Supplementary Online Content

Janssen X, Martin A, Hughes AR, et al. Associations of Screen Time, Sedentary Time and Physical Activity with Sleep in Under 5s: A Systematic Review

This supplementary material has been provided by the authors to give readers additional information about their work.

Appendix 1. Search strategy

Outcome	1	Sleep/
	2	(sleep adj3 duration).tw.
	3	(sleep adj onset adj latency).tw.
	4	(wakefulness or awakening or parasomnia* or insomnia*).tw.
	5	(sleep routine or sleep timing or sleep hygiene or healthy sleep habits or bedtime routine or sleep practice or bedtime practice or sleep environment or sleep schedule or time in bed or sleep onset latency).tw,kw
	6	exp *Sleep Apnea Syndromes/ and (apnea or apnoea).ti.
	7	*(1 or 2 or 3 or 4 or 5) not 6*
	8	Polysomnography/
	9	Accelerometer/ or Accelerometry/
	10	Actigraphy/
	11	(polysomnogr* or actigr* or accelerom*).tw.
	12	((objectiv* adj3 measur*) or (direct* adj3 measure*)).tw.
	13	(Sleep* adj3 (report or questionnaire* or index or eval* or diary or diaries or log* or journal*)).tw.
	14	(self report* or proxy report*).tw.
	15	*or/8-14*
	16	*7 and 15*
Population	17	("infant (1 to 23 months)" or "preschool child (2 to 5 years)")
	18	(pre-school* or preschool* or early childhood).tw,kf.
	19	(Toddler* or Nurser* or Baby or Babies or Kindergarten*).tw,kf.
	20	*or/17-19*
	21	*16 and 20*
	22	*limit 21 to (journal article or published erratum or "retraction of publication")*
	23	*limit 22 to (english)*
Screen	24	Television/ or Video Games/ or Software/ or Videodisc Recording/ or Cartoons as Topic/ or Motion Pictures as Topic/
	25	exp Internet/ or exp Computers, handheld/
	26	Communications Media/ or Mass Media/
	27	(television or screentime or ((screen or computer) adj3 time) or ((watch* or view*) adj2 (dvd* or video*)) or screen media or social media or video gam* or videogam* or computer gam* or electronic gam*).tw,kw.
	28	(Smartphone* or ipad or apps or app or mobile applications).tw,kw.
	29	screen based entertainment.tw,kw.
	30	(Mobile phone* OR mobile telephone* OR cell phone* OR cellular phone* OR cellular telephone* OR electronic media* OR portable media device* OR tablet phone* OR tablet adj3 device).tw,kw.
	31	(bedroom or bed or room or household or house).tw,kw.
Movement	32	Sedentary Lifestyle/
	33	(sedentary or inactiv* or (lack adj2 activity)).tw,kw.
	34	((low adj3 energy expend*) or physical* inactiv*).tw,kw.
	35	((chair or stroller or car or automobile* or auto or motor vehicle* or bus or indoor* or in-door or computer) adj3 time).tw,kw.
	36	sitting.tw,kw.
	37	Physical Activity.mp.
	38	exp Exercise/
	39	exp Exercise Movement Techniques/
	40	exp Exercise Therapy/
	41	Physical Exertion/
	42	exp "Physical Education and Training"/
	43	exp Sports/
	44	(sport$ or bicycl$ or swim$ or walk$ or run$ or jog$).tw,kf.
	45	(physical$ adj2 activ$).tw,kf.
	46	(aerobic adj2 (train$ or active$)).tw,kf.
	47	"Play and Playthings"/ and (activ* or outdoor*).tw,kf.
	48	((activ* or outdoor*) adj3 play*).tw,kf.
	49	playground*.tw,kf.
	50	active.ti. and (space* or behavio?r* or transport* or commut* or neighbo?rhood* or park* or game* or gaming or lifestyle).mp.
	51	(active adj3 (space* or behavio?r* or transport* or commut* or neighbo?rhood* or park* or game* or gaming or lifestyle)).tw,kf.
	52	prone position*.mp. or floor time.tw,kf.
	53	*Or/24-31*
	54	*23 and 53*
	55	*Or/32-52*

56 *23 and 55*
57 *56 not (cerebral palsy or asthma or cystic fibrosis or autism)*.tw,kf,mp.

