

**The relationships between screen use and health indicators
among infants, toddlers and preschoolers: A meta-analysis and**

systematic review

Appendix

Supplemental Files 1:

Table S1. The characteristics of the studies included in this review

Table S2. GRADE assessment of quality of evidence reported the associations
between media use and health indicators.

Table S1. The characteristics of the studies included in this review

<i>Author, date</i>	Study design	N	Age group (months)	Country	Measurem ents	The way described screen time use	Media devices examined	Screen time group	Health domain	Health indicators	Quality
<i>Ariza et al. 2004¹</i>	Cross- sectiona l study	80	60-72	America (Mexican American)	Maternal report: survey	Viewing categories (hours/day)	TV	≤3 >3	Physical	Adiposity (Overweight (BMI:25-29.9))	6
<i>Barr et al. 2008²</i>	Quasi- experim ental design	120	12(40) 15(40) 18(40)	America	Parent report: survey	Mean (SD) (hours/day)	TV	3.67(2.46)	Psycho- social Physical	Parent interaction (Responsiveness) Cognitive development (Learning)	Low bias (Selecti ve bias)
<i>Bedford et al. 2016³</i>	Cross- sectiona l study	612	6-36	England	Parent report: survey	Mean (SD) (hours/day)	Touchscreen	0.41(0.65)	Physical	Cognitive development (Language development) Motor development (Fine motor, Gross motor)	7
<i>Beyens et al. 2019⁴</i>	Cross- sectiona l study	402	36-60	America	Maternal report	Mean (SD) (hours/day)	TV Mobile devices Tablet devices Handheld game player Laptop computer Smartphone	3.8(2.64) 3.08(4.08) 1.4(2.11) 0.59(1.39) 0.51(1.33) 0.41(1.11)	Behavioral	Sleep problems	6
<i>Brambilla et al 2017⁵</i>	Cross- sectiona l study	523	0-36	Italy	Parent report:	Prevalence	TV	39.6%	Behavioral	Sleep problems	7

Table 1. Characteristics of the studies included in the meta-analysis											
Author (Year)	Study Design	N	Age (years)	Country	Report Source	Measure	Media	Effect Size (95% CI)	Outcome	Outcome	Weight
Brockman et al. 2016 ⁶	Cross-sectional study	100	12-72	Chile	Parent report: survey	Median (min-max) (hours/day)	TV	0.042(0.008,0.018)	Behavioral	Sleep problems	7
Byeon et al. 2015 ⁷	Cross-sectional study	1778	24-30	Korea	Parent report: survey	Mean (SD) (hours/day)	TV	1.21(0.99)	Physical	Cognitive development (Language development)	7
Cespedes et al. 2014 ⁸	Cohort study	1864	12-84	America	Parent report: survey	Mean (SD) (hours/day)	TV	6months:0.9 (1.2)	Behavioral	Sleep problems(duration)	7
Chen et al..2019 ⁹	Cross-sectional study	714	0-6(321)	Singapore	Parent report: survey	Median (IQR) (hours/day)	ALL	1.00 (0.50–2.00)	Behavioral	Sleep problems(duration)	7
			TV				0.98 (0.43–2.00)				
			Mobile devices				0.50 (0.25–1.00)				
			6-24(393)				Computer	0.50 (0.36–1.00)			
Cheng et al. 2010 ¹⁰	Cohort study	302	18-30	Japan	Maternal report: survey	Viewing categories (hours/day)	TV	<1	Psycho-social (Behavioral and emotional outcomes)	Emotional symptoms	7
								≥1 to <3		Conduct problems	
								≥3 to <4		Hyperactivity-Inattention	
								≥4		Peer-problems	
Cheung et al.2017 ¹¹	Cross-sectional study	612	6-36	England	Parent report	Mean (SD) (hours/day)	Touchscreen	0.41(0.65)	Behavioral	Sleep duration	5
										Sleep latency	
Christakis et al. 2007 ¹²	Cohort study	330	24-60	America	Parent report: survey	Mean (SD) (hours/day)	TV (content)	Educational:0.42 (0.60)	Psycho-social	Aggressive behavior (Antisocial behaviors)	6
								Nonviolent entertainment:0.91 (1.00)			

