Effects of a Mass Media Campaign to Increase Physical Activity Among Children: Year-1 Results of the VERB Campaign

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ABSTRACT. *Objective.* **To determine the effects of a mass media campaign on the levels of physical activity among children 9 to 13 years of age.**

Design. **A prospective, longitudinal, quasi-experimental design was used. A baseline survey was conducted in April to June 2002, before the launch of VERB advertising. Random-digit-dialing methods were used to survey a nationally representative sample of children and parents. The follow-up survey was repeated with the same cohort of children and parents in April to June 2003. Propensity scoring was used to determine the campaign's effects on awareness and physical activity behaviors.**

Setting. **United States.**

Participants. **A total of 3120 parent-child dyads.**

Intervention. **The VERB campaign is a multiethnic campaign that combines paid advertisements with school and community promotions and Internet activities to encourage children 9 to 13 years of age to be physically active every day. Launched in 2002 by the Centers for Disease Control and Prevention, VERB uses commercial marketing methods to advertise being physically active as cool, fun, and a chance to have a good time with friends. Using the VERB brand, paid advertising ran nationally from June 2002 through June 2003, targeting 9- to 13-year-old youths.**

Main Outcome Measures. **Children's awareness of the campaign and self-reported estimates of free-time and organized physical activity sessions during nonschool hours in the week before the interview.**

Results. **After 1 year, 74% of children surveyed were aware of the VERB campaign. Levels of reported sessions of free-time physical activity increased for subgroups of children 9 to 13 years of age. A pattern of effects across 2 measures was observed for younger children (9–10 years of age), girls, children whose parents had less than a high school education, children from urban areas that were densely populated, and children who were low active at baseline. These subgroups engaged in more median weekly sessions of free-time physical activity than did children who were unaware of VERB and, as the children's level of VERB awareness was incrementally higher, the children engaged in incrementally more free-time physical activity sessions. The average 9- to 10-year-old youth engaged in 34% more free-time physical activity sessions per week than did 9- to 10-year-old youths who were unaware of the campaign. A pattern of effects for organized activity was found only for children classified as low active at baseline.**

Conclusions. **The VERB campaign achieved high levels of awareness in 1 year. Higher levels of physical activity were reported for subgroups of US children. Promoting physical activity with child-focused commercial advertising shows promise.** *Pediatrics* **2005; 116:e277–e284. URL: www.pediatrics.org/cgi/doi/10.1542/peds.2005-0043;** ***children, evaluation, physical activity, media campaign.***

ABBREVIATIONS. CDC, Centers for Disease Control and Prevention; GRP, gross rating point.

Regular physical activity is associated with immediate and long-term health benefits, including weight control, lower blood pressure, bone health, and enhanced psychological well-being.[1–3] Self-reported data indicate that almost one quarter of children 9 to 13 years of age engage in no free-time physical activity during a typical week.[4] Approximately one third of high school students are insufficiently physically active, with girls being less active than boys and Hispanic and black high school students being less active than their white peers.[5] Policy makers and the health community are pressing for ways to help children establish and maintain a physically active lifestyle, which is made ever more urgent by the increase in the prevalence of overweight children[6–8] and the appearance among children of type 2 diabetes and other risk factors for cardiovascular disease.[9]

Many factors contribute to low levels of physical activity among youths, including a media-dominated lifestyle. On average, children 8 to 18 years of age spend >3 hours per day watching television, and the average daily consumption of television, videotapes/DVDs, and movies combined is >4 hours.[10] Ironically, it is this pervasive media environment that presents an opportunity to advertise the benefits of a healthy, physically active lifestyle. This type of media intervention for physical activity has been directed to adults but, until recently, not to children.

There is evidence that media campaigns can affect health behaviors of youths. A combined mass media and school-based anti-smoking program in Vermont decreased smoking among adolescents by 35%.[11] A 4-year, $50 million, statewide, anti-smoking media

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campaign in Massachusetts achieved a 50% reduction in the onset of smoking among younger adolescents.[12] A recent evaluation of the national "truth" anti-smoking campaign found that 22% of the reduction in the prevalence of youth smoking could be attributed to the campaign.[13] Evaluations of media campaigns promoting physical activity, all with adults, have shown effects on awareness, attitudes, and beliefs, but results for behavioral effects have been inconsistent.[14–16] Models of campaign effects suggest that achieving behavioral changes requires very high levels of awareness, which are difficult to achieve without substantial investment.[17,18] Also problematic is attribution of effects to the campaign and not to secular trends or "noise" from other interventions.[19,20]