Figure S1. Flowchart outlining identification of papers for inclusion

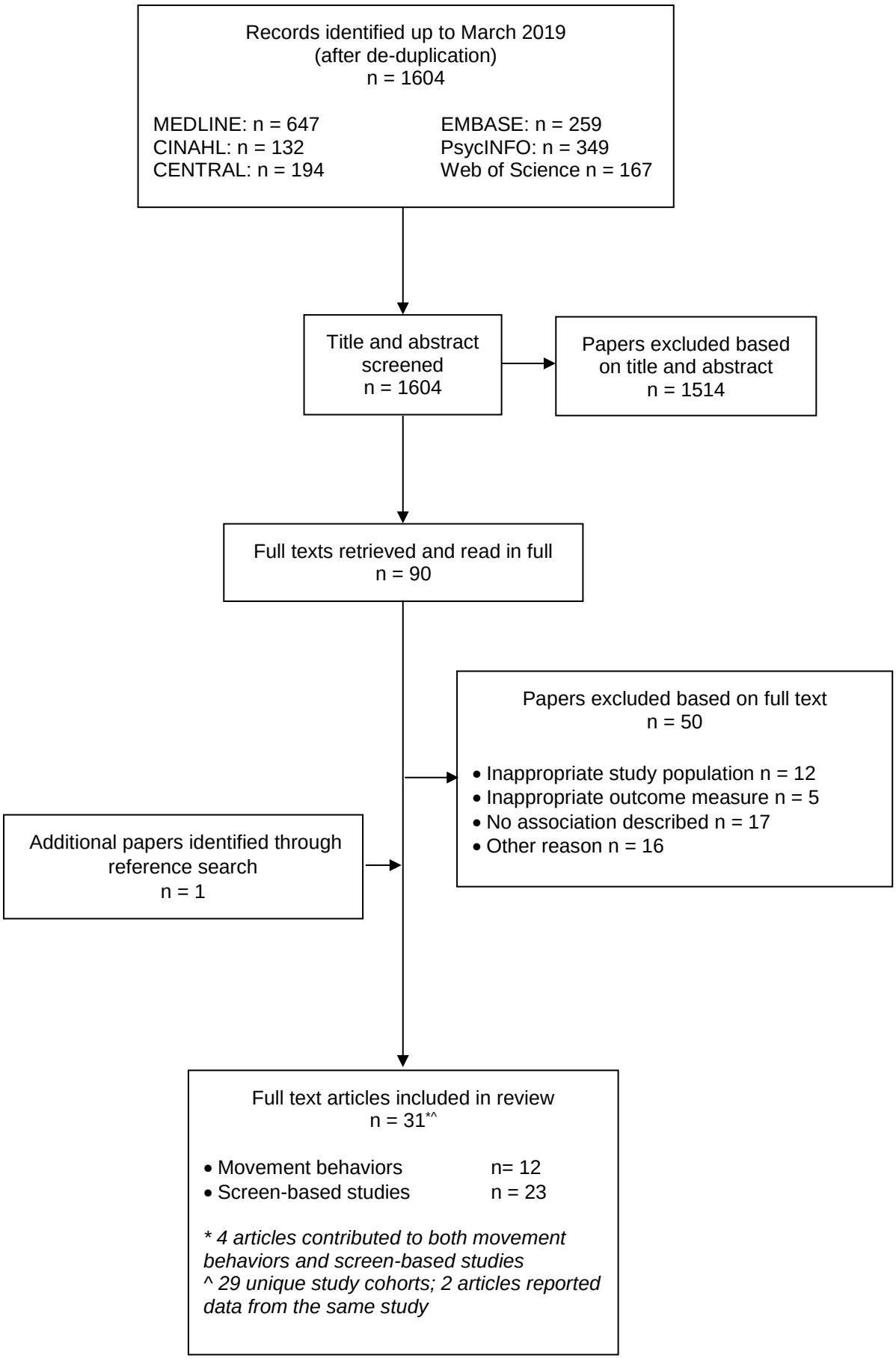

Table S1. Quality assessment individual studies

Study author and year	Selection bias[a]	Performance bias[b]	Detection bias[c]	Attrition bias[d]	Selective reporting bias[e]	Other bias[f]
Ahn et al. 2016 [43]	Unclear	Unclear	Unclear	Unclear	High	Low
Cespedes et al. 2014 [17]	Unclear	Unclear	High	High	Low	Low
Chonchaiya et al. 2017 [30]	High	High	High	Unclear	High	High
De Bock et al. 2013 [36]	Unclear	High	High	Low	Unclear	Low
Duraccio et al. 2017 [31]	High	Unclear	Unclear	Low	Unclear	Unclear
Garrison et al. 2011 [32]	High	High	Unclear	Unclear	Unclear	Unclear
Genuneit et al. 2018 [37]	Unclear	High	Unclear	High	High	High
Hager et al. 2016 [33]	High	Low	Unclear	High	Unclear	Low
Hauck et al. 2018 [26]	High	Unclear	Unclear	Unclear	Low	Low
Ikeda et al. 2012 [29]	Unclear	High	High	Unclear	Low	Low
Iwata et al. 2011 [44]	High	High	Low	Low	Unclear	Low
Krejci et al. 2011 [46]	Unclear	High	High	High	Unclear	Low
Magee et al. 2014 [50]	High	High	High	High	Unclear	Low
Marinelli et al. 2014 [38]	Low	High	High	High	Low	Low
McDonald et al. 2014 [39]	Low	High	Unclear	High	Low	Low
Ji et al. 2018 [45]	low	Unclear	Low	Unclear	High	Low
Mindell et al. 2013 [53]	High	High	Unclear	Unclear	Low	High
Nathanson et al. 2018 [34]	High	High	Low	Unclear	Low	Low
Nathanson et al. 2014 [35]	Unclear	High	High	Unclear	Low	Low
Nevarez et al. 2010 [18]	Low	High	High	High	High	Low
Ota et al. 2007 [48]	High	High	High	Low	Low	Low
