The Effects of Leisure-Based Screen Time

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ABSTRACT

Background: Use of television, computers, and video games competes with physical activity and may be a health risk factor. Purpose: This study assessed the relationship between leisure-based screen time and physical activity in families to determine whether assignment to a limited screen time group results in more physical activity. Methods: Ninety-four families participated for six weeks. Families were randomly assigned to unlimited or limited screen time viewing groups. Participants wore a pedometer to measure steps. Results: Results indicate no statistically significant differences in steps for adults ($F(1,165)=0.81$, $p \leq .369$) or 13-to-18-year-olds ($F(1,63)=0.21$, $p \leq .647$). Among the 5-to-12-year-olds, statistically significant group differences ($F(1,165)=5.63$, $p \leq .019$) for steps were found between the unlimited viewing group and the limited viewing groups. Discussion: Lower amounts of leisure-based screen time yielded increased amounts of physical activity in the 5-to-12-year-olds, but this trend was not found in the 13-to-18-year-olds or adults. Additional research is needed in order to more fully understand the screen time and physical activity relationship. Translation to Health Education Practice: In general, promotion of physical activity at home and school could increase physical activity and decrease leisure-based screen time; otherwise, other sedentary activities may only replace the time not spent in front of a screen.

BACKGROUND

In the United States, the average adult does not get the recommended amount of physical activity. The minimum recommendation is 30 minutes of moderate-intensity physical activity on most, preferably all, days of the week.[1,2] In 2001, 54.6% of people were not active enough to achieve this recommendation.[2]

Television viewing may be contributing to physical inactivity.[3-7] In fact, television viewing is the most prevalent sedentary activity for the majority of children and some age groups in adults.[7,8] Combined data for children, teens, women, and men indicate viewing time each week to be 28 hours and 13 minutes, or roughly 4 hours of viewing time per day.[8] The hours/minutes viewed per day for men and women 25-54 years old are 3:56 and 4:22, respectively, and 2:48 in both 5- to-11-year-olds and 12-to-17-year-olds.[8] Additionally, other data indicate that 5-to-7-year-olds and 8-to-18-year-olds are watching television and videos and playing video games an average of 2.5 hours per day and 4.5 hours per day, respectively.[9]

It may be that television watching and other screen-based behaviors (i.e., computer and video games) are contributing to the sedentary lifestyle many Americans now live. There have only been a small number of experimental studies conducted on sedentary activities (or television viewing) and physical activity. Robinson found that decreasing sedentary behaviors (television viewing, videotape, and video game use) does not increase physical activity levels.[10] Other studies have focused on multiple interventions (unlike the current study, wherein limiting screen time was the only intervention) but have been inconsistent in terms of intervention effectiveness.[10-13] The literature does

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indicate that weight loss can occur, body fat percentage can decrease, and/or skin folds can decrease when sedentary behaviors are also decreased.[10-13]

One meta-analysis considered the relationship between media use, body fatness, and physical activity in children and youths.[14] It was noted that only a small inverse relationship existed between television viewing and physical activity.[14] Given that only a few experimental studies have been conducted, resulting in inconsistent results, the present study was designed to consider the relationship between physical activity and leisure-based screen time in a true experimental design.

The purpose of this study was to assess the relationship between leisure-based screen time and physical activity in families and to determine whether assignment to a limited screen time group results in more physical activity. Leisure-based screen time was any kind of sedentary activity that involved a screen-based activity: watching television or a video, playing video games, using handheld gaming devices, or similar computer screen activities counted as leisure-based screen time. Homework or work-related screen time did not count as leisure-based screen time.

METHODS

Recruitment

Ninety-four families participated in this study for six weeks. The families were recruited through multiple advertising techniques. Flyers were handed out at elementary schools, middle schools, churches, and public libraries, and information regarding the study was printed in local newspapers. Interested families were sent an e-mail with the details of the study and were asked to provide additional information. Follow-up phone calls were made, and any questions were addressed. Eligible families were then asked whether they wanted to participate. A family was defined as having a mother, father, and at least two children living in the home, ranging in age from 5 to 18 years. To be in the study, families had to meet the following criteria: a parent home when children arrived home from school, and internet access to read e-mails sent during the study. Families with limited or no television privileges were excluded from the study. All data collection and analyses were conducted in 2005, and participants signed informed consent and assent forms. The study was approved by the institutional review board. There were no incentives provided for participation.