The VERB campaign, which was launched in 2002 by the Centers for Disease Control and Prevention (CDC), is a mass media campaign based on social marketing principles that is designed to increase physical activity levels among children 9 to 13 years of age.[21,22] A physically active lifestyle, if established at this young age, could attenuate the decline in physical activity typically seen in the high school years, especially among girls.[23–25] In addition, active children are more likely to become active adults.[26]

The campaign chose the word VERB as the brand name, drawing on the meaning of "verb" as the grammatical term for action. With $125 million for its first-year budget, VERB used the sophisticated techniques of commercial marketers in the private sector, such as the use of a brand as a message platform and extensive audience research to develop and to test advertisements, to reach children with messages that physical activity is fun, cool, and socially appealing. Television advertising, mainly on cable channels that children watch (eg, Nickelodeon and Disney), was the primary message vehicle, with 15- and 30-second spots featuring different verbs such as "bounce," showing children and celebrities bouncing a basketball or bouncing on a trampoline and encouraging children to "find their verb."

The first goal of a campaign is to achieve high levels of awareness among the target audience.[20] The hierarchy of effects model described by McGuire[17] posits that the impact of persuasive communication is mediated by 3 broad stages of processing the message, ie, attention, comprehension, and acceptance. Attention depends on exposure and awareness. Comprehension is predicated on understanding the message, and acceptance includes intention and, finally, behavior change. In McGuire's model, because of the variability in how individuals process media messages, a percentage of the audience is lost in each step. Therefore, high levels of exposure and awareness are needed to result in even a small number who will change their behavior.

VERB's first-year goal was that 50% of US 9- to 13-year-old youths would be aware of the campaign. Media time was purchased to deliver an average of 188 gross rating points (GRPs) per week, predominantly on television (119 weekly television GRPs). GRPs are an estimated percentage of the target audience exposed to advertising; they are calculated by multiplying the estimated reach of a medium (ie, the percentage of children who are likely to see an advertisement on Saturday morning cartoons) by the frequency or number of times children have the opportunity to see the advertisement. With a media buy of 750 GRPs on average per month, the media-buying agency estimated that 85% of 9- to 13-year-old youths had the opportunity to see a VERB advertisement and that the average target audience member had the opportunity to see a VERB advertisement ~8.8 times throughout the month. A substantial media buy with additional donated advertising, targeted public relations, and appealing promotional events positioned the VERB campaign to be noticed even within the crowded media landscape of child advertising. Children were also reached via print advertisements, in-school promotions, radio, and the Internet. To maximize the campaign reach to black, Hispanic or Latino, Asian, and Native American children, CDC contracted with 4 advertising agencies specializing in reaching these target audiences. The agencies conducted their own formative research, created advertisements that resonated with their audiences, and developed their own media plans to reach those audiences. The VERB campaign is being evaluated through a longitudinal research design with a nationally representative cohort of children and their parents. We report here the first-year behavioral effects of the VERB campaign.

METHODS

Survey Design

The VERB campaign used a prospective, longitudinal, quasi-experimental design to evaluate the effects of the campaign. A baseline survey was conducted in April to June 2002, before the launch of VERB advertising. A nationally representative telephone survey of children 9 to 13 years of age (Youth Media Campaign Longitudinal Survey) was conducted with random-digit-dialing methods.[27] The eligibility of residential households was determined by the presence of children 9 to 13 years of age; a maximum of 2 children per household were selected randomly from this age range. Up to 20 attempts were made to contact households in the survey during a 10-week period before the household was considered unreachable. In households containing eligible children, parent/guardian interviews were conducted, followed by interviews with sampled children. The institutional review board of the CDC approved this study.

For the baseline survey, persons in 60.5% of sampled households completed the screening interview. Among eligible adult respondents, 3084 (87.0%) completed the parent interview; 3120 eligible child respondents (81.3%) completed the child interview. As determined with standard American Association of Public Opinion Research response rate formulas, the overall baseline response rate was 43% (the product of the completion rates for the screening, parent, and child interviews). At the follow-up assessment in 2003, data were collected from 2732 of the same dyads (87.6%).

The baseline data were weighted to the national population of 9- to 13-year-old youths, adjusting for different probabilities of selection and survey nonresponse. For follow-up (2003) data, the parent baseline weights were adjusted for attrition in parent cooperation, child sampling in 2002, and child nonresponse in 2003.

