

Appendix
Reducing Recreational Sedentary Screen Time: A Community Guide Systematic Review
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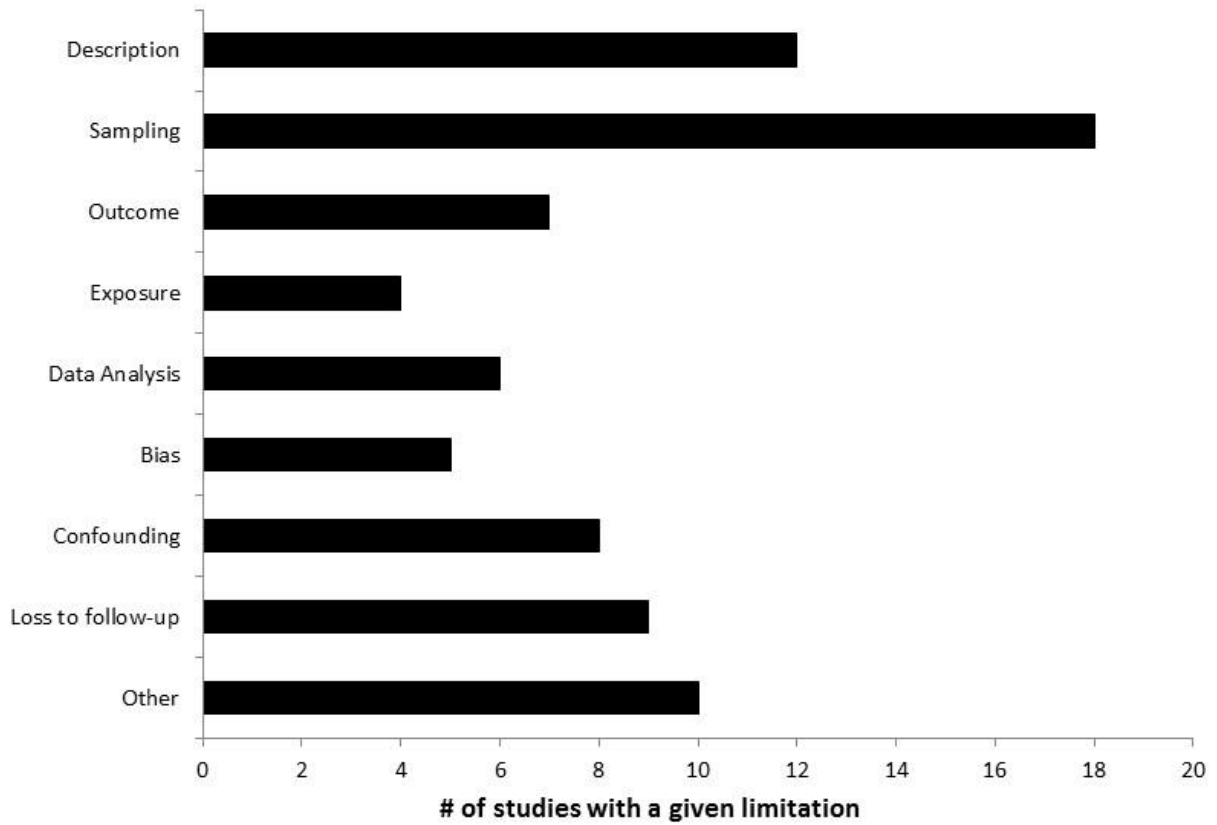
Appendix Table 1. Studies and Study Arms Stratified by Intervention Type and Intensity