								Violent entertainment:0.54 (0.80)			
<i>Collings et al. 2018</i> ¹³	Cohort study	1338	12; 18; 24(798); 36(909)	England	Parent report: survey	Mean (SD) (hours/day)	TV	All time points:1.3(1.2) 36 months:2.1(1.5) 24 months:1.3(2)	Physical	Adiposity (BMI, Sum of skinfolds, Waist circumference)	7
<i>Cox et al. 2012</i> ¹⁴	Cross-sectional study	135	24-72	Australia	Maternal report: survey	Mean (SD) (hours/day)	TV	Weekday:1.43(0.92) Weekend:1.72(1.11)	Physical Behavioral	Adiposity (BMI z-score) Healthy dietary behavior (Energy intake, fast foods, vegetables)	7
<i>De Coen et al..2014</i> ¹⁵	cohort study	568	36-72	Belgium	Parent report: survey	Viewing categories (hours/day)	ALL	Weekday:>1; ≤1 Weekend:>2; ≤2	Physical	Adiposity (Overweight)	7
<i>Ebenegger et al. 2012</i> ¹⁶	Cross-sectional study	450	48-72	Swiss	Parent report: survey	Mean (SD) (hours/day)	TV	0.93(0.82)	Psycho-social	Behavioral and emotional outcomes (Hyperactivity/Inattention)	7
<i>Foster et al. 2010</i> ¹⁷	Cohort study	1159	12, 36	America	Parent report	Viewing categories (hours/day)	TV	0 0-1 1-2 2-3 3-4 4-5 5-6 6-7 ≥7	Psycho-social	Behavioral and emotional outcomes (Attentional problems)	7
<i>Garrison et al. 2011</i> ¹⁸	RCT	617	36-60	America	Parent report:	Mean (SD) (hours/day)	TV	Daytime: 0.98(0.71) Evening:0.24(0.29)	Behavioral	Sleep problems	Low bias (Measur

Table 1. Characteristics of the studies included in the meta-analysis											
Study	Study design	N	Age (years)	Country	Parent report: survey(interview)	Content	Media	Unhealthy media: violent or age-inappropriate content	Behavioral	Outcomes	Measurement bias (Low bias)
Garrison et al. 2012 ¹⁹	RCT	565	36-60	America	Parent report: survey(interview)	Content	TV	0	Behavioral	Sleep problems	Low bias (Measurement bias)
Gubbels et al. 2009 ²⁰	Cross-sectional study	2471	24	Netherlands	Parent report: survey	Viewing categories (hours/day)	TV Computer	0.01-0.24 0.25-0.99 1-1.99 <2 ≥2	Behavioral	Healthy dietary behavior quality (Snacks, Brown bread, Fresh fruit, Sugar-sweetened drinks, Light soft drinks, Vegetables, White bread)	7
Helm et al. 2019 ²¹	Cross-sectional study	470	33-71	America	Parent report: survey	Viewing categories (hours/day)	TV	0 <1 1-3 4-6 ≥ 7 1.4(0.85)	Behavioral	Sleep problems	8
Hinkley et al. 2017 ²²	Cohort study	108	36-60	Australia	Parent report: survey	Mean (SD) (hours/day)	TV Sedentary electronic games Active electronic games Computer/internet (excluding games)	0.12(0.29) 0.04(0.09) 0.10(0.23)	Psychosocial	Emotional and social skills (Intrapersonal, Stress management, Interpersonal, Adaptability)	7
Hinkley et al. 2014 ²³	Cohort study	3604	24-72	Belgium; Cyprus;		Mean (SD) (hours/day)	Weekday television	Boy:1.04 (0.75); Girl:0.98(0.70)	Psychosocial	Behavioral and emotional outcomes	8

