Table 1

The Effect Size for Overall, Moderator, and Subgroup Analysis

Variable	*n*	*k*	Effect size (*r*)	*95% CI* *LL*	*UL*	*Z*	*p*	I^2s	I^2k	*Q*	*QM*
Overall	129	245	.107	.093	.123	14.421	<.001	74.839	23.276	8006.743	
Age (k = 235)											202.008 (<.001)
Children	46	88	.107	.079	.136	7.3481	<.001	65.166	27.853	803.417 (<.001)	
Early adolescence	38	58	.118	.095	.142	9.753	<.001	72.611	25.827	2167.280 (<.001)	
Late adolescence	32	60	.102	.076	.130	7.504	<.001	71.930	26.685	2536.757 (<.001)	
Adult	10	29	.067	.021	.114	2.828	.005	69.895	4.666	75.7093 (<.001)	
SES two category (k = 242)											218.469 (<.001)
Composite indicator	48	98	.128	.104	.154	10.078	<.001	62.647	35.817	2403.551 (<.001)	
Single indicator	78	144	.091	.074	.108	10.523	<.001	75.903	21.083	2313.876 (<.001)	
SES single (k = 145)											132.985 (<.001)
Resources at home	19	20	.105	.069	.141	5.767	<.001	86.309	9.800	329.671 (<.001)	
Parents' Education	32	41	.104	.085	.125	10.125	<.001	11.873	77.411	353.976 (<.001)	
Parents' Occupation	30	39	.082	.059	.105	7.003	<.001	63.648	33.813	468.758 (<.001)	
Family Income	23	45	.071	.031	.111	3.451	<.001	.93.227	0.000	186.897 (<.001)	
Self-concept generic (k = 245)											211.412 (<.001)
General/global SC	20	23	.091	.050	.133	4.362	<.001	.000	89.891	132.939 (<.001)	
Academic SC	103	169	.112	.097	.128	14.147	<.001	73.418	25.103	7577.263 (<.001)	
Non-Academic SC	15	53	.074	.025	.123	2.948	.003	66.626	13.612	276.018 (<.001)	

Self-concept specific (k = 245)											231.528 (<.001)
Science SC	8	10	.158	.130	.188	10.673	<.001	41.374	48.920	108.069 (<.001)	
Social Science SC	4	8	.162	.101	.226	5.098	.<.001	55.381	21.391	27.581 (<.001)	
Verbal SC	24	32	.076	.045	.108	4.765	<.001	22.155	76.036	1144.124 (<.001)	
Social SC	4	5	.132	.023	.243	2.363	<.001	83.068	0.000	14.961 (.005)	
Scholiastic SC	51	63	.119	.093	.146	8.796	<.001	94.169	2.963	1232.448 (<.001)	
Composite SC	6	8	.073	-.004	.150	1.853	.0464	.000	52.264	15.240 (.033)	
General SC	11	11	.106	.040	.174	3.129	.002	45.904	45.904	102.946 (<.001)	
Music SC	5	5	.108	.042	.212	2.040	.041	35.935	35.935	18.449 (.001)	
Math SC	39	55	.093	.074	.112	9.586	<.001	86.301	11.660	2222.028 (<.001)	
Physical SC	4	5	.069	-.062	.200	1.037	.300	80.834	3.258	21.223 (<.001)	
Appearance SC	3	5	.032	-.032	.096	0.984	.325	0.000	0.000	1.188 (.880)	
Intelligence SC	3	3	.051	-.027	.130	1.293	.196	32.086	32.086	5.935 (.051)	
Other SC	9	35	.057	.005	.108	2.164	.030	40.877	27.085	83.701 (<.001)	
Country economy (k = 239)											189.757 (<.001)
Developing	23	40	.119	.079	.161	5.732	<.001	95.216	2.942	946.191 (<.001)	
Developed	102	199	.104	.088	.120	12.645	<.001	69.771	24.510	2221.402 (<.001)	
Data type (k = 245)											209.874 (<.001)
Primary data	76	143	.115	.094	.137	10.374	<.001	66.723	15.466	917.2615 (<.001)	
Secondary data	53	102	.099	.081	.119	10.281	<.001	68.548	30.437	7016.986 (<.001)	

