Continuing Education

Analysis of the American Cancer Society's Generation Fit Project

Michael Peterson, Steve Goodwin, and Deborah Ellenberg

ABSTRACT

This study examined the impact of the American Cancer Society's (ACS's) media based peer education program, Message Magic: Selling Healthy Eating and Physical Activity on participant self-reported dietary and physical activity behaviors and advocacy skill development. High school students participating in the program were required to work as a team to examine advertising techniques and then develop a media-based message to be presented to peers. Results indicated that significant nutritional improvements in girls and physical activity improvements in boys were realized. The majority (76%) of participants expressed that their media messages had made a positive difference in their school and the program enhanced their advocacy skills. Students rated their experience in the program favorably. Findings suggest the ACS media-based program may be a viable option for a high school health curriculum.

Coronary heart disease, cancer, stroke, diabetes, and coronary artery disease are responsible for approximately 63% of all adult deaths (Anderson, 2001). Although each of these has a different etiology, the majority of cases are still traceable to childhood dietary patterns and activity levels (Kelder, Perry, Klepp, & Lytle, 1995; Pate, Baranowski, Dowda, & Trost, 1996). Further, as unhealthy diets and inactivity set the stage for morbidity and mortality problems in adulthood, they also often lead to obesity, psychosocial dysfunction, respiratory disease, and orthopedic conditions in children and adolescents (Gidding, Bao, Srinivasan, & Berenson, 1995; Lowry, Galuska, Fulton, & Kann, 2002). Consequently, as our youth continue to set new levels of obesity and inactivity, efforts to reverse the trend must continue. Evidence suggests that a multifaceted approach that addresses both nutritional choices and activity level, while combining the resources of schools and communities, will be needed to accomplish this goal (Brown & Witherspoon, 2002; U.S. Department of Agriculture, 1999).

One critical component has been to examine the role media (television, radio, music, magazines, movies, etc.) and other social influences play in the health decisions made by youth, and whether boys and girls respond differently to these messages (Hargreaves & Tiggemann, 2003; Murnen, Smolak, Mills, & Good, 2003). For example, there is evidence that girls may be more

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subject to the social influence models of health education than are boys (Kelder, Perry, Peters, Lytle, & Klepp, 1995). This may largely be due to the fact that our culture places a greater emphasis on the physical attractiveness of females than males (Kelder et al., 1995; Ward, 2003). This emphasis on appearance may also be a reason females have been repeatedly more responsive to social messages related to healthy eating than have males (DiSogra & Glanz, 2000).

Regarding media influences it is also important to note that young people's exposure to, and use of, the media peaks just prior to and during adolescence (Roberts, 1999). Research suggests that teens are paying attention to media messages related to body shape, appearance, and beauty and are applying them as their own bodies develop (Brown & Witherspoon, 2002). Based on this understanding, it would appear advantageous to promote educational efforts with adolescents that examine and incorporate the use of media messages (Brown & Witherspoon, 2002; Buijzen & Valkenburg, 2003). This may be especially appropriate given the influence of the television medium on adolescents in general. Signorielli and Staples (1997) stated that children spend more time watching television than any other activity except sleeping. Although television viewing may be harmful due to the sedentary lifestyle it creates, it is also potentially harmful in that the food products that dominate commercial messages in children's programming are predominantly low in nutritional value (Signorielli & Staples, 1997). This is especially important to note given that research supports the notion that the more television children watched the more likely they were to make unhealthy food selections (Crespo et al., 2001; Signorielli & Staples, 1997). Additionally, it has been found that magazine pictures had a strong impact on female adolescents' perceptions of how they should look and what behaviors they should adopt to achieve that "look" (Murnen et al., 2003; Signorielli & Staples, 1997). Field and colleagues (1999) found that 69% of the girls in their study reported that pictures in magazines influenced their perceptions of the perfect body. Data further indicated that 47% of the girls in the study also reported wanting to lose weight because of the magazine pictures. This finding was echoed in the 1999 Youth Risk Behavior Survey, wherein 43% of students were trying to lose weight. In addition, female students were less likely than males to be overweight, but more likely to be trying to lose weight (Lowry et al., 2002).

Another concern in educating adolescent students is the impact television and other media have played in the way students respond to instruction. Years ago lecture was the predominant delivery system. Today, students seem less receptive to similar presentations. Some theorize it is due to the media-intense world in which children are being raised (Gozzi, 1995: Postman, 1984). According to Gozzi (1995), a student's attention can be held for approximately 15–20 minutes, then it is time for something else, such as a video, a peer report, or small group exercise.

Another avenue for instruction is the use of peer education. Peer education has the potential for success for a few reasons. Students tend to respond favorably to peer presentations, and peers may provide services that are uniquely effective in a manner not easily measured (Fennell, 1993). For example, this technique has been shown to be effective in the development of a nutrition education intervention (Corwin, Sargent, Rheaume, & Saunders, 1999).