Interviews were conducted in English and Spanish, with computer-assisted telephone interviewing technology. Child interviews focused on participation in, attitudes toward, and beliefs about physical activity. Participation in specific activities during the 7 days before the interview was measured, along with whether the activities were organized (part of a team or structured lesson) or were something the children had engaged in during free time. The interview with the parents inquired about attitudes and be-

liefs about physical activity for children in general, participation in physical activity with their children, and confidence in influencing their children's involvement in physical activity. For the year-1 follow-up interviews, items measuring unaided and aided awareness of VERB and understanding of the VERB messages were added to the interviews at the end of the survey, so that the responses earlier in the survey were not influenced by knowing that the survey was about VERB.

Measures

Four categories of campaign awareness were constructed, based on the child's ability to recall the VERB brand ("recall") and ability to state ≥1 of the intended VERB messages ("understanding"). The 4 mutually exclusive categories were (1) no recall of the campaign, (2) recall but no understanding, (3) aided recall with understanding, and (4) unaided recall with understanding (see "Appendix" for the exact questions). These categories produced an awareness gradient across the 4 levels that reflected 4 incremental levels of penetration of the campaign messages.

Two primary behavioral measures were used to assess the child's physical activity level, ie, free-time physical activity in the previous 7 days and organized physical activity in the previous 7 days. During the interview, the children listed all of the physical activities in which they had engaged in the previous 7 days outside of school. For each activity mentioned, the children were asked whether they had engaged in that activity in their free time or with a coach, leader, or supervisor, and they were then asked the number of days in the previous 7 on which they had engaged in the activity.

These "occasions" were used to calculate activity levels for the 9- to 13-year-old population. For free-time activity, findings are reported as free-time physical activity sessions. Because the distribution of free-time activity data was skewed, the median number of free-time sessions reported for the previous 7 days was used. Organized activity is reported as the percentage of children who engaged in ≥1 organized session in the previous week. The percentage of children in an organized activity, instead of sessions of organized activity, is reported because at baseline only 38.5% of children engaged in an organized physical activity. The estimates produced for occasions of physical activity were conservative to the extent that, if a child engaged in the same activity on 2 occasions in a single day, only 1 would be counted. Self-reported minutes of activity participation were not recorded because reporting of time has been shown to be unreliable for children in this age range.[28]

Additional physical activity measures were investigated for evidence of campaign effects. After the series of items assessing activity in the previous week, children were asked whether they had engaged in a physical activity on the day before the interview. Lastly, children were asked whether they had tried a new physical activity in the previous 2 months.

All outcome measures were examined in the context of a series of individual and household demographic characteristics. Child demographic variables examined included age, gender, and race/ethnicity. Household characteristics included educational attainment of the responding parent, household income, urbanicity, and other socioeconomic identifiers.[29]

Analytic Approach

Two primary approaches were used to determine the impact of the VERB campaign. We examined (1) the relationship between increasing levels of campaign awareness/understanding and levels of reported physical activity sessions and (2) the campaign's overall effect on the nation's 9- to 13-year-old youths or a subgroup of them.

To determine the effects of the campaign, we used propensity scoring, which is a statistical technique used in the evaluation of other media campaigns[30] and used widely in medical research[31,32] and economics.[33] Propensity scoring offers an improvement over matching techniques for creating equal treatment and comparison groups and is used in nonrandomized observational studies to estimate the probability that a person will belong to a particular group. In the VERB campaign evaluation, propensity scores were developed to equalize the 4 levels of campaign recall, so that physical activity-related outcomes across awareness groups could be attributed to campaign activities without bias from potential confounders. Confounders (ie, covariates) in this study were defined as variables that were related to the study outcomes and related systematically to VERB awareness and thus exposure to the campaign. For example, the number of television minutes the child watched at baseline was related both to awareness of VERB at the follow-up assessment and to being physically active at the follow-up assessment. Potential confounders such as this example were identified by examining baseline characteristics and then were used to adjust for differences among the 4 awareness groups at the follow-up assessment.

With propensity scoring, the 4 awareness categories (no recall, recall but no understanding, aided recall with understanding, and unaided recall with understanding) were assessed for a relationship between awareness and reported activity sessions. This trend analysis used a γ statistic.[34] A significant γ indicated that, for an outcome such as free-time physical activity, as children's level of VERB awareness increased, so did the number of reported free-time physical activity sessions.

To determine the overall effect of the campaign on outcomes, propensity scores were used to make comparisons between 2 groups. The 26% of children who had no recall of the campaign at year 1 served as the comparison or "control" group. Data for these no-recall children were weighted to represent a national population of 9- to 13-year-old youths with no campaign awareness; data for children in the other awareness categories were also weighted. The overall effect analysis compared all children in the sample, including those who had no recall of the campaign, with the comparison group. Including the no-recall group in the measurement of overall effect yielded a more conservative estimate of program impact than would simply comparing aware children with unaware children. Because the VERB campaign's goal was to affect the physical activity levels of all US 9- to 13-year-old youths, the overall effect measure indicated the effect on the whole target audience, not just the effects among children who were aware of the advertising.

