

# Watching the watchers: quantifying the duration and nature of children's after-school screen time

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## Introduction

Children's recreational screen time use has been identified as a potential key risk factor for children's ill-health, including obesity, poor sleep patterns and sleep quality, anti-social behaviour, attention-deficit hyperactivity disorder, and psychosocial issues.<sup>1,2,3,4</sup> It is recommended that children spend no more than two hours per day recreationally using screens,<sup>5</sup> and it is suggested that children's television viewing and engagement with other screen-based media devices close to bedtime be discouraged.<sup>3</sup> To date, children's recreational screen time use has primarily been measured using self-report by children or by parents as a proxy. Wearable cameras have been shown to objectively capture children's environments,<sup>6</sup> but to our knowledge have yet to be used to evaluate children's recreational screen time. This study aimed to determine the duration and nature of children's exposure to screen-based and electronic media after school using wearable cameras.

## Methods

This study used data from the Kids'Cam Project, which investigated children's everyday environments and their potential health impact. 169 randomly selected children (11-13y) recruited from 16 randomly selected schools from Wellington, New Zealand, wore cameras for four days that took photographs automatically every 7s (July 2014-June 2015). In this study, a pre-determined coding schedule was used to code for children's screen-based activity from the first image captured immediately after school to the child's final image recorded on a Thursday. Children with at least 30mins of total recorded image time were coded (n=105). Screen time duration and nature were analysed to determine differences by demographic variables and body mass index (BMI). Rates were calculated using the number of images coded for screen time divided by the total number of images per child. Analysis was weighted and adjusted to account for the sampling design.

## Results

### Study sample

Of the 105 children who recorded images during the study period, 59 (56%) were girls. Just over half (54%) the sample were either underweight or normal weight, with the remainder being overweight or obese.

### Screen time

Total recorded image time per child for the study period ranged from 30mins to 3h 47mins (mean, 1h 51mins). On average, children spent 45mins watching screens during the study period, at a rate of 23mins/hour (range, 0-3h25mins). The most commonly watched screen type was television (mean, 19mins). Other screen types (mean) used included: computers (14mins), mobile phones (6mins) and tablets (5mins). Children were also frequently observed using more than one screen type at one time. Figure 1 shows the distribution of total screen time for the whole study sample.

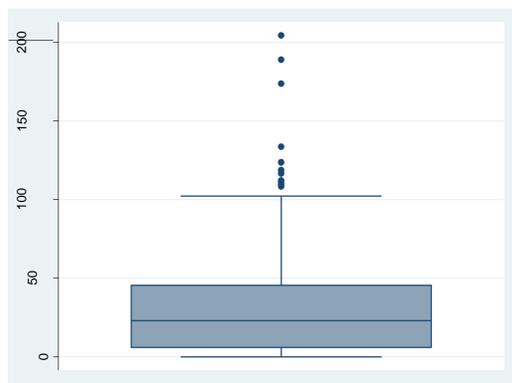


Figure 1: Boxplot showing distribution of total screen time (mins)

### By time period

Data was categorised into three time periods: 3-5.29pm (early); 5.30-7.59pm (mid) and after 8pm (late). Less screen time was recorded for the 'late' period (mean, 11mins) than the 'early' (mean, 23mins) and 'mid' (mean, 20mins) periods. However, almost a third of children (n=34) engaged with a screen after 8pm, at a rate of 36mins/hour. The most popular screen type viewed during the late period was television.

### By deprivation

Mean screen time decreased with increasing deprivation (NZiDep<sup>a</sup>). The least deprived children in the sample used screens for 54mins, on average, while the most deprived spent a mean time of 25mins engaged with screens (RR, 0.61; 95% CI, 0.32-1.18).

### By gender

Differences in the amount and rate of screen time by gender were evident. Mean overall screen time for girls was 29mins, and 60mins for boys, with a maximum screen time of 2h53mins and 3h25mins, respectively (RR, 1.85; 95% CI, 1.11-3.07).

Boys spent a significantly greater time viewing computer screens than girls, 24mins and 4mins, respectively (RR, 5.16; 95% CI, 1.18-22.59). The majority of boys' screen time was spent playing games (mean, 20mins), at a rate significantly greater than that of girls (mean, 2mins) (RR, 10.22; 95% CI, 3.34-31.25). Girls spent most of their time watching programmes (girls, 14mins; boys, 11mins) (RR, 0.67; 95% CI, 0.42-1.06).

### By body mass index

The mean screen time duration recorded for children who were underweight or healthy weight was 52mins, and 36mins for overweight and obese children. Figure 3 illustrates the distribution of screen time recorded by BMI.

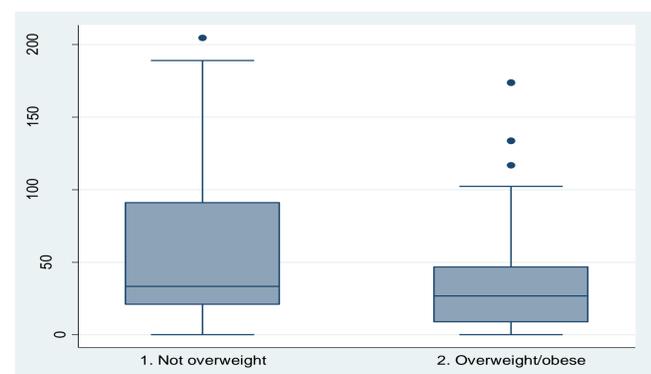


Figure 2: Boxplot showing distribution of total screen time by BMI (mins)

## Discussion

This is one of the first studies to use wearable cameras to assess the duration and nature of children's screen time use. The findings indicate that the majority of children in the study were unlikely to exceed daily recreational screen time recommendations, suggesting that children and parents may be successfully managing screen time use. Of concern are the proportion of children engaged with screens for long periods of time and late into the day, and possibly boys playing games on computers. This findings also support the increasing popularity of screen types with time spent with computers similar to that of television.

This study suggests that increased BMI may not associated with increased screen time, contrary to the evidence in current literature.<sup>1,2,4</sup> While this study assessed screen time for one period of one day, the after-school time is children's main and longest week-day recreational period and Thursdays most likely represent a typical day during a child's week. Analysis of the remainder of the dataset would likely provide a more accurate estimate of recreational screen time duration.

The method demonstrates that wearable cameras can be used to measure screen time use, and likely more accurately and objectively than with previously used methods. The study findings indicate that educational interventions about screen time use may be particularly warranted for boys and those children who engage with screens until very late in their day.



Figure 1: Images illustrating different types of screens used by study participants

## References and Acknowledgements

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