

Table A.2.g. Cognitive outcomes and sedentary behaviour, children and adolescents

Questions: What is the association between **sedentary behaviour** and health-related outcomes? Is there a dose response association (total volume and the frequency, duration and intensity of interruption)? Does the association vary by type and domain of sedentary behaviour?

Population: Children aged 5-under 18 years of age

Exposure: Greater volume, decreased frequency, duration or intensity of interruption of sedentary behaviour

Comparison: Lesser volume, increased frequency, duration or intensity of interruption of sedentary behaviour

Outcome: Cognitive outcomes (e.g., academic performance, executive function)

***Importance:** CRITICAL

Black font is from original GRADE Evidence Profiles for academic achievement from Australian 24-Hour Movement Guidelines for Children (5-12 years) and Young People (12-17 years).(26) **Red font denotes additions based on WHO update using review of existing systematic reviews.**

No. of studies/ Study design No. of participants	Quality Assessment					Summary of findings	Certainty	US PAGAC evidence (27)
	Risk of bias	Inconsistency	Indirectness	Imprecision	Other			
Mean baseline age ranged between 12.0 and 16.9 years; where mean age was not reported, baseline age ranged from 6 to 18 years and grades 9 to 12. Data were collected by longitudinal (n=4) and cross-sectional (n=12) study designs with up to 2 years follow up. Academic achievement was assessed as school/academic performance (self- and proxy-report by interview, questionnaire and Child Behaviour Checklist); grades/grade point average (self- and proxy-report by interview or questionnaire, objectively measured) standardized test scores (National Center for Education Statistics, the National Assessment Program for Literacy and Numeracy); and Reading and Mathematics skills (Wide Range Achievement Test, Revision 3).								
10 Longitudinal ^a n = 33,703 No eligible reviews identified.	Serious risk of bias ^b	Serious inconsistency	No serious indirectness	No serious imprecision	Dose response gradient ^c	<p>Among <i>longitudinal findings</i>, higher sedentary behaviour was associated with lower academic achievement for:</p> <ol style="list-style-type: none"> 1) Total screen time – 2/2 studies 2) TV - 3/6 <i>studies</i> (weekdays only for one study). 3) Video games - 2/6 <i>studies</i>. 4) Computer - 1/2 <i>study</i>. 5) Non-school sedentary time excluding TV – 1/1 studies 6) Mobile Phone – 0/1 study <p>Among longitudinal findings, higher sedentary behaviour was associated with higher academic achievement for:</p> <ul style="list-style-type: none"> - Accelerometer – derived sedentary time – 2/2 studies 1) Reading - 2/3 <i>studies</i>. 2) Homework outside of school -2/2 <i>study</i>. 	LOW ^d	Outcome not included
12 Cross-sectional ^e n = 14,887 No eligible reviews identified.	Serious risk of bias ^f	Serious inconsistency	No serious indirectness	No serious imprecision	Exposure/outcome gradient ^h	<p>Higher sedentary behaviour was associated with lower academic achievement for:</p> <ol style="list-style-type: none"> 1) TV - 1/6 <i>studies</i> (only for males in 1 study). 2) Video games - 3/6 <i>studies</i> (for GPA only in 1 study). 3) Computer - 1/4 <i>study</i>. 4) Total sedentary behaviour - 1/2 studies 5) Cell phone - 0/2 <i>studies</i> <p>Higher sedentary behaviour was associated with higher academic achievement for:</p> <ol style="list-style-type: none"> 1) Computer - 1/4 <i>studies</i>. 	VERY LOW ⁱ	

						2) <u>Total sedentary behaviour</u> - 1/2 studies (before school only for 1 study).		
						Due to heterogeneity in the measurement of sedentary behaviour and academic achievement a meta-analysis was not possible.		

^{*}As determined by WHO

^aIncludes 4-10 longitudinal studies (231-234).

^bNo studies provided information on psychometric properties of the sedentary behaviour items.

^cA dose-response gradient for higher TV/accelerometer derived sedentary time and lower academic achievement or reading and homework with higher academic achievement was observed in 2-4 studies (231, 233); Aggio et al. 2016; Wickel et al. 2017).

^dThe quality of evidence for longitudinal studies could not be upgraded from "low" to "moderate" due to serious risk of bias and was downgraded to "very low" from "low" due to serious inconsistency but upgraded to "low" from "very low" due to a dose response gradient.

^eIncludes 12 cross-sectional study (224, 226, 235-244).

^fApart from 3 studies (236, 240, 242) information on psychometric properties of the sedentary behaviour items were not provided.

^gMixed findings were observed.

^hA gradient for higher video games and computer use with lower academic achievement was observed in 2 studies (224, 239).

ⁱThe quality of evidence for cross-sectional studies was downgraded to "very low" from "low" due to serious risk of bias and serious inconsistency.