Untitled Draft

Report Author

06 December, 2024

# 1 Results

We excluded 242 data points from 49 participants with a reported health condition at the Checkpoint data collection point. Table 2.1 provides an overview of the demographic, anthropometric, and cardio-metabolic characteristics of the remaining 1,825 participants. The cohort was evenly distributed by sex, with 49% females across all wave points. Majority of participants were non-Indigenous (98%), which is representative of the population. The participant cohort was predominantly in early to mid-puberty, with the majority classified as Tanner stages 2 38% and 3 29%. The LSAC is designed to be representative of the Australian population, and therefore the standardized socioeconomic status indicator is expected to have a mean of 0 (standard deviation = 1). Participants included in the Checkpoint data were on average from slightly higher socioeconomic families than the entire LSAC dataset (Wave 3 mean 0.27; SD = 0.95). Participants average total screen time increased steadily across the study period, from a mean of 133 minutes per week (SD = 77) to 196 minutes per week (SD = 92) in Wave 6.

We fit latent growth curve models to estimate trajectories of screen time over time, and to examine if these trajectories were associated with health outcomes. The model fit was considered acceptable, with comparative fit indices ranging from 0.90 to 0.97, and root mean square error of approximation ranging from 0.03 to 0.05. There was a negative and statistically significant covariance between the initial screen time intercept and the screen time slope (correlation = -0.03; p = -0.032), suggesting that children with high levels of inital screen time tend to have slower rates of increase than those with low initial levels.

The results for the association between screen time trajectories and health outcomes are presented in Table @ref(tab:outcomes\_table) (full results are available in supplementary materials). After adjusting for movement behaviours, we found no evidence of associations between screen time trajectories and total cardio-metabolic risk score, ApoB/ApoA1 ratio, glycoprotein acetyls, phospholips, triglycerides, glucose, measurse of cholesterol, and measures of blood pressure. We did, however, find evidence that children’s inital screen time (i.e., trajectory intercept) was associated with lower levels of cardiorespiratory fitness (unadjusted *B* = -3.21; 95%CI, -4.38–2.04), higher waist circumference (unadjusted *B* = 1.18; 95%CI, 0.40-1.96), waist-to-height ratio (unadjusted *B* = 0.01; 95%CI, 0.01-0.02), body mass index (z-score; unadjusted *B* = 0.16; 95%CI, 0.06-0.26), and body fat percentage (unadjusted *B* = 2.04; 95%CI, 1.19-2.88). Contrary to our hypothesis, these results were not attenuated after adjusting for movement behaviours. There was additionally weak evidence for an association between initial screen time and measures of systolic (z-score; unadjusted *B* = 0.08; 95%CI, 0.01-0.16) and diastolic (z-score; unadjusted *B* = 0.08; 95%CI, 0.02-0.13) blood pressure, which were attenuated after adjusting for movement behaviours.

There was some evidence to suggest that the rate of change in screen time (i.e., trajectory slope) was associated with higher waist circumference (unadjusted *B* = 3.20; 95%CI, 0.51-5.88), waist-to-height ratio (unadjusted *B* = 0.02; 95%CI, 0.00-0.03), and lower pulse pressure amplification (unadjusted *B* = -0.11; 95%CI, -0.22-0.00). However, these associations were all attenuated after adjusting for movement behaviours.

# 2 Tables

Table 2.1: \*\*Table 1. Descriptive statistics of the LSAC Checkpoint cohort.\*\*

