Reducing Children’s Television Viewing to Prevent Obesity
A Randomized Controlled Trial

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The United States has experienced alarming increases in obesity among children and adolescents.1 However, most available treatments for obese children have yielded only modest, unsustainable effects.2 Consequently, prevention is considered to hold the greatest promise.3 Unfortunately, most prevention programs that specifically attempt to reduce fat and energy intake and increase physical activity have been ineffective at changing body fatness.4,5 As a result, there is a need for innovative approaches to prevent obesity.

There is widespread speculation that television viewing is one of the most easily modifiable causes of obesity among children. American children spend more time watching television and videotapes and playing video games than doing anything else except sleeping.6 Two primary mechanisms by which television viewing contributes to obesity have been suggested: reduced energy expenditure from displacement of physical activity and increased dietary energy intake, either during viewing or as a result of food advertising.

Cross-sectional epidemiological studies have consistently found relatively weak positive associations between television viewing and child and adolescent adiposity.7-21 Prospective studies are less common and have produced mixed results.18 The consistently weak associations found in epidemiological studies may be due to the measurement error in self-reports of television viewing. As a result, additional epidemiological studies would not be expected to clarify the true nature of this relationship.22

Context Some observational studies have found an association between television viewing and child and adolescent adiposity.

Objective To assess the effects of reducing television, videotape, and video game use on changes in adiposity, physical activity, and dietary intake.

Design Randomized controlled school-based trial conducted from September 1996 to April 1997.

Setting Two sociodemographically and scholastically matched public elementary schools in San Jose, Calif.

Participants Of 198 third- and fourth-grade students, who were given parental consent to participate, 192 students (mean age, 8.9 years) completed the study.

Intervention Children in 1 elementary school received an 18-lesson, 6-month classroom curriculum to reduce television, videotape, and video game use.

Main Outcome Measures Changes in measures of height, weight, triceps skinfold thickness, waist and hip circumferences, and cardiorespiratory fitness; self-reported media use, physical activity, and dietary behaviors; and parental report of child and family behaviors. The primary outcome measure was body mass index, calculated as weight in kilograms divided by the square of height in meters.

Results Compared with controls, children in the intervention group had statistically significant relative decreases in body mass index (intervention vs control change: 18.38 to 18.67 kg/m² vs 18.10 to 18.81 kg/m², respectively; adjusted difference, −0.02 [95% CI, −0.03 to −0.01]; P = .002), triceps skinfold thickness (intervention vs control change: 14.55 to 15.47 mm vs 13.97 to 16.46 mm, respectively; adjusted difference, −2.30 cm [95% CI, −3.27 to −1.33]; P < .001), and waist-to-hip ratio (intervention vs control change: 0.83 to 0.82 vs 0.83 to 0.84, respectively; adjusted difference, −0.02 [95% CI, −0.03 to −0.01]; P < .001). Relative to controls, intervention group changes were accompanied by statistically significant decreases in children’s reported television viewing and meals eaten in front of the television. There were no statistically significant differences between groups in changes in high-fat food intake, moderate-to-vigorous physical activity, and cardiorespiratory fitness.

Conclusions Reducing television, videotape, and video game use may be a promising, population-based approach to prevent childhood obesity.
A causal relationship can only be demonstrated in an experimental trial, in which manipulation of the risk factor changes the outcome. Therefore, we conducted a randomized, controlled, school-based trial of reducing third- and fourth-grade children’s television, videotape, and video game use to assess the effects on adiposity and the hypothesized mechanisms of physical activity and dietary intake. We hypothesized that compared with controls, children exposed to the television reduction intervention would significantly decrease their levels of adiposity.

METHODS

All third- and fourth-grade students in 2 public elementary schools in a single school district in San Jose, Calif, were eligible to participate. Schools were sociodemographically and scholastically matched by district personnel. School principals and teachers agreed to participate prior to randomization. Parents or guardians provided signed written informed consent for their children to participate in assessments and for their own participation in telephone interviews. One school was randomly assigned to implement a program to reduce television, videotape, and video game use. The other school was assigned to be an assessments-only control. Participants and school personnel, including classroom teachers, were informed of the nature of the intervention but were unaware of the primary hypothesis. The study was approved by the Stanford University Panel on Human Subjects in Research, Palo Alto, Calif.