Design

Each family was randomly assigned to one of three screen time groups: (1) unlimited viewing group, (2) 2-hour limit group, and (3) 1-hour limit group. Baseline data was not obtained because randomization allows for the assumption that the groups are alike or equal at the beginning of the study.[15,16] This type of design also overcomes the potential "testing by treatment" effect that can threaten both external and internal validity.[15]

Families in the intervention groups were allowed a maximum individual amount of screen time per day per person. The unlimited viewing group was instructed to continue living the same lifestyle without modifying behavior. The 2-hour-limit group was instructed to limit leisure-based screen time to two hours or less per day. Likewise, the 1-hour-limit group was instructed to limit leisure-based screen time to one hour or less per day.

Instruments and Measurement Methods

Each family member wore a Walk4Life LS 2505 (Walk4Life Inc., Plainfield, IL) pedometer to measure the number of steps taken each day. This pedometer is a valid instrument for assessing physical activity in children and adults.[17,18] Participants in the study wore a pedometer in the waistband of their shorts or pants near the left hip. Each person was instructed to participate in a pedometer placement activity as per manufacturer guidelines to ensure accurate placement. Participants were instructed to wear the pedometer each day, removing it only while sleeping, showering, or bathing. Pedometer belts were available for overweight or obese participants to ensure that the instrument was nearly perpendicular to the ground.

Physical activity reactivity from wearing the pedometer was not a concern. Reactivity is a change in normal activity patterns when people are aware that their activity is being monitored. According to the literature, the duration of this study (six weeks) was much longer than necessary to achieve normal physical activity patterns. In children and adolescents, only 7 days of monitoring physical activity is essential to achieve reliable estimates.[19] Comparable guidelines suggest only five days of physical activity monitoring are required in 2nd, 4th, and 6th graders.[20] In addition, reliable physical activity estimates have been achieved in children in only 16 weekdays, and in adults in only 2 weeks.[21]

At the end of each day, the total steps and total amount of leisure-based screen time that occurred for that day were recorded on a daily log for each participant. Screen time logs accounted for 10-minute intervals of time during which any leisure-based screen time occurred during a 24-hour period for each day of the study. Parents were asked to complete daily logs for younger children who needed assistance.

Participant Orientation

An orientation meeting was conducted for all participants. The principal investigator visited homes of families unable to attend the meeting and gave the same instructions as were given in the meeting. The importance of filling out daily logs and reporting leisure-based screen time and step counts honestly and accurately were emphasized. To determine body-mass index (BMI), weight and height data were collected using valid instruments and accepted protocol. Medical scales (weight) and wall-mounted measuring tapes (height) were available at orientation meetings and also taken to family's homes for participants, mainly children, who did not attend the orientation meeting. A trained researcher collected the anthropometric data. In some cases, parents self-reported height and weight data for themselves and their children. Collecting weight and height data were important so BMI could be calculated and controlled for

in the analyses.

The first week of the study was an acclimation period for participants to become familiar with the pedometer, and to make wearing the pedometer a habit. This was also a time to develop a routine to accurately complete the daily logs. Families were unaware week one was an acclimation period. Week one data were not included in any analyses.

To maintain the integrity of the study, families were instructed not to talk with other families participating in the study until the study was finished. As a way of communicating with families, group-assignment-specific e-mails were sent three times per week (Monday, Wednesday, and Friday). The e-mails offered encouragement, support, and served as reminders of participant responsibilities.

Treatment of the Data

To calculate averages for steps and screen time, participants needed accurate and complete data for at least 3 of 5 weekdays and 1 of 2 weekend days each week of the study. At the conclusion of the study, intraclass correlations were calculated for steps and screen time. An intraclass correlation of at least .80 or higher was the cut-point for determining the minimum number of weeks needed to compute average for number of steps and screen time minutes. It was found that only two weeks of data were needed to calculate a mean; however, the total number of qualifying weekly means was used to calculate the mean because the intraclass correlation increased as weeks increased.

Weekly totals for steps and screen time were computed for the last five weeks of the study. The weekly totals were then used to create an overall mean and converted into a daily averages for leisure-based screen time and steps. Analyses were performed for all participants. Additional subgroup analyses were computed for adults only, all children, 5-to-12-year-olds, and 13-to-18-year-olds. Initial analyses indicated there were no differences between the 2-hour-limit and 1-hour-limit groups in terms of average number of steps taken; consequently, the two screen-time-limited groups were combined for additional analyses.