Note. n = number of independent samples/datasets, k = number of effect sizes, CI = confidence interval. I^2s & I^2k showed the total variation due to the samples and effect sizes, respectively. Q showed overall heterogeneity. Q_M is the moderation effect. The significant Q_M indicates significant moderation. Some studies do not have data (NA = not available for analysis) for various variables; therefore, the moderation analysis included only those studies where data were available. p* < .05, ** < .01, *** < .001

Table 2

Results of Meta-Regression Analysis

Variable	Coefficient	Standard error	*95% CI*		*Z*	*p*	R^2
			LL	*UL*			
Year	.0003	.0005	-.0007	0.0012	0.5599	.5756	.0000
Female Percentage	.0001	.0002	-.0003	.0005	0.4235	.6719	.2195
Age							
Early Adolescents vs. Children	.0067	.0185	-.0296	.0429	0.3609	.7182	.0358
Late Adolescents vs. Children	-.0234	.0191	-.0608	.0141	-1.225	.2215	
Adults vs. Children	-.0406	.0263	-.0922	.0110	-1.5426	.1229	
Late Adolescents vs. Early Adolescents	-.0301	.0191	-.0674	.0073	-1.5750	.1152	
Adults vs. Early Adolescents	-.0473	.0263	-.0986	.0040	-1.8074	.0707	
Adults vs. Late Adolescents	-.0172	.0274	-.0365	.0710	-0.6287	.5295	
SES measures							
Single Vs. Composite indicators	-.0352	.0158	-.0663	.1505	-2.223	.0262	.0588
Self-Concept							
General/Global SC vs Academic SC	-.0133	.0205	-.0536	.0269	-0.6494	.5161	.0100
General/Global SC vs. Non-academic SC	.0281	.0251	-.0210	.0773	1.1219	.2619	
Academic SC vs. Non-academics SC	.0415	.0188	.0046	.0784	2.2022	.0277	
Country Economy							
Developing vs Developed	-.0109	.0197	-.0496	.0278	0.5524	.5801	.0000
Data Type							
Secondary vs. Primary	-.0209	.0152	-.0506	.0088	-1.3772	.1684	.0046

Note. N = 115, k = 227. Total R^2= .3686. In each comparison, the second category was taken as the reference category.

Table 3

Brief Description of the Studies Included in the Meta-Analysis

S. No.	Author(s), year of publication	Data year	Number of participants	Percentage of female	Age groups	Country/ Region	Economy type	Data type	Self-concept Domain	SES measure	*r*
1	Aal-Hussain (1991)[#]	1989	334	52.994	Adult	UAE	Developing	Primary	ASC, VSC, MSC, AppSC, PhSC, OSCs	Composite	0.019
2	Acar (2019), a	2015	320	NA	Early adolescence	Turkey	Developing	Primary	SSC	Composite	0.170
3	Acar (2019), b	2015	241	NA	Early adolescence	Turkey	Developing	Primary	SSC	Composite	0.210
4	Aktop (2010)	NA	198	48.990	Early adolescence	Turkey	Developing	Primary	ComSC	Composite	0.008
5	Allen (1978) a	1974	22	0	Late adolescence	USA	Developed	Primary	ASC	FI, PE, PO	-0.177
6	Allen (1978) b	1974	39	0	Late adolescence	USA	Developed	Primary	ASC	FI, PE, PO	0.131
7	Andersen & Smith (2022)	2019	934	49.893	NA	Denmark	Developed	Primary	MSC	Composite	0.099
8	Areepattamannil et al. (2023)	2019	7915	50	Early adolescence	UAE	Developing	Secondary	SSC	HR	0.150
9	Arıkan et at. (2025)	2019	3988	49.7	Early adolescence	Turkey	Developing	Secondary	SSC	Composite	0.210
10	Bardach et al. (2023), a	NA	606	45.2	Children	Germany	Developed	Secondary	ASC	PO	0.030
11	Bardach et al. (2023), b	NA	556	45.2	Children	Germany	Developed	Secondary	ASC	PO	0.030
12	Bardach et al. (2023), c	NA	853	45.2	Children	Germany	Developed	Secondary	ASC	PO	0.060