RESULTS

Campaign Awareness and Understanding

The campaign produced high levels of awareness, based on the 4 categories of recall and understanding. Twenty-six percent of American children had no recall of the campaign, 7% had recall but no understanding, 50% had aided recall with understanding, and 17% had unaided recall with understanding. Therefore, the overall awareness (all 3 categories that had recall) achieved by the VERB campaign was 74% among the nation's 9- to 13-year-old youths. Ninety percent of children who were aware of VERB also demonstrated understanding of the messages. Overall awareness for white children and Hispanic or Latino children was 78% and 70%, respectively, significantly higher than that for black children at 63% ($P < .05$).

Campaign Effects on Behavior

Free-Time Physical Activity

A significant positive relationship was detected between the level of awareness of VERB and weekly median sessions of free-time physical activity among the total population of 9- to 13-year-old youths ($\gamma = .09$; $P < .05$) (Table 1), meaning that, as VERB awareness increased, levels of physical activity increased. Within subgroups, this relationship between increasing levels of awareness and more free-time sessions of physical activity was also observed at the $P < .05$ level for 9- to 10-year-old children ($\gamma = .16$) (Fig 1), girls ($\gamma = .09$), white children ($\gamma = .08$), children whose parents had less than a high school education ($\gamma = .23$), children from households with incomes of ≤$25 000 and incomes of $50 000 to $75 000 ($\gamma = .17$

TABLE 1. Median Weekly Free-Time Physical Activity Sessions Among Children 9 to 13 Years of Age, National Population, 2003