A similar approach was taken by the American Cancer Society's (ACS) Generation Fit program via the project Message Magic: Selling Healthy Eating and Physical Activity. This program focuses on teaching students about advertising and how it attempts to influence the decisions people make. Further, it requires students to develop healthy eating and exercise messages that will also be displayed or presented to other students. However, this nationally sponsored program has not been independently assessed, even though ACS has directed significant funding to its implementation. The purpose of this study was to determine the effectiveness of this program in achieving its programmatic objectives, potential benefits of this project on adolescent dietary and physical activity behavior, and to determine its pedogological merit.

METHODS

Design

Health and physical education teachers from local public schools were recruited to participate in the ACS Generation Fit program. Teachers were assigned to implement the Message Magic: Selling Healthy Eating and Physical Activity project in their classes. They were provided a full-day training workshop that covered information about how to successfully implement the project. As an incentive, teachers were given a $400 payment on completion of program implementation and evaluation.

Assessment of project outcomes consisted of a pretest–posttest control group design to determine self-reported behavior changes, and a post hoc design (experimental group only) to determine student perceptions of the project. Student surveys were anonymous and were coded by students writing the initial of their mother's first name, initial of their father's first name, last three digits of their phone number, followed by the numerical date of their birth (i.e., from 1 to 31). Teachers were required to provide a comparable control group for each experimental class in which the project was implemented. The control group received a health education intervention that consisted of traditional lecture and readings on physical activity and nutrition.

Project Description

The ACS Message Magic project was designed to (1) educate youth participants about the advertising techniques used by marketers that potentially influence health behaviors, attitudes, and beliefs; (2) address misconceptions about healthy lifestyles; and (3) enhance youth participant advocacy skills (i.e., action planning, group work and communication, media advocacy) related to the promotion of healthy eating

and physical activity. During project implementation, participants completed a handout in which they examined media messages related to eating and physical activity. Students viewed television for a designated time period paying special attention to the commercials, or paged through magazines for advertisements. Teachers discussed with the participants whether the advertisements advocated healthy or unhealthy products and/or behaviors. Students focused on the advertising techniques such as the following:

- "Association:" leading the viewer to think he or she can be like the person in the advertisement
- "Bandwagon:" suggesting everyone is using the product
- "Testimonial:" showing someone who recommends the product
- "Rewards:" offering incentive opportunities for purchasing the product
- "Humor:" using funny or clever slogans or characters to sell the product
- "Sensory:" appealing to the senses through use of sounds or pictures.

Teachers then assisted students in deconstructing the media message by examining the visuals, the copy, the layout, and the source of the advertisement. The participants were divided into small groups (consisting of three to four students per group) and were instructed to brainstorm ideas for creating their own media message to promote healthy eating and/or physical activity among their peers. Work groups were responsible for designing and producing a media message using any communication formats from the following: skit for a video tape; jingle, song, or rap for an audio tape; bumper sticker; poster; banner; or a public service announcement. Each work group presented their health promoting messages to their classmates and tested them via a message campaign to their peers. The project included evaluation activities in which the work groups measured the effectiveness of their media messages by polling target audiences. The final stage of the project included activities in which students informed the media about their project work by writing news releases and/or contacting the media directly. The entire project was 8 weeks in length, and classes were held once per week for 1 hour duration.

Instruments

The evaluation instrument utilized for the pretest–posttest survey consisted of 7 nutritional questions from the Youth Risk Behavior Surveillance System Questionnaire (Centers for Disease Control and Prevention [CDC], 1997), and 11 physical activity questions from the National Health Interview Survey-Youth Risk Behavior Survey (National Center for Health Statistics [NCHS], 1994). The battery of 7 nutrition questions was designed to assess a balanced and nutritionally sound diet through a 24-hour recall of dietary consumption. The battery of 11 physical activity questions assessed the frequency of vigorous physical activity through a 7-day recall of activity. These batteries can be used independently to measure behavior change and have been sanctioned for use by the CDC (1997) and the NCHS (1994). These measures are considered valid and moderately reliable measures of physical activity and nutritional behaviors (U.S. Department of Health and Human Services, 1996) and have been used in other studies (Blair, Kannel, Kohl, Goodyear, & Wilson, 1989). Reliability of Youth Risk Behavior Survey questions have been assessed and achieved moderate reliability (dietary questions mean kappa score=50%; Brener et al., 2002).

To assess the degree students achieved the ACS Message Magic project objectives, 14 questions related specifically to the project were administered on completion. All questions consisted of 5-point Likert-type scale responses. Specific questions included the following.

- "How interesting was the work you performed to complete this project?"
- "Compared to other projects that you have completed in this class, how interesting was this project?"
- "How effective was your group's media message in promoting healthy eating and/or being physically active in others?"
- "Compared to your physical activity habits prior to participating in this project, how much more or less active are you now?"
- "Compared to your eating habits prior to participating in this project, how much better or worse are your eating habits now?"