13	Basarkod et al. (2022), a	2003	12551	48.857	Late adolescence	Australia	Developed	Secondary	MSC	PE, PO, HR	0.103
14	Basarkod et al. (2022), b	2012	14481	48.857	Late adolescence	Australia	Developed	Secondary	MSC	PE, PO, HR	0.100
15	Bauer et al. (2023)		316	86.39	Adult	Germany	Developed	Primary	OSC	FI, HR	-0.065
16	Becker et al. (2024)	2011	3906	48.2	Children	Germany	Developed	Secondary	ASC, VSC, MSC	FI, PO	0.072
17	Bergold & Steinmayr (2023)	NA	1032	47.8	Late adolescence	Germany	Developed	Secondary	MSC, VSC	PE, PO	0.048
18	Biyik et al. (2017)	NA	769	48.635	Children	Turkey	Developing	Primary	VSC	NA	0.266
19	Bledsoe & Dixon (1980)	NA	400	50	NA	USA	Developed	Secondary	OSC, PhSC, SoSC	FI	0.223
20	Carrier (1981)#	NA	253	48.22	Children	USA	Developed	Primary	MSC	PE	0.179
21	Chang et al. (2007)	1988	12144	54.002	Early adolescence	USA	Developed	Secondary	GSC	Composite	0.110
22	Chappell (1979)#	NA	102	58.82	Late adolescence	USA	Developed	Primary	ComSC	PO	-0.029
23	Chavous et al. (2008)	1996	410	50.244	Late adolescence	USA	Developed	Primary	ASC	Composite	0.030
24	Chen & Lu (2022), a	2019	1146	45.899	Early adolescence	Hongkong, China	Developing	Secondary	MSC	HR	-0.010
25	Chen & Lu (2022), b	2019	1981	53.306	Early adolescence	UK	Developed	Secondary	MSC	HR	0.100
26	Chiu et al. (2012)	NA	186725	49.000	Children	38 Countries	Multi-Country	Secondary	MSC	Composite	0.160
27	Coelho (1981)#	NA	383	47.52	Children	USA	Developed	Primary	GSC	PO	0.134

28	Das et al. (2024)	NA	100	40	Early adolescence	India	Developing	Primary	ASC	PE	0.140
29	DeFreitas & Rinn (2013)	NA	167	79.641	Adult	USA	Developed	Primary	VSC, MSC	FI	-0.085
30	Deosaran (1977)	NA	1324	52.266	Early adolescence	Canada	Developed	Primary	ASC	PO	0.155
31	Dumont et al. (2012), a	NA	1911	47.724	Children	Switzerland	Developed	Primary	ASC	HR	0.030
32	Dumont et al. (2012), b	NA	1274	51.334	Children	Germany	Developed	Primary	ASC	HR	0.140
33	Eckert et al. (2025) a	2018	416	NA	Children	Germany	Developed	Primary	OSC	HR	0.030
34	Eckert et al. (2025) b	2018	306	NA	Children	Germany	Developed	Primary	OSC	HR	0.090
35	Eshel & Klein (1981)	NA	2199	NA	Children	Israel	Developed	Secondary	ASC	Composite	-0.125
36	Fagan (1978)#	NA	1725	47.6	Children	Canada	Developed	Primary	GSC	Composite	0.251
37	Fleischmann et al. (2023) a	2012	14812	47	Early adolescence	Austria	Developed	Secondary	ASC	PO	0.070
38	Fleischmann et al. (2023) b	2017	63518	48	Early adolescence	Austria	Developed	Secondary	ASC	PO	0.130
39	Fleischmann et al. (2023) c	2010	1302	53	Adult	Germany	Developed	Secondary	ASC	PO	0.090
40	Fleischmann et al. (2023) d	2011	900	56	Adult	Germany	Developed	Secondary	ASC	PO	0.120
41	Franklin (1978)# a	NA	248	51.21	Children	USA	Developed	Primary	GSC	FI	0.095
42	Franklin (1978)# b	NA	321	50.5	Early adolescence	USA	Developed	Primary	GSC	FI	0.096