Screen-time-only studies				Screen-time-plus studies		
	High intensity studies/Study arms	Low intensity studies/Study arms	High and low intensity studies/Study arms	High intensity studies/Study arms	Low intensity studies/Study arms	High and low intensity studies/Study arms
Study design	Author, year	Author, year	Author, year	Author, year	Author, year	Author, year
RCT	Epstein 2008 Otten 2009 Todd 2008 Zimmerman 2012	Birken 2012 Escobar-Chavez 2010	Ford 2002 (treated as 2 pre-post study arms without comparison; 1 high/1 low intensity) Ni Mhurchu 2009 (treated as 2 pre-post study arms without comparison; 1 high/1 low intensity)	Epstein 1995 (treated as 2 pre-post study arms without comparison; both high intensity) Epstein 2000 (treated as 4 pre-post study arms without comparison; all high intensity) French 2011 Goldfield 2006 Jago 2013 Patrick 2006 Robinson 2003 Robinson 2010 Roemmich 2004 Roemmich 2012 (treated as 3 pre-post study arms without comparison; all high intensity), Spring 2012 (treated as 2 pre-post study arms without comparison; both high intensity)	O'Connor 2011	Shapiro 2008 (treated as 3 pre-post study arms without comparison; 2 high/1 low intensity), Warren 2003 (treated as 2 pre-post study arms with a comparison; 1 high/1 low intensity)

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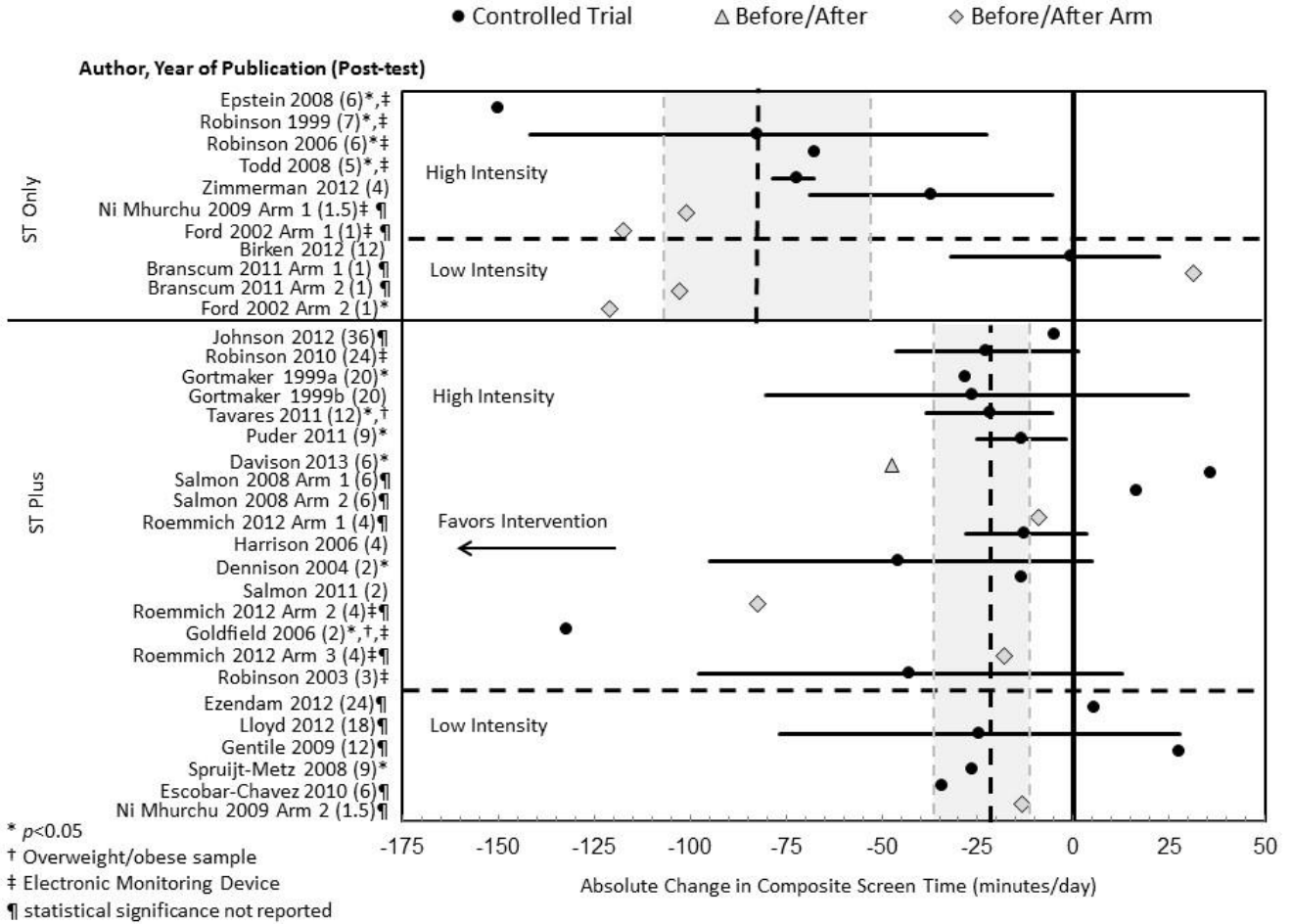
Screen-time-only studies		Screen-time-plus studies	
Group RCT	Robinson 1999, Robinson 2006	Dennison 2004 Gortmaker 1999 (Planet Health) Marcus 2009 Puder 2011 Salmon 2008 (treated as 2 pre-post study arms with a comparison; both high intensity) Salmon 2011 Tavares 2011 Tucker 2011 (treated as 2 pre-post study arms without comparison; both high intensity)	Branscum 2011 (treated as 2 pre-post study arms without comparison; both low intensity) Campbell 2013 Ezendam 2012 Gentile 2009 Hardy 2010 Jouret 09 Lloyd 2012 Spruijt-Metz 2008
Before-After with Comparison		Gortmaker 1999 (Eat Well, Keep Moving) de Silva-Sanigorski 2010 Harrison 2006 de Silva-Sanigorski/Johnson 2012	
Non-randomized Trial			Whaley 2010
Single Group Before-After	Gorin 2006 Johnson 2005	Davison 2013	Riggs 2007
Total	12 studies, 14 study arms	37 studies, 50 study arms	