Plancoulaine et al. 2015 [38]	Unclear	High	High	High	Unclear	Low
Reynaud et al. 2016 [39]	Unclear	High	High	High	Low	Low
Séguin et al. 2016 [28]	High	Unclear	Low	Low	High	Low
Sijtsma et al. 2015 [42]	Low	High	High	Unclear	Low	High
Taylor et al. 2015 [21]	Unclear	Low	Low	Unclear	Low	Low
Vijakkhana et al. 2015 [47]	High	High	High	Low	Low	High

Wang et al. 2019 [49]	Low	High	Low	Low	Low	Low
Williams et al. 2014 [20]	Unclear	Low	Low	Unclear	Low	Low
Xu H et al. 2016 [51]	High	High	Unclear	Unclear	Low	Low
Zhang et al. 2019 [52]	High	High	Low	High	Low	Low

[a] Risk classed as high if sample is convenience sample; risk classed as unclear if generalisability of sample is unknown

[b] Risk classed as high if exposure measure is not validated; risk classed as unclear if exposure measure appears to be validated but psychometric properties are not reported

[c] Risk classed as high if outcome measure is not validated; risk classed as unclear if outcome measure appears to be validated but psychometric properties are not reported

[d] Risk classed as high if large amount of data is missing and reasons are not explained; risk classed as unclear if no information on missing data was provided or participants characteristics of missing data were not provided

[e] Risk classed as high if pre-specified outcomes were missing from the results; risk classed as unclear if questions were raised about how final models were decided on

[f] Risk classed as high if authors failed to control for confounders; risk classed as unclear if questions were raised about statistical methods used