43	Fu et al. (1980)	NA	432	100	Children	USA	Developed	Primary	GSC	FI	0.097
44	Geng et al. (2022)	2018	612004	49.829	Late adolescence	80 Countries	Multi-Country	Secondary	VSC	Composite	0.187
45	Givol (2024)#	NA	156	53.85	Children	Israel	Developed	Primary	AppSC, SoSC, ComSC, OSC	FI, PE	0.066
46	Gnas et al. (2024)	NA	1516	48.8	Children	Germany	Developed	Secondary	ASC	PE	0.150
47	Gogol et al. (2014)	2011	3879	49.007	Early adolescence	Luxembourg	Developed	Primary	GSC, VSC, MSC	Composite	0.056
48	Guay et al. (2004) a	1989	71	NA	Children	Canada	Developed	Primary	ASC	FI	0.180
49	Guay et al. (2004) b	1989	86	NA	Children	Canada	Developed	Primary	ASC	FI	0.100
50	Guay et al. (2004) c	1990	83	NA	Children	Canada	Developed	Primary	ASC	FI	0.250
51	Guo et al. (2015) a	1999	5179	49.295	Early adolescence	Hongkong	Developing	Secondary	MSC	Composite	0.087
52	Guo et al. (2015) b	2003	4972	50.402	Early adolescence	Hongkong	Developing	Secondary	MSC	Composite	0.083
53	Hare (1980)	1980	513	NA	Children	USA	Developed	Primary	ASC	PO	0.289
54	Hascoët et al. (2021)	2011	157814	51.665	Early adolescence	Chile	Developing	Secondary	MSC	PE, FI	0.040
55	Heyder et al. (2017)	2006	520	58.077	Late adolescence	Germany	Developed	Primary	VSC	Composite	0.010
56	Hilz et al. (2022)	NA	202	50.5	Children	Germany	Developed	Primary	MSC	PE	0.120
57	Hollenstein et al. (2024)	NA	509	49.7	Children	Switzerland	Developed	Secondary	MSC	Composite	0.230

58	Holzer et al. (2025)	NA	171	50.9	Early adolescence	France	Developed	Primary	ASC	Composite	0.100
59	Ivcevic & Kaufman (2013)	NA	3289	72.089	Adult	USA	Developed	Primary	ISC, OSC	Composite	0.088
60	Jaekel et al. (2024)	NA	3179	51.4	Children	Germany	Developed	Primary	VSC	FI, HR	0.110
61	Jiang et al. (2020)	2009	14040	51.460	Early adolescence	USA	Developed	Secondary	SSC, MSC	FI, PE	0.088
62	Johannsen et al. (2024) a	2005	1508	50.5	Early adolescence	Germany	Developed	Secondary	VSC, MSC	PO	0.015
63	Johannsen et al. (2024) b	2021	19783	49.9	Late adolescence	Germany	Developed	Secondary	VSC, MSC	PO	0.085
64	Jones (1977)#	NA	98	0	Children	USA	Developed	Primary	ComSC	Composite	0.151
65	Kahraman et al. (2022)	2011	6928	49.307	Early adolescence	Turkey	Developing	Secondary	SSC	Composite	0.170
66	Kelz & Krammer, 2024	2017	203	51.23	Children	Austria	Developed	Primary	MSC	PE, PO	0.080
67	Klapp (2018)	1980	8558	49.439	Early adolescence	Sweden	Developed	Secondary	VSC, MSC, SoSC	Composite	0.106
68	Klein-Sosa & Renk (2016)	NA	278	41.727	Children	USA	Developed	Primary	GSC	Composite	0.230
69	Kohlmeier (2024)	2013	4109	56.61	Early adolescence	Germany	Developed	Secondary	ASC	HR, PO	-0.005
70	Koivuhovi et al. (2022)	2010	950	52.704	Children	Finland	Developed	Secondary	MSC	PE	-0.020
71	Kovács et al. (2025) a	NA	155	55.5	Children	Hungary	Developed	Primary	MuSC	PE	0.134
72	Kovács et al. (2025) b	NA	143	55.5	Children	Hungary	Developed	Primary	MuSC	PE	0.119