				Estonia; Germany; Hungary; Italy; Spain; Sweden	Parent report: survey		Weekend television Weekday PC Weekend PC	Boy:1.62 (0.93); Girl: 1.53 (0.91) Boy:0.19 (0.39); Girl:0.11 (0.26) Boy:0.33 (0.56); Girl:0.21 (0.40)		(Emotional problems, Peer problems, Self- esteem, Emotional well- being)	
<i>Howie et al. 2017</i> ²⁴	Subject laboratory trial	6	36-60	Australia	Parent report	Range (hours/day)	mobile touchscreen	(0.33,2.7)	Behavioral	Sedentary behaviors	Low bias (Selective bias)
								<1	Physical	Musculoskeletal risk	
<i>Hu et al. 2019</i> ²⁵	Case- control study	933	12-24(264) 48-60(669)	China	Parent report: survey(interview)	Viewing categories (hours/day)	TV	≥1	Behavioral	Adiposity (Overweight) Sleep problems) Sleep duration Physical activity	7
								0 <1 1-2 2-3 3-4 4-5 >5			
<i>Inoue et L. 2016</i> ²⁶	Cohort study	3243 9	36-60	Japan	Parent report: survey	Viewing categories (hours/day)	TV		Psycho- social	Emotional and social skills (Self-Regulation)	7
<i>Jago et al. 2005</i> ²⁷	Cohort study	149 147 133	36-48 48-60 60-72	America	Maternal report	not mentioned	TV	not mentioned	Physical	Adiposity (BMI)	7
<i>Ji et al. 2018</i> ²⁸	Cross- sectional study	112	36-72	China	Parent report: survey	Mean (SD) (hours/day)	ALL	Weekday:0.75(0.7); Weekend:2.07(1.64)	Behavioral	Sleep problems	7
<i>Jouret et al. 2007</i> ²⁹		298(boy)	48	France	Parent report	not mentioned	TV	not mentioned	Physical	Adiposity (Overweight (BMI≥90% percent))	7

	Cross-sectional study	295(girl)										
Kirkorian et al. 2016 ³⁰	Cross-sectional study	58(boy) 58(girl)	23.5-36	America	Parent report: survey	Range (hours/day)	ALL TV Interactive media	(0,3.58) (0,3.33) (0,1)	Physical	Cognitive development (Language learning)	6	
Lillard et al. 2011 ³¹	Cross-sectional study	60	48	America	Parent report: survey	Range (hours/day)	Fast-Paced Television Educational Television Drawing	0.8(0.16) 0.66(0.16) 0.91(0.16)	Physical	Executive function	6	
Lin et al. 2015 ³²	Cross-sectional study	150	15-36	China	Parent report: survey(interview)	Mean (hours/day)	TV	2.28	Physical	Cognitive development Cognitive development (Language development) Motor development	7	
Lumeng et al. 2006 ³³	Cross-sectional study	1016	36	America	Maternal report	Viewing categories(hours/day)	TV	<2 ≥2	Physical	Adiposity (Overweight (BMI≥95%))	7	
Manganello et al. 2009 ³⁴	Cohort study	3128	36	America	Maternal report	Mean (SD) (hours/day)	TV	3.2(2.3)	Psycho-social	Aggressive behavior	7	
Manios et al. 2009 ³⁵	Cohort study	2241	12-69	Greece	Parental report	Mean (SD) (hours/day)	TV	1.32(1.12)	Physical	Adiposity (Overweight(95%>BMI≥85%), Obese (BMI≥95%))	7	
Marinelli et al. 2014 ³⁶	Cohort study	1444	24(657) 48(787)	Spain	Maternal report	Viewing categories(hours/day)	TV	<0.5 ≥0.5	Behavioral	Sleep duration	7	
		185	43.2-57.6	Australia			ALL	2.42(1.33)	Physical	Executive Function	6	

<i>McNeill et al. 2019</i> ³⁷	Cohort study				Parent report: survey	Mean (SD) (hours/day)	TV	2.04(1.14)	Psycho-social	Behavioral and emotional outcomes (Internalizing problems, Externalizing problems)	
							ALL	>2 ≤2			
							TV	>2 ≤2			
<i>Mendoza et al. 2007</i> ³⁸	Cross-sectional study	1809	24-60	America	Parent report: survey	Viewing categories(hours/day)		0 <1 1 2 3 4 ≥5	Physical	Adiposity (Overweight, Sum of skinfolds)	7
							Computer				
<i>Mezie-Okoye et al. 2015</i> ³⁹	Cross-sectional study	198	24-60	Nigeria	Maternal report	Viewing categories(hours/day)	ALL	≤1 >1	Physical	Adiposity (Overweight (BMI≥85%))	8
<i>Miller et al. 2007</i> ⁴⁰	Cohort study	107	34.8-70.4	America	Parent report: survey(interview)	not mentioned	TV	not mentioned	Physical	Behavioral and emotional outcomes (Attentional problems)	6
<i>Nathanson et al. 2014</i> ⁴¹	Cross-sectional study	107	38-74	America	Parent report: survey	Mean (SD) (hours/day)	TV (background)	2.87(1.99)	Physical	Executive function	6
<i>Nathanson et al. 2018</i> ⁴²	cross-sectional study	402	36-60	America	Maternal report	Mean (SD) (hours/day)	TV Tablet devices Smartphone Game player	3.8(2.64) 1.4(2.11) 0.41(1.11) 0.59(1.39)	Behavioral	Sleep problems (Sleep duration, Sleep latency)	7