Intervention

To test the specific role of television, videotape, and video game use in the development of body fatness, as well as effects on dietary intake and physical activity, it was necessary to design an intervention that decreased media use alone without specifically promoting more active behaviors as replacements. This was accomplished by limiting access to television sets and budgeting use while simultaneously becoming more selective viewers or players.

The intervention, which was based in Bandura’s social cognitive theory, consisted of incorporating 18 lessons of 30 to 50 minutes into the standard curriculum that was taught by the regular third- and fourth-grade classroom teachers. The teachers were trained by the research staff, and the majority of lessons were taught during the first 2 months of the school year. Early lessons included self-monitoring and self-reporting of television, videotape, and video game use to motivate children to want to reduce the time they spent in these activities. These lessons were followed by a television turnoff, during which children were challenged to watch no television or videotapes and play no video games for 10 days. After the turnoff, children were encouraged to follow a 7-hour per week budget. Additional lessons taught children to become “intelligent viewers” by using their viewing and video game time more selectively. Several final lessons enlisted children as advocates for reducing media use. The entire curriculum consisted of approximately 18 hours of classroom time. Newsletters that were designed to motivate parents to help their children stay within their time budgets and that suggested strategies for limiting television, videotape, and video game use for the entire family were distributed to parents.

To help with budgeting, each household also received an electronic television time manager (TV Allowance, Mindmaster, Inc, Miami, Fla). This device locks onto the power plug of the television set and monitors and budgets viewing time for each member of the household through use of personal identification codes. Because it controls power to the television, it also controls video cassette recorder (VCR) and video game use. Families could request additional units for every television in their homes, at no cost.

Outcome Measurements

Assessments were performed by trained staff, blinded to the experimental design, at baseline (September 1996) and after the completion of the intervention (April 1997). At each time point, on the same days in both schools, children completed self-report questionnaires on 2 non-Monday weekdays. A research staff member read each question out loud. Classroom teachers did not participate in the assessments. Physical measures were performed during 2 physical education periods at each time point, by the same staff in both schools. Parents were interviewed by telephone at baseline and after the intervention by trained interviewers following a standardized protocol. Parents, children, and teachers were not aware that the primary outcome was adiposity.

Body mass index (BMI), defined as the weight in kilograms divided by the square of the height in meters, was the primary measure of adiposity. Standing height was measured using a portable direct-reading stadiometer and body weight was measured using a digital scale, according to established guidelines. Test-retest reliabilities were high (intraclass Spearman $r=0.99$ for height, $r>0.99$ for weight). Triceps skinfold thickness was included as a measure of subcutaneous fat and was measured on the right arm, according to established guidelines. Test-retest reliability was $r>0.99$ and skinfold thickness was highly correlated with BMI ($r=0.82$).

Waist and hip circumferences were measured with a nonelastic tape at the level of the umbilicus and the maximal extension of the buttocks, respectively, according to established guidelines. Test-retest reliabilities were $r>0.99$. Waist and hip circumferences were correlated with BMI ($r=0.87$, $r=0.90$, respectively) and triceps skinfold thickness ($r=0.72$, $r=0.78$, respectively). The waist-to-hip ratio was calculated as a measure of body fat distribution.

Children reported the time they spent “watching television,” “watching movies or videos on a VCR,” and “playing video games,” separately for before school and after school, “yesterday” and “last Saturday” on the first assessment day, and “yesterday” on the second assessment day. Prior to reading these items, the research staff led children
through several participatory time-
estimating exercises. This instrument was
adapted from a similar instrument pre-
viously used in young adolescents with
high test-retest reliability (r = 0.94).35

Parents estimated the amount of time
their child spent watching television,
watching videotapes on the VCR, and
playing video games on a typical school
day and on a typical weekend day. Simi-
lar items have produced accurate es-
timates compared with videotaped
observation.30 There was moderate
agreement between parent and child re-
ports of children’s media use (Spear-
man r = 0.31, P < .001 for television view-
ing; r = 0.17, P = .03 for videotape view-
ing; r = 0.49, P < .001 for video game
playing). A previously validated 4-item
instrument was used to assess overall
household television viewing.31

Children and parents also estimated
the amount of time the child spent in
other sedentary behaviors, including,
using a computer, doing homework,
reading, listening to music, playing a
musical instrument, doing artwork or
crafts, talking with parents, playing
quiet games indoors, and at classes or
clubs (parent-child agreement Spear-
man r = 0.16, P < .05).