|  | **Wave Point** | | | | |
| --- | --- | --- | --- | --- | --- |
| **Characteristic** | **Wave 3**  N = 1,790 | **Wave 4**  N = 1,793 | **Wave 5**  N = 1,800 | **Wave 6**  N = 1,825 | **Checkpoint**  N = 1,825 |
| Age (Years), Mean (SD) | 4.82 (0.22) | 6.85 (0.29) | 8.91 (0.30) | 10.91 (0.33) | 12.00 (0.40) |
| Sex, n / N (%) |  |  |  |  |  |
| Male | 917 / 1,790 (51%) | 919 / 1,793 (51%) | 925 / 1,800 (51%) | 935 / 1,825 (51%) | 935 / 1,825 (51%) |
| Female | 873 / 1,790 (49%) | 874 / 1,793 (49%) | 875 / 1,800 (49%) | 890 / 1,825 (49%) | 890 / 1,825 (49%) |
| Indigenous Status, n / N (%) | 32 / 1,790 (1.8%) | 32 / 1,793 (1.8%) | 32 / 1,800 (1.8%) | 33 / 1,825 (1.8%) | - |
| Socioeconomic Status, Mean (SD) | 0.27 (0.95) | 0.24 (0.96) | 0.22 (0.97) | 0.19 (0.96) | - |
| Aggregated Screen Time (min/day), Mean (SD) | 133 (77) | 148 (79) | 178 (86) | 196 (92) | - |
| MVPA (min/day), Mean (SD) | - | - | - | - | 63 (34) |
| Sedentary Time (min/day), Mean (SD) | - | - | - | - | 552 (81) |
| Diet, n / N (%) |  |  |  |  |  |
| Does Not Meet Guidelines | - | - | - | - | 1,591 / 1,787 (89%) |
| Meets Guidelines | - | - | - | - | 196 / 1,787 (11%) |
| Sexual Maturity, n / N (%) |  |  |  |  |  |
| Tanner1 | - | - | - | - | 322 / 1,704 (19%) |
| Tanner2 | - | - | - | - | 639 / 1,704 (38%) |
| Tanner3 | - | - | - | - | 492 / 1,704 (29%) |
| Tanner4 | - | - | - | - | 212 / 1,704 (12%) |
| Tanner5 | - | - | - | - | 39 / 1,704 (2.3%) |
| VO2 Max, Mean (SD) | - | - | - | - | 48 (10) |
| Waist Circumference (cm), Mean (SD) | - | - | - | - | 66 (8) |
| Waist-to-Height Ratio, Mean (SD) | - | - | - | - | 0.43 (0.05) |
| BMI Z-Score, Mean (SD) | - | - | - | - | 0.30 (0.99) |
| Body Fat (%), Mean (SD) | - | - | - | - | 22 (8) |
| Systolic Blood Pressure (mmHg), Mean (SD) | - | - | - | - | 108 (8) |
| Diastolic Blood Pressure (mmHg), Mean (SD) | - | - | - | - | 62.4 (5.7) |
| Fasting Time (hours), Mean (SD) | - | - | - | - | 4.16 (1.10) |
| Glucose (mmol/L), Mean (SD) | - | - | - | - | 4.88 (0.47) |
| Triglycerides (mmol/L), Mean (SD) | - | - | - | - | 1.17 (0.50) |
| Total Cholesterol (mmol/L), Mean (SD) | - | - | - | - | 4.07 (0.65) |
| Cholesterol:HDL Ratio, Mean (SD) | - | - | - | - | 1.41 (0.27) |
| Non-HDL Cholesterol (mmol/L), Mean (SD) | - | - | - | - | 0.97 (0.26) |
| Phospholipids (mmol/L), Mean (SD) | - | - | - | - | 0.41 (0.12) |
| Apolipoprotein A1 (g/L), Mean (SD) | - | - | - | - | 1.39 (0.12) |
| Apolipoprotein B (g/L), Mean (SD) | - | - | - | - | 0.65 (0.10) |
| ApoB:ApoA1 Ratio, Mean (SD) | - | - | - | - | 0.48 (0.08) |
| Glycoprotein (mmol/L), Mean (SD) | - | - | - | - | 0.98 (0.11) |

(#tab:outcomes\_table)Table 2. Unadjusted and adjusted associations between screen time and health outcomes.