							Laptop computer	0.51(1.33)			
							iPod	0.17(0.78)			
		1676	6					6months:0.89 (1.21)			
<i>Nevarez et al. 2010</i> ⁴³	Cohort study	1228	12	America	Maternal report	Mean (SD) (hours/day)	TV	12months:1.20 (1.46)	Behavioral	Sleep problems(duration)	7
		1365	24					24months:1.44 (1.22)			
<i>Paavonen et al. 2006</i> ⁴⁴	Cross-sectional study	321	60-72	Finland	Parent report: survey	Viewing categories(hours/day)	TV (content)	<1.66 ≥1.66	Behavioral	Sleep problems	7
		1997	29						Psycho-social	Bullying	
<i>Pagani et al. 2013</i> ⁴⁵	Cohort study	1997	65	Canada	Parent report: survey	Mean (SD) (hours/day)	TV	29months: 1.62(1.21)	Physical	Cognitive development (mathematics, learning)	7
										Motor development (Gross motor)	
								0-2 2.1-4 4.1-6		Behavioral problems	
<i>Parent et al. 2016</i> ⁴⁶	Cohort study	209	36-84	America	Parent report: survey	Viewing categories(hours/day)	ALL	6.1-8 8.1-10 >10	Behavioral	Sleep problems	6
		11014	60				Television/video/DVD	0 <1 ≥1,<3	Psycho-social	Behavioral and emotional outcomes (Conduct problems,	7
<i>Parkes et al. 2013</i> ⁴⁷	Cohort study	11014	84	England	Parent report	Viewing categories(hours/day)	Computer/electronic games	≥3,<5 ≥5,<7		Hyperactivity/inattention, Emotional symptoms,	

								≥7		Peer problems, Prosocial behavior)	
<i>Peck et al. 2015</i> ⁴⁸	Cross-sectional study	12385	48-72	America	Parent report: survey	Viewing categories(hours/day)	TV	≥1;<1 ≥2;<2	Physical	Adiposity (Obesity, Overweight)	7
<i>Pinhas-Hamiel et al. 2009</i> ⁴⁹	Cross-sectional study	204	48-72	Israeli	Parent report: survey	Mean (SD) (hours/day)	ALL	Normal weight (122):4(1.8) Normal weight (51):4(2.2) Normal weight (31):4.6(2.5)	Physical	Adiposity (Overweight)	7
<i>Plancoulaine et al. 2018</i> ⁵⁰	Cohort study	1205	60-72	France	Maternal report	Mean (SD) (hours/day)	TV	0.76(0.7)	Behavioral	Sleep duration	7
<i>Raman et al. 2017</i> ⁵¹	Cross-sectional study	210	12-36	America	Parent report: survey	not mentioned	ALL	not mentioned	Psycho-social	Social-emotional delay	7
<i>Reilly et al. 2005</i> ⁵²	Cohort study	8234	0-36	England	Parent report: survey	not mentioned	TV	not mentioned	Physical	Adiposity (Obesity)	7
<i>Ribner et al. 2017</i> ⁵³	RCT	807	60.88-76.84	America	Parent report	Mean (SD) (hours/day)	TV	2.19(0.79)	Psycho-social	Cognitive development (language development, mathematics)	no bias
<i>Ruangdaranon et al. 2009</i> ⁵⁴	Cohort study	220	0-24	Thailand	Parent report: survey(interview)	Mean (SD) (hours/day)	TV	12months:1.23(1.42) 24months:1.69(1.56)	Physical	Executive function Cognitive development (language development)	8
		759	36-48				ALL	1.02(0.67)	Physical	Adiposity (BMI)	7