ANOVA was used to compute between group differences for steps while controlling for gender and BMI. ANOVA was also used to identify differences between steps and gender. Correlation was used to determine whether relationships existed between steps and BMI. All analyses were performed using SPSS (Version 11.5, Chicago, IL).

RESULTS

The age-specific demographic and descriptive data for average number of steps per day and average leisure-based screen time in minutes per day are presented in Table 1. Intraclass correlations for adults, 5-to-12-year-olds, and 13-to-18-year-olds were .885 or higher for steps and leisure-based screen time between each of the five weeks of data collection, indicating that only two weeks of data were needed to calculate an overall mean (see Table 2). The response rates for this study were high. Of the families contacted, more than 97% agreed to participate, and only five families out of 102 dropped out.

All Participants

Daily average steps for all participants combined between the unlimited and limited viewing groups were 9,443 and 9,778, respectively, and were statistically significantly different from each other ($F(1,401)=4.88$, $p\leq.028$) when controlling for gender and BMI (see Table 3). There was a statistically significant inverse correlation between BMI and average steps ($r=-.252$, $p\leq.001$), and no differences were noted between gender and steps ($F(1,171)=0.003$, $p\leq.954$).

Adults

Daily average steps for adults only when controlling for gender and BMI were not statistically significantly different from each other ($F(1,165)=0.81$, $p\leq.369$) for the unlimited and limited viewing groups (8,259 and 8,512, respectively) (see Table 3). There was a statistically significant inverse correlation between BMI and average steps ($r=-.252$, $p\leq.001$), and no differences were seen between gender and steps ($F(1,171)=0.003$, $p\leq.954$).

All Children

When including all children together and controlling for gender and BMI, daily average steps for the limited and unlimited groups (10,317 and 10,672, respectively) were statistically significantly different from each other ($F(1,232)=5.26$, $p\leq.023$) (Table 3). Correlational analysis in the children showed a statistically significant inverse relationship between BMI and average steps ($r=-.256$, $p<.001$), and statistically significant differences were also noted between average steps and gender ($F(1,237)=26.68$, $p\leq.001$), with boys averaging more steps per day than girls (Table 1).

5-to-12-Year-olds

In more specific age-group analyses, daily average steps for the unlimited and limited 5-to-12-year-old viewing groups (controlling for gender and BMI) were 10,414 and 11,044, respectively ($F(1,165)=5.63$, $p\leq.019$), and were statistically different from each other (see Table 3). Average steps and BMI were not statistically significantly correlated; however, statistically significant differences between steps and gender, in favor of the boys ($F(1,167)=22.68$, $p\leq.001$), existed (Table 1).

13-to-18-Year-olds

Finally, analysis of variance was conducted in the 13-to-18-year-olds for average steps-by-group assignment. Daily average steps (controlling for gender and BMI) for the unlimited and limited viewing groups were 10,002 and 9,829, respectively ($F(2,63)=0.21$, $p\leq.647$), and were not statistically different from each other (see Table 3). A statistically significant inverse correlation was found between BMI and average steps ($r=-.382$, $p\leq.001$), and statistically significant differences between gender and average steps were also seen ($F(1,68)=6.28$, $p\leq.015$). Again, the boys averaged more steps per day than the girls (Table 1).

DISCUSSION

The purpose of this study was to assess the relationship between leisure-based screen time and physical activity in families and to determine whether assignment to a limited screen time group results in more

Table 1. Demographic and Descriptive Statistics for Adults, 5-to-12-Year-Olds, and 13-to-18-Year-Olds

		Female			Male			Total		
		N	Mean	SD	N	Mean	SD	N	Mean	SD
Adults										
Age (years)		92	39.12	5.95	93	40.99	5.51	185	40.06	5.73
Height (in)		92	66.46	3.05	93	71.03	3.40	185	68.75	3.23
Weight (lbs)		89	162.36	38.36	92	196.25	35.92	181	179.31	37.14
BMI		89	25.76	5.30	92	27.34	4.65	181	26.55	4.98
Steps/day	Unlimited group	31	8,263.42	3,781.37	28	8,116.40	2,820.88	59	8,193.65	3,332.51
	Limited group	57	8,447.58	2742.68	57	8,554.87	3,408.12	114	8,501.22	3,080.10
Screen time (min/day)	Unlimited group	32	84.20	60.03	32	86.22	61.91	64	85.21	60.50
	Limited group	60	57.55	39.63	61	55.51	39.63	121	56.52	34.15
5-to-12-year-olds										
Age (years)		100	8.86	2.12	90	8.78	2.07	190	8.82	2.10
Height (in)		100	54.29	6.42	90	53.60	5.53	190	53.95	5.98
Weight (lbs)		100	75.84	30.32	90	70.46	20.77	190	73.15	25.55
BMI		100	17.49	3.80	90	16.90	2.67	190	17.20	3.24