|  | **Unadjusted** | | **Adjusted** | |
| --- | --- | --- | --- | --- |
| **Variable** | **Beta** **(95% CI)**1 | **p-value** | **Beta** **(95% CI)**1 | **p-value** |
| **Cardio-metabolic Risk Score** |  |  |  |  |
| Screen Time Trajectory Intercept | 0.01 (-0.07 to 0.10) | 0.80 | 0.01 (-0.09 to 0.11) | 0.88 |
| Screen Time Trajectory Slope | 0.11 (-0.17 to 0.40) | 0.44 | 0.19 (-0.23 to 0.61) | 0.37 |
| Moderate-to-Vigorous Physical Activity |  |  | -0.09 (-0.15 to -0.03) | **0.003** |
| Sedentary Time |  |  | -0.01 (-0.07 to 0.05) | 0.81 |
| **ApoB/ApoA1 Ratio** |  |  |  |  |
| Screen Time Trajectory Intercept | 0.00 (-0.01 to 0.01) | 0.97 | -0.01 (-0.02 to 0.01) | 0.39 |
| Screen Time Trajectory Slope | 0.01 (-0.03 to 0.05) | 0.54 | 0.01 (-0.05 to 0.06) | 0.85 |
| Moderate-to-Vigorous Physical Activity |  |  | -0.01 (-0.02 to -0.01) | **<0.001** |
| Sedentary Time |  |  | 0.00 (0.00 to 0.01) | 0.23 |
| **Glycoprotein Acetyls** |  |  |  |  |
| Screen Time Trajectory Intercept | 0.01 (-0.01 to 0.02) | 0.47 | 0.00 (-0.02 to 0.02) | 0.82 |
| Screen Time Trajectory Slope | 0.02 (-0.04 to 0.07) | 0.55 | 0.02 (-0.06 to 0.10) | 0.60 |
| Moderate-to-Vigorous Physical Activity |  |  | -0.02 (-0.03 to -0.01) | **<0.001** |
| Sedentary Time |  |  | 0.00 (-0.01 to 0.01) | 0.64 |
| **Phospholipids** |  |  |  |  |
| Screen Time Trajectory Intercept | -0.01 (-0.03 to 0.00) | 0.11 | 0.00 (-0.02 to 0.01) | 0.65 |
| Screen Time Trajectory Slope | -0.05 (-0.11 to 0.00) | 0.058 | -0.04 (-0.13 to 0.04) | 0.30 |
| Moderate-to-Vigorous Physical Activity |  |  | 0.02 (0.01 to 0.03) | **0.001** |
| Sedentary Time |  |  | -0.01 (-0.02 to 0.01) | 0.37 |
| **Cardiorespiratory Fitness (VO2 Max)** |  |  |  |  |
| Screen Time Trajectory Intercept | -3.2 (-4.4 to -2.0) | **<0.001** | -2.9 (-4.2 to -1.6) | **<0.001** |
| Screen Time Trajectory Slope | -3.3 (-7.3 to 0.71) | 0.11 | -3.4 (-8.9 to 2.1) | 0.23 |
| Moderate-to-Vigorous Physical Activity |  |  | 3.3 (2.5 to 4.1) | **<0.001** |
| Sedentary Time |  |  | 0.26 (-0.52 to 1.0) | 0.51 |
| **Waist Circumference** |  |  |  |  |
| Screen Time Trajectory Intercept | 1.2 (0.40 to 2.0) | **0.003** | 1.3 (0.36 to 2.2) | **0.007** |
| Screen Time Trajectory Slope | 3.2 (0.51 to 5.9) | **0.020** | 1.8 (-2.1 to 5.8) | 0.36 |
| Moderate-to-Vigorous Physical Activity |  |  | -1.5 (-2.1 to -0.94) | **<0.001** |
| Sedentary Time |  |  | -0.29 (-0.87 to 0.28) | 0.31 |
| **Waist-to-Height Ratio** |  |  |  |  |
| Screen Time Trajectory Intercept | 0.01 (0.01 to 0.02) | **<0.001** | 0.01 (0.01 to 0.02) | **<0.001** |
| Screen Time Trajectory Slope | 0.02 (0.00 to 0.03) | **0.033** | 0.01 (-0.01 to 0.03) | 0.44 |
| Moderate-to-Vigorous Physical Activity |  |  | -0.01 (-0.01 to 0.00) | **<0.001** |
| Sedentary Time |  |  | 0.00 (-0.01 to 0.00) | 0.39 |
| **Body Mass Index (z-score)** |  |  |  |  |
| Screen Time Trajectory Intercept | 0.16 (0.06 to 0.26) | **0.002** | 0.19 (0.07 to 0.30) | **0.002** |
| Screen Time Trajectory Slope | 0.30 (-0.04 to 0.64) | 0.082 | 0.16 (-0.35 to 0.66) | 0.54 |
| Moderate-to-Vigorous Physical Activity |  |  | -0.17 (-0.25 to -0.10) | **<0.001** |
| Sedentary Time |  |  | -0.06 (-0.14 to 0.01) | 0.082 |
| **Body Fat Percentage** |  |  |  |  |
| Screen Time Trajectory Intercept | 2.0 (1.2 to 2.9) | **<0.001** | 2.2 (1.3 to 3.2) | **<0.001** |
| Screen Time Trajectory Slope | 2.4 (-0.47 to 5.3) | 0.10 | 1.1 (-3.0 to 5.3) | 0.59 |
| Moderate-to-Vigorous Physical Activity |  |  | -2.4 (-3.1 to -1.8) | **<0.001** |