<i>Sijtsma et al. 2015</i> ⁵⁵	Cohort study			Netherlands	Parent report: survey	Mean (SD) (hours/day)	TV Computer	0.97(0.63) 0.05(0.15)	Behavioral	Sleep problems (Sleep duration)	
<i>Sisson et al. 2012</i> ^{(a)56}	Cross-sectional study	1368	24-60	America	Parent report: survey	Viewing categories(hours/day)	TV	≤1 2-3 ≥4	Behavioral	Healthy dietary behavior (Energy intake)	6
<i>Sisson et al. 2012</i> ^{(b)57}	Cross-sectional study	1423	24-60	America	Parent report: survey	Viewing categories(hours/day)	TV	≤1 2-3 ≥4	Behavioral	Healthy dietary behavior (Dietary quality)	6
<i>Skaug et al. 2018</i> ⁵⁸	Cohort study	995 795	48 72	Norway	Parent report: survey(interview)	Mean (SD) (hours/day)	TV	0.92(0.57) 1.1(0.87)	Psychosocial	Parent interaction (Responsiveness)	7
<i>Sorrie et al..2016</i> ⁵⁹	cross-sectional study	504	36-60	Ethiopia	Caregiver report: survey(interview)	Viewing categories(hours/day)	TV	≤2 >2	Physical	Adiposity (Overweight)	6
<i>Straker et al. 2006</i> ⁶⁰	Cohort study	1600	60	Australia	Parent report: survey	Viewing categories(hours/day)	TV Hand-held games Console games	0 <1 1-2 >2	Physical	Musculoskeletal risk	8
<i>Sugimori et al. 2004</i> ⁶¹	Cohort study	8170 8170	36 72	Japan	Parent report: survey	not mentioned	TV	not mentioned	Physical	Adiposity (Overweight)	7
<i>Suglia et al. 2013</i> ⁶²	Cohort study	1589 1589	36 60	America	Maternal report	Viewing categories(hours/day)	TV	≤2 >2	Physical	Adiposity (Obesity)	6
<i>Tahir et al. 2019</i> ⁶³	Cohort study	3092 1	36-60	America	Maternal report: survey	Viewing categories(hours/day)	TV	0 0.5 1 2	Physical	Adiposity (Overweight)	7

										3	
										≥4	
Tamana et al. 2019 ⁶⁴	Cohort study	2427	36	Canada	Parent report	Mean (95%CI) (hours/day)	ALL	1.8(1.5,2.1)	Psycho-social (Behavioral and emotional outcomes)	Externalizing behaviors problems	7
		2427	60							Internalizing behaviors problems	
Taveras et al. 2006 ⁶⁵	Cross-sectional study	240	24-70.8	America	Parent report	Mean (SD) (hours/day)	TV	1.4(1.1)	Behavioral	Healthy dietary behavior quality (Fast Food Intake)	7
Tester et al. 2018 ⁶⁶	Cohort study	7028	24-60	America	Parent report: survey	Viewing categories(hours/day)	TV	>2	Physical	Adiposity (Overweight (BMI:85%-94.5%),	5
								>3		Obesity (BMI:95%-	
							ALL	>2		1.2*95%), Severe obesity	
								>3		(BMI≥1.2*95%))	
Thompson et al. 2005 ⁶⁷	cross-sectional study	1783	4-35	America	Parent report: survey (telephone interview)	Mean (95%CI) (hours/day)	TV	4-11months:0.9 (0.8–1.0)	Behavioral	Sleep problems (Naptime/Bedtime Schedules)	7
								12-23months:1.6 (1.4–1.8)			
								24-35months:2.3 (2.1–2.5)			
Tomopoulou et al. 2010 ⁶⁸	Cohort study	259	6	America	Maternal report: survey(interview)	Mean (SD) (hours/day)	ALL	2.55(2.09)	Physical	Cognitive development	7
									Cognitive development (language development)		
		75	21	America			ALL	21months: 1.97(1.8)		Aggressive behavior	7

