
		BMI	-.267	-2.08	.042		.062	
	DTE cognitive	-	-	-	-	-	-	-
	DT gait speed	-	-	-	-	-	-	-
Auditory WM	CCR ST	age	.380	3.15	.003	.144	.130	.003
(Auditory 2-Back Task)	CCR DT	-	-	-	-	-	-	-
	DTE motor	age	.506	4.51	<.001	.256	.244	<.001
	DTE cognitive	age	-.405	-2.91	.006	.164	.145	.006
	DT gait speed	-	-	-	-	-	-	-
Visuo-spatial WM	CCR ST	age	-.427	-3.56	.001	.182	.168	.001
(Clock Task)	CCR DT	age	-.326	-2.63	.011	.106	.091	.011
	DTE motor	age	.518	4.65	<.001	.268	.256	<.001

			Standardized beta	t	p	Partial R ²	R ²	Significance of model
	DTE cognitive	age	.378	2.97	.004	.143	.127	.004
	DT gait speed	-	-	-	-	-	.-	-
	CCR ST	age	.327	2.66	.010	.107	.092	.010
Response inhibition (Auditory Stroop Task)	CCR DT	Exercise	-.258	-2.03	.047	.066	.050	.047
	DTE motor	age	.464	4.03	<.001	.216	.202	<.001
	DTE cognitive	age	-.362	-2.90	.005	.198	.253	<.001
		MABC AB	.300	2.41	.020	.083		
ST gait speed		Exercise	.309	2.52	.015	.078		
COD-pathway (m/s)		MABC C	.252	2.06	.044	.063	.111	.012
	DT tracing speed	MABC AB	-.336	-2.65	.010	.067	.107	.014
Information processing speed (TMT A [cm/s] / TWT-2 [m/s])		VO ₂ max	-.276	-2.17	.034	.070		
	DT gait speed	-	-	-	-	-	-	-
	DTE motor	-	-	-	-	-	-	-
	DTE cognitive	-	-	-	-	-	-	-
	DT tracing speed	age	.291	2.33	.023	.085	.069	.023
Cognitive flexibility (TMT B [cm/s] / TWT-3 [m/s])	DT gait speed	-	-	-	-	-	-	-
	DTE motor	-	-	-	-	-	-	-
	DTE cognitive	-	-	-	-	-	-	-

Notes: BMI Body Mass Index; MABC Movement Assessment Battery; ST Single Task; DT Dual Task; DTE Dual Task Effects; CCR correct cognitive response; * indicates $p < .05$; ** indicates $p < .05$

Table S3. Performance outcome measures in ST and DT conditions by grade (means \pm standard deviation)