physical activity. Statistically significant differences were not found in physical activity between the groups among 13-to-18-year-olds ($p \leq .647$) or adults ($p \leq .369$). Thus, reducing leisure-based screen time may not increase physical activity in these age groups. However, the results of this study indicate that a treatment designed to reduce leisure-based screen time may influence physical activity in 5-to-12-year-olds. In this particular age group, more leisure-based screen time was indicative of lower average steps when screen time was limited to 2 hours or less per day. When BMI and gender were controlled, the 5-to-12-year-olds in the limited viewing group averaged statistically significantly ($p \leq .019$) more steps each day than the unlimited viewing group.

According to the results, 5-to-12-year-old girls in the limited viewing group had about 880 more steps each day than girls in the unlimited viewing group. This means girls in the limited viewing group would average 6,158 more steps each week and 320,200 more steps each year. Furthermore, 5-to-12-year-old boys in the limited viewing group had about 1,120 more steps each day than boys in the unlimited viewing group. This equates to roughly 7,838 and 407,428 more steps per week and per year, respectively. For both genders this represents an increase in steps of about 9% per day. Unfortunately, the average stride length of 5-to-12-year-olds is variable. Thus, translating 9% more steps per day into weekly and/or yearly mileage would be difficult to calculate.

The eta-squared value or effect sizes for this study were small in all age groups. Only a small percentage of the variance in steps can be accounted for by the treatment or group assignment. The 5-to-12-year-olds had an effect size of just over 3%. The significance in this age group may be attributed to the large N and therefore high power. Nevertheless, although the difference in mean steps is real for this age group, there are probably additional confounding factors contributing to differences in steps. Group assignment accounts for only a small amount of the variance in steps.

The participants appeared to follow their

Table 1. Demographic and Descriptive Statistics for Adults, 5-to-12-Year-Olds, and 13-to-18-Year-Olds (cont.)

		Female			Male			Total		
		N	Mean	SD	N	Mean	SD	N	Mean	SD
Steps/day	Unlimited group	23	9,168.31	2,590.41	35	11,232.99	2,417.00	58	10,414.24	2,666.93
	Limited group	63	10,047.98	2,106.26	48	12,352.30	3,774.72	111	11,044.44	3,146.99
Screen time (min/day)	Unlimited group	26	115.20	43.04	36	113.52	58.52	62	114.22	52.20
	Limited group	70	61.01	24.59	54	71.44	28.67	124	65.56	26.84
13-to-18-year-olds										
Age (years)		48	15.17	1.58	49	14.57	1.50	97	14.86	1.54
Height (in)		46	64.65	3.13	48	68.26	4.17	94	66.46	3.65
Weight (lbs)		45	127.18	25.17	48	142.42	39.84	93	134.80	32.51
BMI		45	21.45	4.04	48	21.26	4.90	93	21.36	4.47
Steps/day	Unlimited group	9	8,851.43	1,894.85	12	10,652.42	2,175.80	21	9,880.57	2,207.71
	Limited group	25	9,114.96	2,222.21	24	10,572.77	3,345.98	49	9,828.99	2,894.10
Screen time (min/day)	Unlimited group	14	82.27	72.90	16	116.51	65.88	30	100.53	70.20
	Limited group	33	59.47	36.42	31	71.61	31.18	64	65.35	34.27

specific leisure-based screen time instruction considering that screen time decreased from the unlimited viewing group to the limited viewing group, in all age groups. Interestingly the average screen times, which included all screen time activities (not just television viewing), for all study participants did not approximate reported viewing times for other adults or children, according to the Nielsen report.[8] The average screen times being lower than typical national viewing times may be indicative of a Hawthorne Effect.