<i>Tomopoulou et al. 2007</i> ⁶⁹	Cohort study	96	33		Caregiver report: survey(interview)	Mean (SD) (hours/day)		33months: 2.13(1.59)	Psychosocial	Behavioral and emotional outcomes (Oppositional Defiant problems, Externalizing problems, Hyperactivity problems)	
<i>Tso et al. 2016</i> ⁷⁰	Cross-sectional study	533	65.5	China	Parent report: survey	Viewing categories(hours/day)	ALL	≤1 >1-3 ≥3	Behavioral	Sleep problems (Sleep duration)	7
<i>Twenge et al. 2019</i> ⁷¹	Cross-sectional study	13109	0-12(3818) 24-60(9291)	America	Parent report: survey	Viewing categories(hours/day)	TV and Video game Portable electronic devices	<2 ≥2	Behavioral	Sleep problems (Sleep duration)	7
<i>Vallejo et al. 2015</i> ⁷²	Cross-sectional study	140	24-72	Brazil	Maternal report	not mentioned	TV	not mentioned	Physical	Adiposity (Overweight)	6
<i>Verlinden et al. 2014</i> ⁷³	Cohort study	1176	24-60	Netherlands	Parent report: survey	Viewing categories	TV	Low Mid-low Mid-high High	Psychosocial	Bullying (Being a bully, Being a bully-victim, Being a victim)	6
<i>Vijakhana et al. 2015</i> ⁷⁴	Cohort study	208 208	6 12	Thailand	Caregiver report	Mean (SD) (hours/day)	ALL	6 months:4.46(2.98) 12months:4.81(3.03)	Behavioral	Sleep problems (Sleep duration)	7
<i>Watt et al. 2015</i> ⁷⁵	Cohort study	1997	29	Canada	Maternal report	Mean (SD) (hours/day)	TV	1.26(0.88)	Psychosocial	Bullying (Victimization at 12 years old)	7
<i>Wu et al. 2017</i> ⁷⁶		8900	36-72	China	Caregiver report		ALL	<2	Psychosocial	Behavioral and emotional outcomes	6

	Cross-sectiona l study					Viewing categories(hours/ day)		≥2		(Emotional symptoms, Conduct problems, Hyperactivity, Peer problems, Prosocial)	
<i>Xu et al..2016</i> ⁷⁷	RCT	497	24	Australia	Maternal report	Mean (SD) (hours/day)	ALL	1.37 (1.02)	Behavioral	Sleep problems (Sleep duration)	no bias
		415	42					2.48 (1.49)		Sleep problems (Sleep latency)	
		369	60					2.25 (1.27)			
<i>Zhao et al. 2018</i> ⁷⁸	Cross-sectiona l study	1856 2	36-48	China	Parent report: survey	Viewing categories(hours/ day)	ALL	0-1 1-2 2-3 3-4 >4	Psycho- social	psychosocial problems	8
<i>Zimmerman et al. 2005</i> ⁷⁹	Cohort study	1797	0-35	America	Maternal report	Mean (SD) (hours/day)	TV	0-35months: 2.2(2.22)	Physical	Cognitive development (mathematics, reading comprehension. reading recognition)	7
		1797	36-60					36-60months: 3.29(2.18)			
								8-16 months: 0.15(0.35)			
							DVDs/videos	17-24 months: 0.16(0.43)			
<i>Zimmerman et al. 2007</i> ⁸⁰	Cross-sectiona l study	729	8-16(384)	America	Parent report: survey (telephone interview)	Mean (SD) (hours/day)	Children's educational shows	8-16 months: 0.31(0.7)	Physical	Cognitive development (language development)	5
								17-24 months: 0.7(0.96)			
								8-16 months: 0.16(0.49)			
			17-24(345)				Movies and children's non- educational TV	17-24 months: 0.39(0.75)			

		8-16 months:
	Grownup TV	0.1(0.31)
		17-24 months:
		0.15(0.41)

Note:
RCT: randomized control trail

Table S2. GRADE assessment of quality of evidence reported the associations between media use and health indicators.