		5 th grade (<i>n</i> =42)	8 th grade (<i>n</i> =27)	statistical analysis
ST gait speed				
straight pathway (m/s)		1.90 \pm 0.29	1.73 \pm 0.29	$t(67) = 2.47, p = .016, d = -0.59$
Information processing	DT gait speed	1.73 \pm 0.32	1.69 \pm 0.27	$t(67) = 0.60, p = .552, d = -0.13$
speed	CCR ST	0.25 \pm 0.03	0.26 \pm 0.01	$t(54) = -1.80, p = .078, d = 0.38$
(Auditory Motor Task)	CCR DT	0.25 \pm 0.03	0.25 \pm 0.03	$t(65) = 0.73, p = .469, d = -0.18$
	DTE motor	-8.97 \pm 10.4	-1.33 \pm 13.8	$t(67) = -2.62, p = .011, d = 0.65$
	DTE cognitive	-2.09 \pm 9.31	-5.98 \pm 11.5	$t(59) = 1.46, p = .151, d = -0.38$
Verbal WM	DT gait speed	1.49 \pm 0.27	1.50 \pm 0.32	$t(67) = -0.19, p = .847, d = 0.03$
(Serial Subtraction Task)	CCR ST	0.20 \pm 0.09	0.22 \pm 0.15	$t(37) = -0.72, p = .479, d = 0.20$
	CCR DT	0.23 \pm 0.12	0.24 \pm 0.14	$t(65) = -0.36, p = .719, d = 0.09$
	DTE motor	-21.3 \pm 11.5	-11.7 \pm 17.9	$t(67) = -2.47, p = .018, d = 0.67$
	DTE cognitive	19.7 \pm 53.4	18.9 \pm 66.9	$t(62) = 0.57, p = .955, d = -0.01$
Auditory WM	DT gait speed	1.47 \pm 0.35	1.55 \pm 0.28	$t(67) = -1.02, p = .309, d = 0.25$
(Auditory 2-Back Task)	CCR ST	0.05 \pm 0.07	0.12 \pm 0.08	$t(67) = -3.44, p = .001, d = 0.85$
	CCR DT	0.06 \pm 0.06	0.07 \pm 0.06	$t(66) = -0.42, p = .673, d = 0.11$
	DTE motor	-22.6 \pm 14.6	-9.32 \pm 12.1	$t(67) = -3.94, p < .001, d = 0.97$
	DTE cognitive	69.6 \pm 160	-48.0 \pm 54.2	$t(39) = 3.80, p < .001, d = -0.92$
Visuo-spatial WM	DT gait speed	1.46 \pm 0.27	1.55 \pm 0.30	$t(67) = -1.31, p = .196, d = 0.32$
(Clock Task)	CCR ST	0.05 \pm 0.03	0.02 \pm 0.02	$t(65) = 4.31, p < .001, d = -0.97$
	CCR DT	0.05 \pm 0.03	0.02 \pm 0.02	$t(66) = 3.63, p = .001, d = -0.83$
	DTE motor	-23.1 \pm 11.6	-9.74 \pm 13.2	$t(67) = -4.42, p < .001, d = 1.09$
	DTE cognitive	21.3 \pm 96.2	189 \pm 316	$t(24) = -2.48, p = .021, d = 0.82$
Response inhibition	DT gait speed	1.54 \pm 0.30	1.56 \pm 0.26	$t(67) = -0.33, p = .742, d = 0.07$

		5 th grade (<i>n</i> =42)	8 th grade (<i>n</i> =27)	statistical analysis
(Auditory Stroop Task)	CCR ST	0.09 ± 0.05	0.11 ± 0.06	$t(67) = -1.59, p = .116, d = 0.39$
	CCR DT	0.10 ± 0.04	0.10 ± 0.07	$t(38) = 0.37, p = .716, d = -0.10$
	DTE motor	-18.9 ± 11.6	-8.69 ± 12.6	$t(67) = -3.45, p = .001, d = -0.59$
	DTE cognitive	22.4 ± 64.8	-34.9 ± 53.3	$t(58) = .55, p < .001, d = -0.94$
ST gait speed COD-pathway (m/s)		1.46 ± 0.22	1.58 ± 0.19	$t(67) = -2.32, p = .023, d = 0.58$
Information processing speed (TMT A [cm/s] / TWT-2 [m/s])	DT tracing speed	6.14 ± 1.54	7.06 ± 1.32	$t(67) = -2.56, p = .013, d = 0.63$
	DT gait speed	1.05 ± 0.21	1.09 ± 0.18	$t(67) = -1.02, p = .312, d = 0.20$
	DTE motor	-44.2 ± 29.3	-48.1 ± 27.0	$t(67) = 0.55, p = .581, d = -0.14$
	DTE cognitive	-311 ± 227	-374 ± 232	$t(61) = 1.07, p = .293, d = -0.28$
Cognitive flexibility (TMT B [cm/s] / TWT-3 [m/s])	DT tracing speed	3.40 ± 0.87	4.00 ± 0.82	$t(67) = -2.86, p = .006, d = 0.71$
	DT gait speed	0.78 ± 0.23	0.83 ± 0.17	$t(67) = -0.81, p = .422, d = 0.24$
	DTE motor	-92.0 ± 54.1	-98.8 ± 47.5	$t(65) = 0.53, p = .597, d = -0.13$
	DTE cognitive	-215 ± 88.8	-217 ± 49.9	$t(67) = 0.10, p = .924, d = -0.03$