Screen time for the adults, 5-to-12-year-olds, and 13-to-18-year-olds in the unlimited viewing groups averaged 85.21, 114.36, and 100.53 minutes per day, respectively. None of the age groups averaged more than two hours per day of screen time, even the unlimited viewing group. This amount of screen time was less than expected. Nielsen Media Research reports that 25-to-54-year-olds have an average television viewing time of about four hours (240 minutes) each day, while 2-to-17-year-olds have an average television viewing time of almost three hours (180 minutes) per day.[8] According to this report, adults, 5-to-12-year-olds, and 13-to-18-year-olds in our study averaged three hours less, one hour less, and 80 minutes less screen time per day, respectively.

Involvement in this study may have changed behaviors of participants, even in the unlimited viewing group. The instructions for the unlimited viewing group were to continue living the same lifestyle, without behavior modification. The anticipation was that screen time and physical activity habits would not change because of involvement in this study. Either the families involved do not watch a typical amount of television compared to national averages, or there may have been a potential study effect. Adult and child participants may also have been guilty of underreporting or losing track of screen time for themselves or for a young child,

Table 2. Intraclass Correlations for Steps and Leisure-Based Screen Time

Weeks	Steps	Screen Time
Adults		
2,3	.900	.902
2,3,4	.940	.934
2,3,4,5	.953	.943
2,3,4,5,6	.965	.954
5-to-12-year-olds		
2,3	.885	.892
2,3,4	.924	.903
2,3,4,5	.889	.924
2,3,4,5,6	.912	.941
13-to-18-year-olds		
2,3	.919	.909
2,3,4	.892	.928
2,3,4,5	.925	.952
2,3,4,5,6	.938	.964

given that this data was self-reported.

In terms of average steps, the President's Challenge makes some interesting recommendations and is used for comparison to this study. The President's Challenge recommends adults get at least 10,000 steps per day.[22] Average steps per day for adults in the unlimited and limited viewing groups were 8,193 and 8,501, respectively. Hence, average step recommendations were not achieved in either of the groups. Based on recent evidence, Tudor-Locke and Bassett[23] offer the following classification for pedometer-determined physical activity in healthy adults: (1) <5,000 steps per day (sedentary lifestyle); (2) 5,000-7,499 (low active); (3) 7,500-9,999 (somewhat active); (4) 10,000-12,499 (active); (5) >12,500 (highly active).

According to these guidelines, the adults in this study would be considered "somewhat active." Additionally, a range of about 6,000-7,000 steps per day indicates normal daily activity (not including physical activity from sports or exercise).[23] It appears the adults in this study had more steps than a sedentary or low-active adult, but pedometers were also worn for all activities, including exercise and sports.

The President's Challenge recommends that 6-to-17-year-old girls and boys get at least 11,000 and 13,000 steps per day, respectively.[22] Likewise, other research suggests that 6-to-12-year-old girls and boys average 11,000 and 13,000 steps per day, respectively.[24] The 5-to-12-year-olds average steps per day in the unlimited and limited viewing groups were 10,414 and 11,044, respectively. As seen in Table 1, neither the boys nor girls met the recommendation. However, the 5-to-12-year-olds averaged more steps per day compared to the 13-to-18-year-olds. This finding is consistent with other research that indicates children (grades 1-6) achieve more steps than adolescents (grades 7-12).[25] The 13-to-18-year-old boys averaged more steps per day than girls in the limited viewing group (10,572 vs. 9,114) but still did not meet current recommendations.[22,24]

One reason physical activity recommendations were not achieved may be related to the seasonal influence on study participants. The study took place during the last 3 weeks of January and the first 3 weeks of February. Salt Lake City, Utah, is located approximately 40-85 miles from the geographic areas of the study. According to Salt Lake City Climate Data, the average temperature for January was 34.4° F, with 1.44 inches of precipitation and 6.7 inches of snowfall.[26] The average temperature for February was 35.0° F, with 1.23 inches of precipitation and 11.3 inches of snowfall.[26] If this study were conducted at a different time of year, perhaps participants in the limited screen time groups would achieve more steps per day compared to the unlimited viewing groups. Then again, warmer weather would permit the same opportunity for physical activity in the unlimited viewing group.

Furthermore, with school in session the majority of the children's days were spent in a classroom; this is another factor that may have influenced the results. It would also not be unexpected for parents of children to limit screen time in order to prevent it from interfering with a child's homework and other school activities no matter what the group assignment. If this study happened when school was not in session, the unlimited viewing groups may have acquired more screen time as the opportunity for screen time could be more frequent.

Many factors were taken into consideration when determining how the leisure-based screen time groups should be constructed for this study. Although having a group without any leisure-based screen time was discussed, we chose not to include a group like this because of anticipated poor compliance. However, having a randomized trial with a no-screen-time group may result in different findings.