	No. of Sessions (95% Confidence Interval)						
	(A) No Recall of Campaign	(B) Recall of Campaign Without Understanding	(C) Aided Recall of Campaign With Understanding	(D) Unaided Recall of Campaign With Understanding	(E) γ	(F) Actual Population	(F − A) Overall Campaign Effect
Total	3.58 (2.90 to 4.21)	3.13 (2.24 to 3.95)	4.45 (4.16 to 4.74)	4.70 (3.68 to 5.86)	.09* (.03 to .14)	4.13 (3.90 to 4.35)	0.54 (−0.16 to 1.24)
Gender							
Male	4.37 (3.67 to 4.99)	4.05 (2.47 to 4.96)	4.94 (4.60 to 5.41)	5.98 (4.12 to 7.23)	.08 (−.01 to .16)	4.75 (4.46 to 5.08)	0.39 (−0.12 to 0.90)
Female	2.60 (1.92 to 3.64)	2.64 (0.59 to 3.62)	3.79 (3.21 to 4.37)	3.38 (2.43 to 4.82)	.09* (.01 to .17)	3.29 (2.94 to 3.69)	0.70* (0.06 to 1.33)
Age†							
9–10 y	3.18 (2.36 to 4.13)	2.36 (0.71 to 4.12)	4.79 (4.28 to 5.41)	5.63 (4.02 to 6.89)	.16* (.08 to .23)	4.28 (3.85 to 4.72)	1.10* (0.29 to 1.91)
11–13 y	4.02 (2.94 to 4.53)	3.46 (2.46 to 4.55)	4.21 (3.77 to 4.61)	4.06 (3.00 to 5.45)	.03 (−.04 to .10)	4.04 (3.69 to 4.33)	0.02 (−0.62 to 0.66)
Race/ethnicity							
White	4.01 (2.91 to 4.60)	3.90 (2.56 to 4.75)	4.49 (4.12 to 4.86)	5.11 (4.31 to 5.94)	.08* (.02 to .13)	4.33 (4.06 to 4.60)	0.33 (−0.44 to 1.09)
Black	3.54 (2.39 to 4.98)	1.90 (0.00 to 5.34)	3.45 (2.44 to 5.26)	6.36 (0.36 to 11.32)	.13 (−.05 to .32)	3.36 (2.66 to 4.32)	−0.18 (−1.55 to 1.19)
Hispanic or Latino	2.98 (1.01 to 4.62)	2.68 (0.00 to 3.90)	4.58 (4.03 to 5.24)	3.32 (0.30 to 6.36)	.06 (−.10 to .23)	3.94 (3.36 to 4.50)	0.96 (−2.32 to 4.23)
Other	2.38 (0.00 to 5.72)	2.28 (0.00 to 9.13)	4.88 (3.80 to 6.40)	4.23 (2.35 to 8.41)	.17 (−.06 to .41)	4.14 (3.19 to 4.94)	1.76 (−0.38 to 3.90)
Parental education							
Less than high school	2.24 (1.11 to 5.25)	0.94 (0.00 to 6.22)	5.16 (4.33 to 6.43)	6.05 (1.83 to 9.69)	.23* (.07 to .39)	4.43 (2.92 to 5.65)	2.20* (0.52 to 3.87)
High school graduate or equivalent	3.71 (2.72 to 4.62)	2.90 (0.53 to 6.06)	4.01 (3.31 to 4.82)	5.10 (2.69 to 7.45)	.11 (−.02 to .24)	4.01 (3.52 to 4.50)	0.30 (−0.96 to 1.56)
Some college/vocational education	3.85 (2.77 to 4.88)	3.69 (2.49 to 5.16)	5.13 (4.40 to 6.07)	4.12 (2.72 to 6.03)	.07 (−.02 to .15)	4.47 (4.09 to 4.84)	0.62 (−0.34 to 1.58)
College degree or higher	3.51 (2.11 to 4.58)	3.28 (1.49 to 4.20)	3.55 (2.89 to 4.21)	4.30 (3.16 to 5.37)	.04 (−.05 to .14)	3.71 (3.22 to 4.16)	0.20 (−1.85 to 2.25)
Household income							
≤$25 000	3.81 (2.64 to 4.77)	3.13 (0.99 to 6.31)	4.96 (4.32 to 6.06)	6.08 (3.14 to 9.05)	.17* (.03 to .30)	4.30 (3.79 to 4.81)	0.49 (−0.56 to 1.54)
$25 001–$50 000	3.64 (2.73 to 4.80)	3.36 (1.22 to 5.41)	5.05 (4.48 to 5.64)	4.01 (2.15 to 5.20)	.03 (−.10 to .15)	4.55 (4.19 to 4.92)	0.92* (0.12 to 1.71)
$50 001–$75 000	3.00 (1.85 to 4.28)	2.87 (1.33 to 4.43)	4.17 (3.40 to 4.74)	6.93 (3.83 to 8.35)	.16* (.05 to .26)	4.12 (3.50 to 4.56)	1.12 (−0.13 to 2.38)
≥$75 000	4.00 (2.38 to 4.89)	3.05 (0.50 to 7.06)	3.50 (2.87 to 4.18)	3.96 (2.92 to 5.51)	.02 (−.07 to .10)	3.45 (2.99 to 3.92)	−0.55 (−2.60 to 1.51)
Urbanicity (quintile of population density)‡							
Urban	2.17 (0.00 to 3.24)	2.15 (0.00 to 4.07)	4.12 (3.30 to 4.91)	4.59 (2.35 to 12.04)	.24* (.09 to .38)	3.33 (2.71 to 3.93)	1.16* (0.35 to 1.97)
Metropolitan suburban	3.23 (1.77 to 4.74)	3.28 (1.36 to 5.40)	4.34 (3.72 to 4.91)	4.19 (2.38 to 6.37)	.06 (−.06 to .18)	4.01 (3.54 to 4.57)	0.78 (−0.54 to 2.10)
Second city	4.18 (2.92 to 5.30)	2.91 (1.50 to 5.56)	4.99 (4.14 to 6.08)	5.29 (1.75 to 7.84)	.04 (−.11 to .19)	4.35 (3.78 to 4.95)	0.17 (−0.81 to 1.16)
Town/exurban	4.39 (2.97 to 5.86)	4.30 (2.72 to 5.85)	4.43 (3.63 to 5.13)	4.51 (3.37 to 5.63)	.01 (−.10 to .12)	4.45 (4.04 to 4.86)	0.07 (−0.71 to 0.84)
Rural	4.01 (2.26 to 5.30)	2.23 (0.10 to 4.80)	4.44 (3.43 to 5.43)	5.66 (3.19 to 7.12)	.12* (.02 to .22)	4.30 (3.66 to 4.85)	0.29 (−0.95 to 1.54)
Free-time activity, ≥3 sessions in previous week							
Yes	4.69 (4.17 to 5.49)	3.62 (2.70 to 4.60)	5.05 (4.73 to 5.56)	6.02 (4.71 to 6.95)	.08* (.01 to .15)	4.91 (4.66 to 5.29)	0.22 (−0.28 to 0.72)
No ("low active")	1.48 (0.79 to 2.11)	1.51 (0.00 to 3.15)	2.92 (2.40 to 3.48)	2.53 (1.35 to 4.17)	.11* (.02 to .21)	2.32 (2.01 to 2.63)	0.84* (0.27 to 1.42)

* Significant difference at $P < .05$, representing a positive directional change for the campaign.
† Children were 9 to 13 years of age when interviewed in the baseline survey in spring 2002.
‡ See Claritas Prizm for variable definitions (www.claritas.com).