No. of participants (No. of studies)	Design	Risk of bias	Quality assessment				Summary of findings	
			Inconsistency	Indirectness	Imprecision	Publication bias	Absolute effect	Quality of evidence (GRADE)
Adiposity								
Observational studies								
933 (1) ²⁵	Case-control study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration) 1/1 studies reported positive associations	Low
60997(10) ^{13, 15, 27, 35, 52, 55, 61-63, 66}	Cohort study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration) 8/8 studies reported positive associations Screen time (duration) 2/2 studies reported positive associations	High
17064 (10) ^{14, 29, 33, 38, 39, 48, 49, 59, 72}	Cross-sectional study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration) 7/7studies reported positive associations Screen time (duration) 2/3 studies reported positive associations 1/3 studies reported negative associations	Moderate
Cognitive development								
Intervention studies								
807 (1) ⁵³	RCT	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration) 1/1 study reported null associations	Moderate
Observational studies								

4273 (4) ^{45, 54, 68, 79}	Cohort study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration)	Low
							2/3 studies reported negative associations	
							1/3 studies reported null associations	
							Screen time (duration)	
							1/1 studies reported negative associations	
3385 (5) ^{3, 7, 30, 32, 80}	Cross-sectional study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration)	Low
							2/2 studies reported negative associations	
							Touchscreen (duration)	
							1/1 studies reported null associations	
							DVD/videos (duration)	
							1/1 studies reported null associations	
							Screen time (duration)	
							1/1 studies reported positive associations	
805 (1) ⁵³	RCT	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	Executive function	Moderate
							Intervention studies	
							Observational studies	
							TV (duration)	
							1/1 studies reported negative associations	
185 (1) ³⁷	Cohort study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	Screen time (duration)	Low
							1/1 studies reported negative associations	
167 (2) ^{31, 41}	Cross-sectional study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration)	Low
							2/2 studies reported negative associations	
1997 (1) ⁴⁵	Cohort study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	Motor development	Low
							Observational studies	
							TV (duration)	
							1/1 studies reported negative associations	
762 (2) ^{3, 32}	Cross-sectional study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration)	Low
							1/1 studies reported negative associations	

							Touchscreen (duration) 1/1 studies reported mixed negative and null associations	
				Musculoskeletal risk				
				Intervention studies				
6 (1) ²⁴	Subject laboratory trial	Serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	Touchscreen (duration) 1/1 studies reported positive associations	Moderate
				Observational studies				
1600 (1) ⁶⁰	Cohort study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration) 1/1 studies reported positive associations	Low
				Healthy dietary behavior quality				
				Observational studies				
5637 (5) ^{14, 20, 56, 57, 65}	Cross-sectional study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration) 5/5 studies reported negative associations	Low
				Physical activity				
				Observational studies				
933 (1) ²⁵	Case-control study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration) 1/1 studies reported negative associations	Low
				Sedentary activity				
				Intervention studies				
6 (1) ²⁴	Subject laboratory trial	Serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	Touchscreen (duration) 1/1 studies reported positive associations	Moderate
				Sleep problems				
				Intervention studies				
1679 (3) ^{18, 19, 77}	RCT	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration) 2/2 studies reported positive associations Screen time (duration) 1/1 studies reported positive associations	Moderate
				Observational studies				

933 (1) ²⁵	Case-control study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration) 1/1 studies reported positive associations	Low
7365 (7) ^{8, 36, 43, 46, 50, 55, 74}	Cohort study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration) 5/5 studies reported positive associations Screen time (duration) 2/2 studies reported positive associations	Moderate
19081 (12) ^{4-6, 9, 11, 21, 28, 42, 44, 67, 70, 71}	Cross-sectional study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration) 5/6 studies reported positive associations 1/6 studies reported negative associations TV (prevalence) 1/1 studies reported positive associations Touchscreen (duration) 1/1 studies reported positive associations Video games (duration) 1/1 studies reported positive associations Screen time (duration) 3/3 studies reported positive associations	Moderate
Aggressive behavior Observational studies								
3533 (3) ^{11, 34, 69}	Cohort study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration) 2/2 studies reported positive associations Screen time (duration) 1/1 studies reported positive associations	Low
Behavioral and emotional outcomes Observational studies								
19103 (9) ^{10, 17, 23, 37, 40, 46, 47, 64, 69}	Cohort study	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Undetected	TV (duration) 5/5 studies reported negative associations Computer games 1/1 studies reported negative associations Screen time (duration)	Moderate

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to influence our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: Uncertain about the estimate.

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