Although we did not measure weight loss, body fat, or skinfolds, we found a similar relationship with BMI and physical activity. Participants BMIs were associated with physical activity levels. A higher BMI was indicative of lower activity levels, meaning BMI and physical activity had a negative relationship.

Future research may consider a study at a warmer time of year, when weather may not be as much of a factor and the opportunity for outside play or physical activity is not limited by climate. Perhaps steps were lower than the recommended amount because of the seasonal influence. In fact, for adults

living in the United States, the months of January (35.3%) and February (35.0%) have the highest percentages of no leisure-time physical activity, and June (24.7%) has the lowest rate of no leisure-time physical activity.[27] Also, conducting this study when school is not in session and the majority of the day is not spent at school may result in different findings.

Future research may also consider a larger sample size in order to have an adequate number of participants for all groups. The intraclass correlations indicate children and adults have the same type of behaviors each week related to the variables of interest. A valuable finding of this study that may impact future research was that only two weeks of data were needed for determining typical means on steps and screen time. The intraclass correlations in the children and adults were .885 or higher for steps and screen time. Performing a study like this for only three weeks time (using the first week as an acclamation period), instead of six weeks, would reduce the burden for both researchers and study participants.

Other experimental or quasi-experimental studies may limit screen time and additionally provide play and activity opportunities, with one group asked to only limit screen time and another group asked to both limit screen time and increase physical activity or be provided with activity opportunities. It could be that an active behavior is not automatically adopted simply by eliminating a sedentary behavior. It may be possible to determine if limiting screen time with physical activity encouragement makes it possible to achieve more physical activity than only limiting screen time. Such encouragement could also be studied for effectiveness in a variety of settings such as school, pediatric offices, and home.

The conclusion of this study is that decreasing leisure-based screen time does not statistically significantly increase physical activity for everyone. Decreasing leisure-based screen time increased physical activity levels in the 5-to-12-year-old girls and boys in the limited viewing group. They averaged 630 more steps per day, compared to the unlimited viewing group.

Table 3. ANOVA for Average Daily Steps by Screen Time Group: Controlling for Gender and BMI

	Screen Time Group				
Variable	Unlimited Mean ± SD	Limited Mean ± SD	F	p	eta-squared
All participants	(n=132) 9444 ± 3112	(n=273) 9778 ± 3277	4.88	.028*	.012
All adults	(n=56) 8259 ± 3391	(n=113) 8512 ± 3092	0.81	.369	.005
All children	(n=76) 10317 ± 2581	(n=160) 10672 ± 3114	5.26	.023*	.022
5-to-12-year-olds	(n=58) 10414 ± 2667	(n=111) 11044 ± 3147	5.63	.019*	.033
13-to-18-year-olds	(n=18) 10002 ± 2323	(n=49) 9829 ± 2894	0.21	.647	.003

* Indicates significance at the p≤.05 level

Translation to Health Education Practice

Television viewing and other screen-based behaviors have been blamed for many social problems, not the least of which is physical inactivity. It appears from the results of this study and others that leisure screen time may not be a primary cause of low physical activity levels.[10] There are other obvious factors that contribute to physical inactivity, such as desk jobs, school, and lack of resources, to name a few. Maybe if the focus of attention was shifted from decreasing leisure screen time to encouraging and providing opportunities for physical activity, individuals would become more active.

Wearing pedometers may also help children, teenagers, and adults increase their physical activity. As a side note to the results of the current study, it was observed that some children and adults appreciated wearing a pedometer to see how many steps they took each day. After the study ended, some adult participants purchased pedometers for their families because the instruments were the incentive needed to be active. Pedometer contests among or within classrooms, families, or even communities may be one way to inexpensively promote increased physical activity levels.

Parents and educators need to be good examples of being physically active. It is possible for active parents to positively influence children.[28-30] Parents could be encouraged to provide physical activity opportunities for their children by going on family hikes, taking bike rides, or playing kickball in the backyard. Health educators and teachers could encourage children to be more physically active during recess and other leisure time, rather than engaging in sedentary activities. In conclusion, physical activity encouragement from parents, spouses, educators, and siblings, and the creation of more physical activity opportunities, could all be helpful in efforts to increase physical activity in adults and children when leisure-based screen time is decreased. Otherwise, other sedentary activities may only replace the time not spent in front of a screen.

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