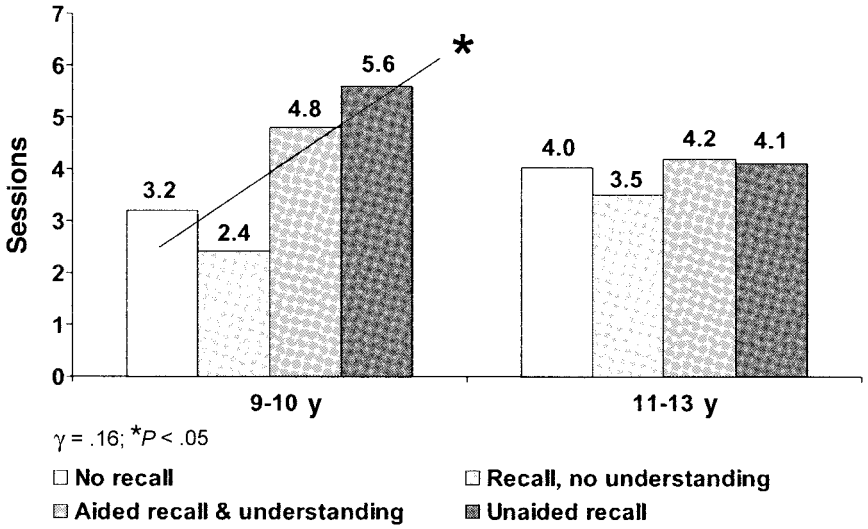

Fig 1. Association between awareness and outcomes according to age: weekly median free-time physical activity sessions.

and $\gamma = .16$, respectively), children living in urban areas of high density ($\gamma = .24$), children from rural areas ($\gamma = .12$), children who reported engaging in <3 free-time physical activity sessions at baseline ("low active at baseline") ($\gamma = .11$), and children who reported engaging in ≥3 free-time sessions at baseline ($\gamma = .08$). The classification of "low active at baseline" was constructed from children's reports of free-time sessions of physical activity. If children had engaged in <3 sessions of free-time physical activity in the past week, then they were classified as low active.

For the measure of overall effect, when free-time physical activity sessions of all US children were compared with those of the children who were unaware of the campaign (the comparison group), no overall effect on free-time physical activity sessions was detected at the total-population level. However, within subgroups, significant overall effects were observed for 9- to 10-year-old children, girls, children with parental education of less than high school, children from households with annual incomes of $25 001 to $50 000, children living in urban areas of high density, and children who were low active at baseline (all $P < .05$) (Table 1).

Organized Physical Activity

At the total-population level, no relationship was found between levels of awareness and percentage of children engaging in organized physical activity (Table 2). Within subgroups, a relationship between awareness of VERB and organized activity ($P < .05$) was observed for parental education of less than high school ($\gamma = .44$) and classification as low active at baseline ($\gamma = .16$).

No overall effect of the campaign on organized physical activity was detected at the population level. Within the subgroup classified as low active at baseline, 39.1% of children were engaged in an organized physical activity, compared with 31.9% of the comparison group, a significant difference of 7.2 percentage points ($P < .05$). The other subgroup effect for organized activity was for children with parents with a college degree or higher education level.

Additional Physical Activity Measures

No pattern of effects was detected for the previous-day physical activity measure or the measure of trying a new physical activity in the past 2 months.

DISCUSSION

After 1 year of advertising, the VERB campaign was successful in achieving high levels of awareness and understanding and in affecting free-time physical activity for subgroups of children 9 to 13 years of age. The campaign's first-year goal to establish the VERB brand and achieve 50% awareness of VERB among 9- to 13-year-old youths was exceeded by 24 percentage points (74% awareness). This reflects the campaign's significant mass media efforts in establishing an identity and a clear message. Achieving awareness and understanding of a campaign brand and message is an essential first step in influencing children's attitudes and behaviors.[14,17,35]

Two analyses were used to determine the campaign's behavioral effects for year 1. One analysis answered the following question: Did children's activity increase incrementally as their awareness of VERB increased (relationship of levels of advertising to levels of physical activity)? The other analysis compared levels of physical activity for all children in the US with those for a comparison group made up of children unaware of the campaign. Significant effects in both of these analyses were found for free-time activity sessions for several subgroups, ie, 9- to 10-year-old children, girls, children whose parent had less than a high school education, children in urban areas, and children engaging in low levels of physical activity at baseline. The finding that 9- to 10-year-old children overall engaged in 1.1 more sessions of activity in their free time than did those not exposed to the campaign is a notable difference. To interpret this overall effect in a different way, the 1.1-session difference between children not exposed