On both days children reported their
previous day’s out-of-school physical
activities, using a previously validated
activity checklist.32 Responses from the
2 days were averaged and weighted for
levels of intensity using standard en-
ergy expenditure estimates.33 Parents es-
imated the amount of time their child
spent in organized physical activities
(such as teams or sports classes) and
nonorganized physical activities (such as
playing sports, bicycling, rollerblad-
ing, etc) (parent-child agreement Spear-
man r = 0.16, P = .05).

On both days, children completed
1-day food frequency recalls for 60
foods in 26 food categories, based on
instruments previously validated in
third- through sixth-grade chil-
dren.34,35 High-fat foods were those pre-
viously identified as the major con-
tributors of fat in the diets of children35
and adults,36 and were identified
through focus groups with children,
parents, and school lunch personnel.
Highly advertised foods included 3 cat-
egories representing sugary cereals, car-
bonated soft drinks, and foods from
fast-food restaurants.

Children also reported how often
they ate breakfast and dinner in a room
with the television turned on during the
past week, on 4-point scales ranging
from never to every day, and they re-
ported the proportion of time they were
eating or drinking a snack (not includ-
ing meals) while watching television or
videotapes or playing video games, on
a 3-point scale. Parents responded to
the same questions about their chil-
dren, reporting the number of days in
the last week for meals (parent-child
agreement Spearman r = 0.24, P = .003)
and the percentage of time for snack-
ing (parent-child agreement Spear-
man r = 0.02, P > .05).

The maximal, multistage, 20-m,
shuttle run test (20-MST) was used to
assess cardiorespiratory fitness.37 The
20-MST has been found to be reliable
(test-retest r = 0.73-0.93),37-39 a valid
measure of maximum oxygen con-
sumption as measured by treadmill test-
ing (r = 0.69-0.87),38-42 and sensitive to
change42 in children.

**Statistical Analysis**

Baseline comparability of interven-
tion and control groups was assessed
using nonparametric Wilcoxon rank
sum tests for scaled variables and χ2
tests for categorical variables. As a pri-
mary prevention program, the inter-
vention was designed to target the en-
tire sample. Effects were expected and
intended to occur throughout the en-
tire distribution of adiposity in the
sample—not just around a defined
threshold. Thus, for purposes of estab-
lishing the efficacy of this interven-
tion, it is most appropriate to compare
the full distributions of BMI between
intervention and control groups. There-
fore, to test the primary hypothesis, ac-
counting for the design with school as
the unit of randomization (adjusting
for intraclass correlation), a mixed-
model analysis of covariance ap-
proach was used, with postinterven-
tion BMI as the dependent variable; the
intervention group (intervention vs con-
trol) as the independent variable;
and baseline BMI, age, and sex as co-
variates (SAS MIXED procedure, SAS
version 6.12, SAS Institute Inc, Cary,
NC).43 The same analysis approach was
used for all secondary outcome vari-
bles, triceps skinfold thickness, waist
and hip circumferences, waist-to-hip ra-
tio, and measures of dietary intake and
physical activity. Each outcome also was
tested for intervention by sex and in-
tervention by age interactions. All analy-
yses were completed on an intention-
to-treat basis, and all tests of statistical
significance were 2-tailed with α = .05.

With an anticipated sample size of ap-
proximately 100 participants per group
and using the above analysis, the study
was designed to have 80% power to de-
tect an effect size of 0.20 or greater. This
corresponded to estimated differences
between groups of about 0.75 BMI
units, 1.2 mm of triceps skinfold, 1.8
cm of waist circumference, and 2 hours
per week of television, videotape, and
video game use.

In children of this age, BMI, triceps
skinfold thickness, waist circumference,
and hip circumference were all ex-
pected to increase over the course of the
experiment, as part of normal growth,
in both the intervention and control
groups. Therefore, effect sizes are re-
ported as changes in the intervention
group relative to changes in the con-
trols (relative differences). A negative
difference is termed a relative decrease
in comparison with the controls, even
if the actual value increased as a result
of normal growth and development.