Appendix Figure 1. Study limitations.



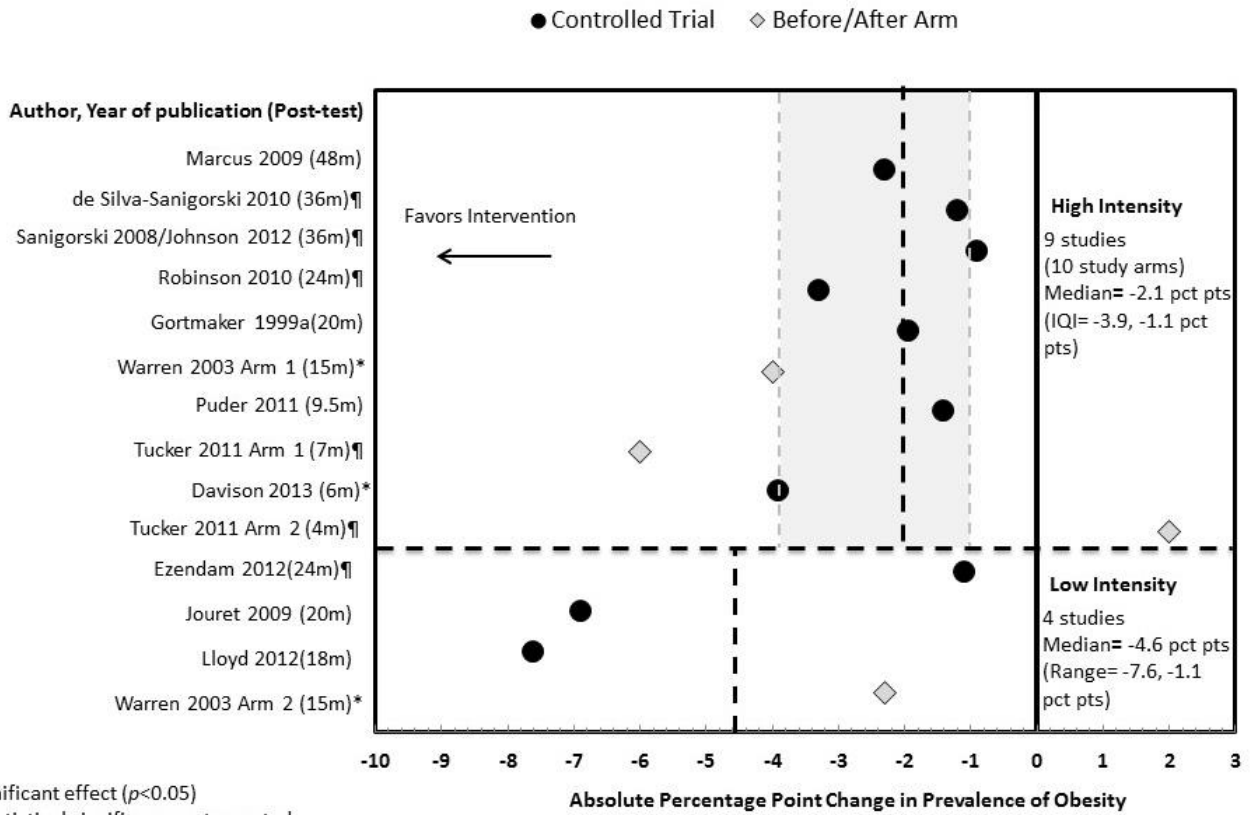
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Appendix Figure 2. Change in composite screen time among children aged 13 years and younger, Community Guide screen time review.