TABLE 2. Percentage of Children 9 to 13 Years of Age Engaging in Organized Physical Activity, National Population, 2003

	Percentage (95% Confidence Interval)						
	(A) No Recall of Campaign	(B) Campaign Recall Without Understanding	(C) Aided Campaign Recall With Understanding	(D) Unaided Campaign Recall With Understanding	(E) γ	(F) Actual Population	(F − A) Overall Campaign Effect
Total	37.85 (32.87 to 42.83)	37.19 (29.41 to 44.97)	37.70 (35.17 to 40.22)	39.46 (33.09 to 45.83)	.02 (−.05 to .09)	37.71 (35.75 to 39.68)	−0.14 (−4.36 to 4.09)
Parental education							
Less than high school	9.27 (−0.30 to 18.83)	14.63 (−3.10 to 32.37)	9.62 (2.47 to 16.77)	41.07 (13.98 to 68.16)	.44* (.04 to .85)	11.02 (6.70 to 15.34)	1.75 (−7.04 to 10.54)
High school graduate or equivalent	27.54 (21.16 to 33.91)	25.93 (13.34 to 38.53)	27.11 (21.33 to 32.88)	24.29 (12.59 to 36.00)	−.04 (−.22 to .14)	27.64 (23.23 to 32.05)	0.10 (−5.54 to 5.75)
Some college/vocational education	44.88 (36.20 to 53.56)	35.81 (20.42 to 51.20)	37.03 (31.72 to 42.34)	37.12 (27.89 to 46.35)	−.09 (−.19 to .02)	37.45 (33.45 to 41.45)	−7.43 (−15.17 to 0.32)
College degree or higher	47.87 (37.78 to 57.95)	60.27 (47.57 to 72.97)	60.29 (55.61 to 64.98)	53.92 (43.13 to 64.71)	.05 (−.11 to .21)	57.30 (53.86 to 60.74)	9.44* (0.23 to 18.65)
Free-time activity, ≥3 sessions in previous week							
Yes	40.86 (33.63 to 48.09)	38.15 (28.36 to 47.95)	36.88 (33.98 to 39.78)	35.56 (27.16 to 43.97)	−.06 (−.18 to 0.06)	36.98 (34.75 to 39.21)	−3.88 (−10.02 to 2.25)
No	31.89 (23.74 to 40.04)	35.56 (25.02 to 46.10)	39.33 (34.47 to 44.20)	45.61 (35.75 to 55.46)	.16* (.02 to .30)	39.13 (35.95 to 42.30)	7.24* (0.05 to 14.42)

* Significant difference at $P < .05$, representing a positive directional change for the campaign.

to the campaign and all children in the sample is 34%, meaning that the VERB campaign resulted in 34% more free-time physical activity sessions among all 9- to 10-year-old children, compared with children who were not aware of the campaign (Fig 2). Importantly, this is not an increase from baseline in 2002, but a difference between children who were not exposed to the campaign and all 9- to 10-year-old youths in 2003.

VERB's influence with younger children might have been because the campaign's key message in the first year, "getting active is fun," and the campaign's emphasis on the social and friendship aspects of physical activity were motivating to younger children. In contrast, the aspects of physical activity that resonated with older children in our audience research were mastery, peer acceptance, and competition, in addition to fun. Consequently, advertisements developed for year 2 added concepts of mastery, inclusiveness, and fun competition, to better appeal to 11- to 13-year-old youths.

Influencing girls was an important campaign effect, given the lower levels of physical activity among girls generally and the precipitous decline in girls' physical activity that occurs as they age through the teen years. VERB's emphasis on the social benefits of physical activity likely appealed to girls, as it did with the younger segment. The effects reported for children in urban settings and children whose surveyed parent had less than a high school education suggest that the VERB advertisements connected with these youths by portraying activities that were realistic and accurate for their neighborhoods and life experiences. The evidence for influencing low-active youths is encouraging, because VERB seeks to get children involved in new physical activities, rather than just reinforcing activity among those who are already active.

This study has several limitations. The survey is based on self-report, with inherent threats to validity and the potential for unreliability, especially among children. The national scope of the advertising meant that randomization was not possible, which necessitated reliance on the unaware group as the comparison group. A drawback to the longitudinal design is the social desirability bias that can occur when participants are recontacted. Questions about VERB awareness were placed at the end of the follow-up questionnaire, to avoid bias in physical activity answers once the VERB campaign was mentioned. Although the response rate at year 1 was 37%, it is comparable to that of many large-scale telephone surveys. Corrections for nonresponse bias and adjustments for undercoverage were made.