73	Kovács et al. (2025) c	NA	132	55.5	Children	Hungary	Developed	Primary	MuSC	PE	-0.015
74	Kovács et al. (2025) d	NA	156	55.5	Early adolescence	Hungary	Developed	Primary	MuSC	PE	-0.015
75	Lauremann et al. (2020)	2014	1067	52.202	Early adolescence	Germany	Developed	Primary	VSC, MSC	PO	0.100
76	Li et al. (2020)	NA	345	47.536	Early adolescence	China	Developing	Primary	GSC	Composite	0.128
77	Li et al. (2024)	NA	812	49.75	Children	China	Developing	Primary	GSC	FI	-0.149
78	Liou et al. (2024)	2019	3857	49.8	Early adolescence	South Korea	Developed	Secondary	MSC, SSC	PE, HR	0.178
79	Lloyd (2013)[#]	NA	156	0.000	Late adolescence	USA	Developed	Primary	ASC	PE	-0.045
80	Lu et al. (2022)	2019	2221	41.648	Children	China	Developing	Primary	ComSC	Composite	0.147
81	Luo & Guan (2025)	2023	12155	48.2	NA	China	Developing	Primary	MuSC	HR	0.222
82	Maqsud & Rouhani (1991)	NA	135	57.037	Late adolescence	South Africa	Developing	Primary	GSC	Composite	0.130
83	Marsh (1987)	1974	2213	NA	Late adolescence	USA	Developed	Secondary	ASC	Composite	0.334
84	Marsh (1991)	1980	14825	NA	Late adolescence	USA	Developed	Secondary	GSC, ASC	Composite	0.165
85	Marsh et al. (2006)	2000	107899	NA	Late adolescence	25 Countries	Multi-Country	Secondary	VSC, MSC, ASC	Composite	0.110
86	Marsh et al. (2023)	2002	16197	NA	Late adolescence	USA	Developed	Secondary	ASC	Composite	0.220
87	Marsh & Parker (1984)	1981	305	47.869	Children	Australia	Developed	Primary	MSC, AppSc, PhSc, VSC, SoSC, OSC	Composite	0.030

88	Mohammadpour & Abdul Ghafar (2014)	2007	217728	50.184	Early adolescence	48 Countries	Multi-Country	Secondary	MSC	Composite	0.111
89	Montoro (2023)#	NA	979	73	Adult	USA	Developed	Primary	ASC	PE, PO	0.105
90	Mortimer et al. (2017) a	1989	265	74.717	Late adolescence	USA	Developed	Primary	VSC, ISC, OSC	FI	0.027
91	Mortimer et al. (2017) b	2011	422	53.318	Late adolescence	USA	Developed	Primary	VSC, ISC, OSC	FI	0.037
92	Morton et al. (2024)	NA	182	45.1	Children	USA	Developed	Primary	ASC	FI	0.320
93	Myint & Robnett, (2024)	NA	629	51	Late adolescence	USA	Developed	Primary	OSC	PE	0.083
94	Østbø & Zachrisson (2022)	2015	1819	NA	Children	Norway	Developed	Primary	MSC	HR	0.160
95	Paschke et al. (2020)	2014	284	56.338	Late adolescence	Germany	Developed	Primary	VSC, MSC	PE	0.073
96	Paschke et al. (2023)	2016	504	52.6	Late adolescence	Germany	Developed	Secondary	MSC	PE, HR	0.080
97	Postigo et al. (2022)	2009	7379	47.405	Children	Spain	Developed	Primary	ASC	Composite	0.227
98	Raju & Asfaw (2009)	NA	497	50.101	Early adolescence	Ethiopia	Developing	Primary	ASC	Composite	0.070
99	Rinn et al. (2013)	NA	499	25.251	Adult	USA	Developed	Primary	MSC	PE	0.115
100	Rodríguez-Rodríguez & Guzmán (2021), a	NA	305	NA	Late adolescence	Spain	Developed	Primary	ASC	PE	0.160
101	Rodríguez-Rodríguez & Guzmán (2021) b	NA	991	NA	Late adolescence	Spain	Developed	Primary	ASC	PE	0.145