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Appendix Figure 3. Change in obesity prevalence among children aged 13 years and younger, Community Guide screen time review.



*Significant effect ($p < 0.05$)

¶ statistical significance not reported

IQI, Interquartile Interval; pct pts, percentage points

Note: some studies combined overweight and obesity prevalence. In this case, it was not possible to separate out obesity, and a combined prevalence is reported.

Physical Activity and Dietary Behavior Outcomes

Physical activity. Forty-seven study arms from 35 studies^{36,38,41,42,44,46-49,52,54-63,65,66,68,69,71-80,83} reported physical activity. Sixteen study arms from 14 studies reported a median increase in moderate to vigorous physical activity (MVPA) of 2.3 minutes/day (IQR= -4.5, 16.7) (Table 2, below). Accelerometer counts were used to measure physical activity in seven study arms and in seven high-intensity study arms. Four study arms from two studies found a median increase of 66.0 counts/day (range=40.8, 115),^{74,75} three study arms from three studies where TV viewing was contingent on physical activity found a median increase of 130.0 counts/day (range=127.8, 150.0).^{57,73,74} The body of evidence for both interventions was generally positive, though the magnitude of effect was often small. Among adults, four study arms from three studies^{55,62,83} reported a median increase of 14.3 minutes/day in duration of MVPA (range=10.8, 29.6).

Dietary behaviors. Forty study arms from 32 studies included dietary behaviors as outcomes among children^{35-38,40-42,44,47-50,54-59,63,65,66,68,70-72,77,79-82} and adults.^{46,83} Eleven screen-time-only study arms from nine studies^{35-38,40-42,44,46} reported dietary outcomes, even though improving diet was not specifically targeted in the interventions (Table 2, below). Twenty-nine screen-time-plus study arms from 23 studies^{47-50,54-59,63,65,66,68,70-72,77,79-83} reported dietary outcomes. Six study arms^{36,49,57,59,71,72} reported a median reduction in total energy intake (kilocalories/day) of 121.0 (IQR= -268.0, 0.59). Three study arms from 2 studies^{41,57} reported a median decrease in snack intake (measured in kilocalories/day) of 233.7 (range= -281.9, -123.7). For the remaining outcomes, the body of evidence for both interventions was generally positive, though the magnitude of effect was often small. Among adults, one study⁵⁵ reported a significant decrease in eating meals with the TV on, snack intake, and sugar-sweetened beverage intake.

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Table 2. Selected Outcomes for Children Stratified by Intervention Type and Intensity

Outcome	Screen-time-only ^a			Screen-time-plus ^b			Combined Screen-time-only and screen-time-plus	
	High intensity ^c	Low intensity ^d	Screen-time-only (high and low intensity combined)	High intensity	Low intensity	Screen-time-plus (high and low intensity combined)		
Recreational sedentary screen time								
Commercial TV viewing (minutes/day)	No. of study arms	6	3	9	13	5	18	27
	Median change	-46.8 (-210.0, -34.8)	-0.6 (-120.6, 0.0)	-45.6 (-162.6, -15.0)	-13.8 (-52.2, 6.0)	-18.0 (-78.0, 0.0)	-16.2 (-70.8, 3.6)	-22.2 (-76.8, -0.60)
Composite screen time (minutes/day)	No. of study arms	7	4	11	17	6	23	34
	Median change	-82.2 (-117.6, -67.2)	-51.6 (-116.4, -23.4)	-82.2 (-117.6, -37.2)	-21.6 (-44.4, -10.8)	-19.2 (-28.2, 10.8)	-21.6 (-34.2, -9.0)	-26.4 (-74.4, -12.0)
Physical activity								
Accelerometer counts (counts/day)	No. of study arms	NR	NR	NR	7	NR	7	NA
	Median change				4 arms: 66.0 (40.8, 115.0) Contingent ^e (3 arms): 130.0 (127.8, 150.0)		4 arms: 66.0 (40.8, 115.0) Contingent ^e (3 arms): 130.0 (127.8, 150.0)	