**RESULTS**

The study design and participation are
shown in the Figure. Ninety-two
(86.8%) of 106 eligible children in the
intervention school and 100 (82.6%) of
121 eligible children in the control
school participated in baseline and
postintervention assessments. Interven-
tion and control participants, re-
spectively, were comparable in age
(mean [SD], 8.95 [0.64] vs 8.92 [0.70]
years, P = .69), sex (44.6% vs 48.5%
girls, $P = .59$), mean (SD) number of televisions in the home (2.7 [1.3] vs 2.7 [1.1], $P = .56$), mean (SD) number of video game players (systems) (1.5 [2.3] vs 1.2 [1.7], $P = .49$) and percentage of children with a television in their bedroom (43.5% vs 42.7%, $P = .92$). Physical measures but not self-reports were included in the analysis for 11 children who were classified by their teachers as having limited English proficiency or having a learning disability.

Baseline and postintervention telephone interviews were completed by 68 (71.6%) and 75 (72.8%) of the parents of participating children in the intervention and control schools, respectively. Intervention school parents reported greater maximum household education levels than participating control school parents (45% vs 21% college graduates, $P = .01$) but did not differ significantly in ethnicity (80% vs 70% white, $P = .19$), sex of respondent (82% vs 88% female, $P = .33$) or marital status (77% vs 67% married, $P = .22$).

**Figure. Study Design and Participant Flow**

**Participation in the Intervention**

Teachers reported teaching all lessons, although we did not collect detailed data determining whether the lessons were delivered as they were intended. Ninety-five (90%) of 106 students in the intervention school participated in at least some of the television turnoff and 71 (67%) completed the entire 10 days without watching television or videotapes or playing video games. During the budgeting phase of the intervention, 58 (55%) of the students turned in at least 1 signed parent confirmation that they had stayed below their television and videotape viewing and video game playing budget for the previous week. Forty-four parents (42%) returned response cards reporting they had installed the TV Allowance and 29 families (27%) requested 1 or more additional TV Allowances.

**Effects on Adiposity**

Results of anthropometric measures are presented in Table 1. At baseline, both groups were comparable ($P > .10$) on all baseline measures of body composition. As expected for children of this age, BMI, triceps skinfold thickness, waist circumference, and hip circumference all increased in both intervention and control children during the course of the school year. However, compared with controls, children in the intervention group had statistically significant relative decreases in BMI, triceps skinfold thickness, waist circumference, and waist-to-hip ratio (Table 1). There were no significant interventions by sex or intervention by age interactions for any of the body composition outcomes. The results did not change when ethnicity and parent education were included as additional covariates for children with completed parent interviews.

Although the sample size was insufficient to formally test for effects within subgroups, it was desirable to further characterize the effects of the intervention on participants with varying levels of adiposity, with a descriptive analysis. Intervention and control group changes were compared within strata defined by baseline levels of BMI, triceps skinfold, waist circumference, and waist-to-hip ratio. For all body composition measures, effects of the intervention occurred across the entire distribution of baseline adiposity, with greater intervention vs control differences evident among the middle and higher strata of body fatness.

**Effects on Media Use, Diet, and Physical Activity**

Child measures are presented in Table 2 and parent measures are presented in Table 3. Both groups were well matched at baseline, although intervention group children reported eating significantly more meals while watching television, and participating intervention group parents reported significantly less overall household television use and that their children spent significantly more time in other sedentary behaviors at baseline.

The intervention significantly decreased children’s television viewing, compared with controls, according to both child and parent reports (relative reductions of about one third from baseline). Intervention group children also reported significantly greater reductions in video game use than controls. The intervention also resulted in greater, but not statistically significant, decreases in parent reports of children’s video game use, parent and child reports of videotape viewing, and parent reports of overall household television viewing. There were no significant intervention by sex or intervention by age interactions for any of the media use outcomes.