Reverse causation (ie, highly physically active children becoming more aware of the advertisements) is a potential problem for media campaigns. The longitudinal design of the VERB campaign allowed us to adjust for baseline activity levels, to reduce this threat to validity. An alternative analytic approach would have been to use propensity scoring to examine the changes in levels of physical activity from 2002 to 2003 among the 4 awareness groups. However, the low statistical power of this approach un-

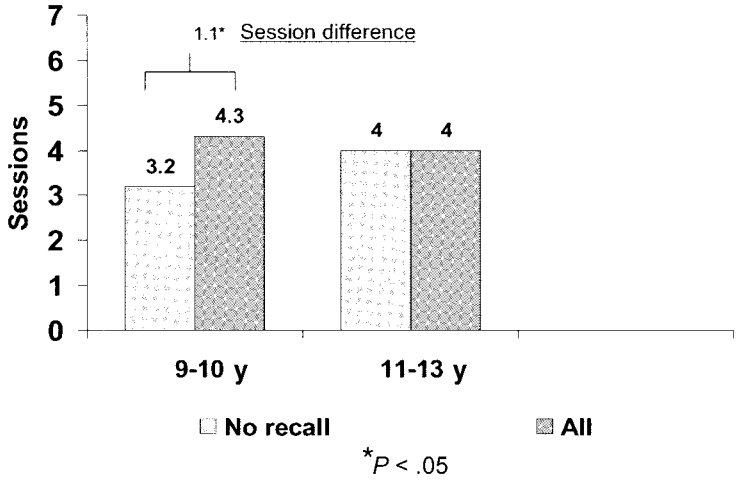

Fig 2. Overall effect of VERB according to age: weekly median free-time physical activity sessions.

dermined the slight improvement in confounder control, and thus this approach was not adopted.

This evaluation used the ordinal relationship between awareness and outcomes (γ) as one of the main indicators of effects. For example, the relationship between awareness of the campaign and free-time physical activity for girls was significant with a γ of .09, comparable to an odds ratio of 1.1, which is not dissimilar from effect sizes found for other interventions. Although these effects are relatively small, they are significant and especially relevant in the context of the challenge of changing physical activity behavior. For the 10 million girls 9 to 13 years of age in the United States, a positive change in free-time physical activity levels is indeed promising.

Through interventions such as VERB, public health programs have adopted the sophisticated techniques that the private sector uses to promote products to customers,[36] in this case, promoting physical activity to youths. Early indications from the VERB evaluation show that such a strategy on a national scale can be effective in reaching millions of young people simultaneously. With careful planning and the resources to purchase media time during children's prime viewing times, the VERB campaign was able to implement fully a commercial marketing strategy that also included extensive audience research and development of the VERB brand to communicate messages that physical activity is fun, cool, and a chance to be with friends, not a typical "do it, it's good for you" public health message. Leveraging the purchased media time to garner substantial added-value support from media partners gave opportunities to surround children in more ways, such as in schools and at promotional events.

VERB is the first national paid mass media campaign intended to change children's physical activity patterns. Significant investment was made to use private sector marketing tactics to reach the majority of children 9 to 13 years of age with messages that portrayed being physically active as an easy appealing choice. The VERB campaign's use of mass media is one strategy for influencing children's physical activity. Multipronged approaches, including more physical education in schools, programs that address transportation and other barriers to being active, and public and private efforts to increase access to safe places for children to be active, are still required if we are to increase and to maintain the number of US children participating in regular physical activity. We view VERB as creating a fertile environment that, combined with more opportunities for children to be active, will result in more physically active lifestyles among our nation's children. In its first year, VERB produced promising changes among our nation's 21 million children 9 to 13 years of age. If VERB is sustained and proves effective over the long term, then it will contribute to the health of the nation's youth and provide important evidence of the critical role of using paid media as a public health intervention strategy.

APPENDIX: SCRIPT FOR QUESTIONS THAT ASSESSED AWARENESS AND UNDERSTANDING

Recall

1. Unaided recall: Have you seen, read, or heard about any messages or advertising for kids getting active? If yes, ask: What is the name of the message or advertising? If no, go to question 2.
2. Aided recall: Have you seen, read, or heard any messages or advertising about VERB?

Understanding

3. Please tell me in your own words what VERB is all about. Probes: Can you tell me more? What does that mean? Anything else?
4. What ideas did VERB give you? Probes: Can you tell me more? What does that mean? Anything else?

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