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Pedometer steps (steps/day)	No. of study arms	2	1	3	4	2	6	9
	Median change	679.0 (298, 1,150)	992.0	992.0 (298, 1,150)	1,359.5 (-258.0, 4,972.0)	-377.0 (-993.0, 239.0)	310.0 (-441.8, 2,996.4)	381 (-9.5, 1,743.9)
Duration of moderate to vigorous physical activity (minutes/day)	No. of study arms	2	1	3	9	4	13	16
	Median change	27.6 (-2.4, 30.0)	-70.6	-2.4 (-70.6, 30.0)	1.2 (-4.5, 20.2)	5.1 (-2.5, 15.4)	4.4 (-3.0, 14.7)	2.3 (-4.2, 16.7)
Diet								
Total energy intake (kilocalories/day)	No. of study arms	1	NR	NR	5	NR	NR	6
	Median change	-75			-117.9 (-373.1, 28.5)			-121.0 (-268.0, 0.59)
Snack intake (kilocalories/day)	No. of study arms	1	1	2	1	NR	NR	3
	Median change	-233.7	-123.7	-178.7	-281.9			-233.7
Sugar sweetened beverage intake (relative percent change)	No. of study arms	NR	NR	NR	8	6	14	NA
	Median change				-17.2 (-54.7, -9.2)	-1.6 (-40.9, 5.4)	-10.9 (-50.0, 3.5)	

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Fruit and vegetable intake (servings/day)	No. of study arms	NR	NR	NR	9	5	14	NA
	Median change				0.16 (-0.25, 0.43)	0.5 (-0.85, 1.04)	0.21 (-0.38, 0.53)	
Weight-related outcomes								
BMI (kg/m ²)	No. of study arms	3	1	4	9	2	11	15
	Median change	-0.44 (-0.45, -0.04)	-0.09	-0.27 (-0.45, -0.04)	-0.21 (-0.65, 0.07)	0.13 (0.10, 0.16)	-0.08 (-0.40, 0.10)	-0.09 (-0.44, -0.04)
BMI z-score	No. of study arms	1	1	2	7	5	12	14
	Median change	-0.20	0.01	-0.11	-0.11 (-0.19, 0.02)	-0.20 (-0.34, -0.02)	-0.11 (-0.19, 0.05)	-0.13 (-0.23, -0.01)
Percent body fat (pct pts)	No. of study arms	1	NR	NR	5	2	7	8
	Median change	-2.54			-4.9 (-5.9, 2.8)	-0.38 (-0.83, 0.08)	-4.5 (-5.5, -0.8)	-3.5 (-5.4, -0.90)
Morbidity								
Obesity prevalence (pct pts)	No. of study arms	NR	NR	NR	9	4	13	NA
	Median change				-2.0 (-2.8, -1.1)	-4.6 (-7.6, -1.1)	-2.3 (-4.5, -1.2)	

Note: All medians are followed by interquartile interval if there are ≥ 5 study arms, range if there are < 5 study arms. Not all studies are represented in the table because of inconsistent outcome measures.

^a Screen-time-only interventions only focus on reducing recreational sedentary screen time.

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^b Screen-time-plus interventions focus on reducing recreational sedentary screen time and increasing physical activity and/or improving diet.

^c High-intensity interventions must include use of an electronic monitoring device to limit screen time or at least three personal or computer-tailored interactions.

^d Low-intensity interventions include two or fewer personal or computer-tailored interactions.

^e Contingent = Screen time contingent on physical activity.

kg, kilogram; m, meter; NA, not applicable; NR, not reported; pct pts, percentage points

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