102	Sáinz & Upadyaya, (2024) a	NA	807	50.2	Early adolescence	Spain	Developed	Primary	SsSC	Composite	0.235
103	Sáinz & Upadyaya, (2024) b	NA	796	50.2	Early adolescence	Spain	Developed	Primary	SsSC	Composite	0.115
104	Sáinz & Upadyaya, (2024) c	NA	796	50.2	Late adolescence	Spain	Developed	Primary	SsSC	Composite	0.105
105	Sáinz & Upadyaya, (2024) d	NA	864	50.2	Late adolescence	Spain	Developed	Primary	SsSC	Composite	0.190
106	Schiele et al. (2025)	NA	369	51	Children	Germany	Developed	Primary	OSC	Composite	-0.020
107	Schoon et al. (2025)	2004	15770	49.1	Early adolescence	UK	Developed	Secondary	ASC	PE, PO	0.106
108	Schotte et al. (2022)	2012	4722	50.191	Late adolescence	Germany	Developed	Secondary	MSC	Composite	0.120
109	Shalev (2024)	NA	208	NA	Children	Israel	Developed	Primary	VSC	NA	0.175
110	Sheehan & Hadfield (2024)	2006	1715	53.59	Children	Ireland	Developed	Secondary	ASC	FI	0.094
111	Smith (1978)# a	1977	202	52	Children	USA	Developed	Primary	VSC, MSC,	FI	0.093
112	Smith (1978)# b	1977	236	53	Children	USA	Developed	Primary	VSC, MSC,	FI	0.085
113	Sojourner & Kushner (1997)##	1990	1868	50.428	Late adolescence	USA	Developed	Secondary	GSC	NA	0.055
114	Stang-Rabrig et al. (2023)	2017	1028	46.7	Late adolescence	USA	Developed	Secondary		PO	0.110
115	Suárez-Álvarez et al. (2014)	2011	7729	52.801	Early adolescence	Spain	Developed	Primary	ASC	Composite	0.310
116	Szumski & Karwowski (2019)	NA	1488	48.992	Early adolescence	Poland	Developed	Primary	ASC, MSC	Composite	0.166

117	Trusty et al. (1996)	NA	563	47.069	Children	USA	Developed	Secondary	ComSC	Composite	0.076
118	Tulagan & Eccles, (2022)	NA	786	48	Early adolescence	USA	Developed	Primary	ASC	Composite	0.120
119	Vasalampi et al. (2023)	2016	1351	52	Late adolescence	Finland	Developed	Secondary	VSC	PE, PO	-0.010
120	Vollmer et al. (2021)	2016	966	54.244	Early adolescence	Germany	Developed	Primary	PhSC	Composite	0.096
121	von Keyserlingk et al. (2020)	1996	2624	62	Adult	Germany	Developed	Secondary	ASC	Composite	0.060
122	Walberg & Tsai (1983)	1978	2300	48.522	Late adolescence	USA	Developed	Secondary	VSC	PE	0.170
123	Wang (2023)	2012	2275	50.33	Late adolescence	USA	Developed	Secondary	MSC	PE, PO, HR	0.095
124	Weller & Levi (1981)	NA	122	NA	Children	Israel	Developed	Primary	ComSC	PO	0.050
125	Xu (2023)	NA	1072	51.3	Early adolescence	China	Developing	Primary	MSC	PE	0.250
126	Yang & Xia (2023)	NA	998	49.1	Children	China	Developing	Primary	ASC	Composite	0.147
127	Yildirim & Yildirim (2019)	2012	4848	50.990	Late adolescence	Turkey	Developing	Secondary	MSC	Composite	0.070
128	Zhang et al. (2022)	2015	14291	49.990	Early adolescence	USA	Developed	Secondary	SSC	HR	0.170
129	Zhao et al. (2023)	NA	1524	76.2	Adult	China	Developing	Primary	ASC	Composite	0.178

Note. [#]= PhD Thesis, [##]= Conference proceeding. NA = Not available. SSC = Science self-concept, ASC = Academic self-concept, VSC = Verbal self-concept, SoSC = Social self-concept, GSC = General self-concept, MSC = Math self-concept, ISC = Intelligence self-concept, PhSC = Physical self-concept, AppSC = Appearance self-concept, MuSC = Musical self-concept, ComSC= composite SC, SsSC = Social Science SC. OSC = Other self-concept. FI = Family Income, PE = Parental education, PO = Parental occupation, HR = Home resources.