The intervention significantly reduced the frequency of children eating meals in a room with the television turned on. Intervention group children also reported relative reductions in servings of high-fat foods compared with controls, although these differences were not statistically significant. There were no significant intervention effects on reports of children’s physical activity levels or performance on the 20-MST of phys-
COMMENT
This is the first experimental study to demonstrate a direct association between television, videotape, and video game use and increased adiposity. Because the intervention targeted reduction of media use alone, without substituting alternative behaviors, a causal

Table 1. Children’s Anthropometric Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Baseline</th>
<th>Postintervention</th>
<th>Adjusted Change (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>Control</td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td>Body mass index, kg/m²</td>
<td>18.38 (3.67)</td>
<td>18.10 (3.77)</td>
<td>18.67 (3.77)</td>
<td>18.81 (3.76)</td>
</tr>
<tr>
<td>Triceps skinfold thickness, mm</td>
<td>14.55 (6.06)</td>
<td>13.97 (5.43)</td>
<td>15.47 (5.95)</td>
<td>16.46 (5.27)</td>
</tr>
<tr>
<td>Waist circumference, cm</td>
<td>60.48 (9.91)</td>
<td>59.51 (8.91)</td>
<td>63.57 (8.96)</td>
<td>64.73 (8.91)</td>
</tr>
<tr>
<td>Hip circumference, cm</td>
<td>72.78 (8.91)</td>
<td>72.70 (8.78)</td>
<td>76.53 (7.94)</td>
<td>76.79 (8.37)</td>
</tr>
<tr>
<td>Waist-to-hip ratio</td>
<td>0.83 (0.05)</td>
<td>0.82 (0.05)</td>
<td>0.83 (0.06)</td>
<td>0.84 (0.05)</td>
</tr>
</tbody>
</table>

*Baseline and postintervention values are unadjusted mean (SD). At baseline, both groups were comparable (P > .10) on all measures of body composition.
†Change estimates and 95% confidence intervals (CIs) are the differences between intervention group and control group after adjustment by mixed-model analysis of covariance for the baseline value, age, and sex.

Table 2. Child Measures of Television Viewing, Diet, and Physical Activity and Fitness

<table>
<thead>
<tr>
<th>Measure</th>
<th>Baseline</th>
<th>Postintervention</th>
<th>Adjusted Change (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>Control</td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td>Hours per week</td>
<td>15.35 (13.17)</td>
<td>15.46 (15.02)</td>
<td>8.80 (10.41)</td>
<td>14.46 (13.82)</td>
</tr>
<tr>
<td>Television</td>
<td>4.74 (6.57)</td>
<td>5.52 (10.44)</td>
<td>3.46 (4.86)</td>
<td>5.21 (8.41)</td>
</tr>
<tr>
<td>Videotapes</td>
<td>2.57 (5.10)</td>
<td>3.85 (9.17)</td>
<td>1.32 (2.72)</td>
<td>4.24 (10.00)</td>
</tr>
<tr>
<td>Meats in front of television,</td>
<td>2.38 (1.75)</td>
<td>1.84 (1.78)</td>
<td>1.70 (1.49)</td>
<td>1.99 (1.78)</td>
</tr>
<tr>
<td>0-3 scale</td>
<td>Frequency of snacking in front of the television, 1-3 scale</td>
<td>2.20 (0.56)</td>
<td>2.15 (0.61)</td>
<td>1.94 (0.51)</td>
</tr>
<tr>
<td>Daily servings of high-fat foods</td>
<td>6.15 (3.63)</td>
<td>6.62 (5.85)</td>
<td>5.14 (3.50)</td>
<td>6.17 (4.88)</td>
</tr>
<tr>
<td>Daily servings of highly advertised foods</td>
<td>1.36 (0.96)</td>
<td>1.55 (1.20)</td>
<td>1.47 (1.10)</td>
<td>1.48 (1.06)</td>
</tr>
<tr>
<td>Other sedentary behaviors, h/d</td>
<td>4.66 (3.81)</td>
<td>4.47 (6.37)</td>
<td>3.81 (2.66)</td>
<td>4.05 (4.53)</td>
</tr>
<tr>
<td>Physical activity, metabolic equivalent–weighted, min/wk</td>
<td>396.8 (367.8)</td>
<td>310.2 (250.7)</td>
<td>362.3 (235.2)</td>
<td>337.8 (277.3)</td>
</tr>
<tr>
<td>20-m shuttle test, laps</td>
<td>15.21 (9.60)</td>
<td>14.80 (8.56)</td>
<td>19.72 (11.40)</td>
<td>18.18 (10.72)</td>
</tr>
</tbody>
</table>

*Baseline and postintervention values are unadjusted mean (SD).
†Change estimates and 95% confidence intervals (CIs) are the differences between groups after adjustment by mixed-model analysis of covariance for the baseline value, age, and sex.
‡Groups were significantly different (P < .05) at baseline by a nonparametric Wilcoxon rank sum test.