| Sedentary Time |  |  | -0.47 (-1.1 to 0.13) | 0.13 |
| **Systolic Blood Pressure Ampification** |  |  |  |  |
| Screen Time Trajectory Intercept | -0.15 (-0.46 to 0.16) | 0.34 | -0.11 (-0.47 to 0.26) | 0.57 |
| Screen Time Trajectory Slope | 0.16 (-0.91 to 1.2) | 0.77 | 0.48 (-1.1 to 2.0) | 0.55 |
| Moderate-to-Vigorous Physical Activity |  |  | 0.28 (0.03 to 0.52) | **0.027** |
| Sedentary Time |  |  | 0.00 (-0.23 to 0.23) | 0.97 |
| **Pulse Pressure Amplification** |  |  |  |  |
| Screen Time Trajectory Intercept | -0.02 (-0.05 to 0.01) | 0.22 | -0.01 (-0.05 to 0.03) | 0.57 |
| Screen Time Trajectory Slope | -0.11 (-0.22 to 0.00) | **0.046** | -0.09 (-0.25 to 0.07) | 0.27 |
| Moderate-to-Vigorous Physical Activity |  |  | 0.03 (0.00 to 0.05) | **0.047** |
| Sedentary Time |  |  | 0.01 (-0.01 to 0.03) | 0.41 |
| **Sysolic Blood Pressure (z-score)** |  |  |  |  |
| Screen Time Trajectory Intercept | 0.08 (0.01 to 0.16) | **0.035** | 0.07 (-0.02 to 0.17) | 0.11 |
| Screen Time Trajectory Slope | 0.22 (-0.04 to 0.49) | 0.10 | 0.18 (-0.22 to 0.57) | 0.38 |
| Moderate-to-Vigorous Physical Activity |  |  | 0.00 (-0.06 to 0.06) | 0.98 |
| Sedentary Time |  |  | 0.02 (-0.04 to 0.07) | 0.57 |
| **Diastolic Blood Pressure (z-score)** |  |  |  |  |
| Screen Time Trajectory Intercept | 0.08 (0.02 to 0.13) | **0.005** | 0.05 (-0.01 to 0.12) | 0.12 |
| Screen Time Trajectory Slope | 0.16 (-0.03 to 0.35) | 0.095 | 0.10 (-0.18 to 0.38) | 0.48 |
| Moderate-to-Vigorous Physical Activity |  |  | -0.05 (-0.09 to -0.01) | **0.018** |
| Sedentary Time |  |  | 0.01 (-0.03 to 0.05) | 0.70 |
| **Triglycerides** |  |  |  |  |
| Screen Time Trajectory Intercept | 0.00 (-0.07 to 0.07) | 0.98 | -0.02 (-0.10 to 0.06) | 0.62 |
| Screen Time Trajectory Slope | 0.13 (-0.09 to 0.36) | 0.24 | 0.20 (-0.15 to 0.54) | 0.27 |
| Moderate-to-Vigorous Physical Activity |  |  | -0.07 (-0.12 to -0.03) | **0.003** |
| Sedentary Time |  |  | -0.02 (-0.07 to 0.03) | 0.40 |
| **Total Cholesterol** |  |  |  |  |
| Screen Time Trajectory Intercept | -0.05 (-0.13 to 0.04) | 0.29 | -0.03 (-0.14 to 0.07) | 0.52 |
| Screen Time Trajectory Slope | -0.12 (-0.41 to 0.16) | 0.40 | -0.16 (-0.61 to 0.29) | 0.49 |
| Moderate-to-Vigorous Physical Activity |  |  | -0.05 (-0.11 to 0.02) | 0.15 |
| Sedentary Time |  |  | 0.01 (-0.05 to 0.07) | 0.77 |
| **HDL Cholesterol** |  |  |  |  |
| Screen Time Trajectory Intercept | -0.02 (-0.06 to 0.02) | 0.27 | 0.00 (-0.04 to 0.04) | 0.96 |
| Screen Time Trajectory Slope | -0.08 (-0.20 to 0.04) | 0.19 | -0.06 (-0.25 to 0.12) | 0.48 |
| Moderate-to-Vigorous Physical Activity |  |  | 0.05 (0.02 to 0.07) | **<0.001** |
| Sedentary Time |  |  | -0.01 (-0.03 to 0.02) | 0.56 |
| **Non-HDL Cholesterol** |  |  |  |  |
| Screen Time Trajectory Intercept | -0.02 (-0.05 to 0.02) | 0.35 | -0.02 (-0.06 to 0.02) | 0.32 |
| Screen Time Trajectory Slope | -0.03 (-0.14 to 0.09) | 0.62 | -0.04 (-0.22 to 0.13) | 0.62 |
| Moderate-to-Vigorous Physical Activity |  |  | -0.04 (-0.07 to -0.01) | **0.002** |
| Sedentary Time |  |  | 0.01 (-0.01 to 0.04) | 0.39 |
| **Glucose** |  |  |  |  |
| Screen Time Trajectory Intercept | -0.05 (-0.11 to 0.01) | 0.13 | -0.03 (-0.11 to 0.05) | 0.43 |
| Screen Time Trajectory Slope | -0.01 (-0.21 to 0.19) | 0.92 | 0.11 (-0.21 to 0.43) | 0.50 |
| Moderate-to-Vigorous Physical Activity |  |  | 0.03 (-0.02 to 0.07) | 0.25 |
| Sedentary Time |  |  | 0.01 (-0.04 to 0.05) | 0.75 |
| 1CI = Confidence Interval | | | | |