Table 3. Parent Reports of Children’s Television Viewing, Diet, and Physical Activity

<table>
<thead>
<tr>
<th>Measure</th>
<th>Baseline</th>
<th>Postintervention</th>
<th>Adjusted Change (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>Control</td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td>Children’s hours per week</td>
<td>12.43 (5.65)</td>
<td>14.90 (7.10)</td>
<td>8.86 (4.91)</td>
<td>14.75 (7.37)</td>
</tr>
<tr>
<td>Television</td>
<td>4.96 (4.21)</td>
<td>4.41 (3.72)</td>
<td>3.87 (2.87)</td>
<td>3.91 (3.21)</td>
</tr>
<tr>
<td>Videotapes</td>
<td>1.84 (2.73)</td>
<td>2.71 (3.78)</td>
<td>1.44 (1.96)</td>
<td>2.57 (4.41)</td>
</tr>
<tr>
<td>Overall household television use, 0-16 scale</td>
<td>7.09 (3.97)</td>
<td>8.60 (3.51)</td>
<td>6.09 (3.64)</td>
<td>7.76 (3.26)</td>
</tr>
<tr>
<td>No. of children’s meals eaten in front of the television, 0-14 meals</td>
<td>3.18 (3.69)</td>
<td>3.53 (3.71)</td>
<td>2.19 (2.95)</td>
<td>3.43 (3.64)</td>
</tr>
<tr>
<td>Percentage of children’s viewing when snacking</td>
<td>17.28 (20.91)</td>
<td>18.83 (41.24)</td>
<td>19.54 (22.43)</td>
<td>20.25 (22.70)</td>
</tr>
<tr>
<td>Children’s other sedentary behaviors, h/wk</td>
<td>44.89 (19.76)</td>
<td>39.79 (20.27)</td>
<td>41.31 (20.89)</td>
<td>43.37 (26.75)</td>
</tr>
<tr>
<td>Children’s physical activity, h/wk</td>
<td>11.19 (7.16)</td>
<td>9.19 (5.77)</td>
<td>16.08 (8.45)</td>
<td>17.21 (9.32)</td>
</tr>
</tbody>
</table>

*Baseline and postintervention values are unadjusted mean (SD).
†Change estimates and 95% confidence intervals (CIs) are the differences between groups after adjustment by mixed-model analysis of covariance for the baseline value, age, and sex.
‡Groups were significantly different (P < .05) at baseline by a nonparametric Wilcoxon rank sum test.
Some epidemiological studies have found weak inverse associations between hours of television viewing and physical activity and fitness. Our intervention did not result in a significant change in physical activity or cardiorespiratory fitness. However, because only moderate- and vigorous-intensity activities were assessed, it is also possible that reductions in television viewing resulted in increased energy expenditure via more low-intensity activity. This is consistent with the finding that reductions in television, videotape, and video game use did not result in compensatory increases in other sedentary pursuits. Larger experimental studies and improved measures of diet and activity are needed to more definitively assess the specific mechanisms that account for changes in adiposity in response to reduced television, videotape, and video game use.

With a few exceptions, previous prevention interventions that have attempted to increase physical activity and decrease dietary fat and energy intake have been relatively ineffective at reducing body fatness. In contrast, this intervention targeting only television, videotape, and video game use produced statistically significant and clinically significant relative changes in BMI, triceps skinfold thickness, waist circumference, and waist-to-hip ratio over a period of 7 months. These changes occurred over the entire sample, shifting the entire distribution of adiposity downward. Even a small shift downward in the population distribution of adiposity would be expected to have large effects on obesity-related morbidity and mortality. Additional experimental studies with larger and more sociodemographically diverse samples are needed to evaluate the generalizability of these findings. However, this study indicates that reducing television, videotape, and video game use may be a promising, population-based approach to help prevent childhood obesity.

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REFERENCES


25. Gortma...
CHILDREN'S TELEVISION VIEWING AND OBESITY PREVENTION


In science, read, by preference, the newest works; in literature, the oldest.
—Edward George Bulwer-Lytton (1803-1873)