Questions pertaining to perceived improvement of advocacy skills were also asked. These questions related to the ability to create media messages that influence other people's health behaviors, ability to create an action plan, ability to contact the media or develop a press release, ability to speak in front of a group of peers, and ability to work effectively in a group. Two open-ended questions were also posed. One asked what the students liked most about doing this project; the other asked what they liked least about doing this project. Project-related questions were reviewed by a panel of health educators and ACS personnel (N=5) and pilot tested (N=8) for question clarity and face validity prior to inclusion in the study. Project-related questions were not assessed for test–retest reliability, because they were designed for one-time perceptual measures of student project experience.

Data Analysis

Pretest data were collected during the first day of the project implementation, and posttest data were collected during the last class period of the intervention. Data were analyzed to compare changes in student answers via the STATISTICA software. Descriptive and comparative inferential statistical protocols were used to analyze student and teacher perceptions of the project. Dependent t-tests were used to determine behavioral changes within both the experimental and control group participants, and independent t-tests were used to assess posttest comparisons between the experimental and control group participants. One-way analyses of variance (ANOVAs) were applied to ascertain variance in project scores by teacher. All measures were considered significant at $p \leq .05$.

Table 1. Demographic Data for Completed and Incomplete Responses for Experimental and Control Groups

	N	Females	Males	9th Grade	10th Grade	11th Grade	12th Grade	White	Non-White
Experimental Group Complete	94	47	47	27	44*	15	8	67	27
Experimental Group Incomplete	60	28	32	30	9	12	9	39	21
Control Group Complete	96	52	44	57*	15	11	13	78	18
Control Group Incomplete	89	38	51	27	36	15	11	58	31

Note: Complete=Both pretest and posttest questionnaires completed. Incomplete=either one or both of the pretest and posttest questionnaires were not completed.
*$p<0.05$

RESULTS

A total of six teachers implemented the ACS media-based project to a total of 154 students. Student participants included 79 boys and 75 girls and represented 9th (N=57), 10th (N=53), 11th (N=27), and 12th (N=17) grades. Ethnic composition reflected a predominantly White (non-Hispanic) sample (N=106). The control group consisted of 185 students comprised of 90 girls and 95 boys, 136 White (non-Hispanic) students, and represented 9th (N=84), 10th (N=51), 11th (N=26), and 12th (N=24) grades. A total of 94 experimental group participants (61%) and 93 control group participants (52%) completed both the pretest and posttest surveys. These respondents were analyzed to determine changes in behavior. Breakdown of the demographic distribution of these respondents is provided in Table 1 and also includes the demographic distribution of individuals who did not complete both a pre- and posttest behavioral questionnaire. Two-by-two chi-square analysis revealed no significant frequency differences between the complete experimental group and complete control group in gender or ethnic compositions (χ^2=0.37 and 2.61, respectively), but did reveal a significant difference in frequency distributions related to 9th and 10th grade. Specifically, the control group had significantly more 9th graders, and the experimental group had significantly more 10th graders (χ^2=24.96; $p<.001$). All 154 experimental group participants completed a project perception questionnaire.

Behavioral Impact

Overall, the control group remained consistent in its nutritional behaviors based on pretest–posttest comparisons. Although tennis and racquet-related sport involvement increased from pre- to posttest, physical activity related to walking/running or biking for 30 minutes significantly decreased, as did self-reported moderate involvement in running/jogging/swimming. In comparison, the experimental group reflected a significant increase in eating salads and greens, consuming more juice, as well as significantly increasing their involvement in baseball/softball/Frisbee (Table 2). Further analysis indicated specific changes among the experimental group that were gender specific. Among girls there was a cluster of positive nutritional behavior changes. Specifically, girls reported consuming more fruit and more fruit juice, while eating fewer French fries, potato chips, and pastries. They also reported a slight, albeit significant, increase in playing tennis/racquetball. In comparison, control group female participants reported no change in nutritional behaviors. However, they did report significant increases in physical activity related to walking/running/biking and tennis/racquetball.

Male results reflected significant increases in French fry and potato chip consumption for both the control and experimental groups, while male experimental group participants played more baseball/Frisbee/softball and male control group participants became more involved in running, jogging, and swimming. Informal discussions with teachers suggest differences were related to different physical education class activities in the control group (i.e., some teachers admitted to providing occasional physical activity opportunities during the study period).

Although the experimental group pretest–posttest scores demonstrated significant differences in behavior change, especially among girls. Posttest score comparisons between control and experimental groups revealed only two significant differences. The Generation Fit female girl students reported consuming significantly more cooked vegetables (t=2.01, df=162, $p<.05$), and boys in the control group reported participating in running, jogging, and swimming significantly more often than the Generation Fit male group (t=2.00, df=172, $p<.05$). No significant behavior differences were found between the two groups at pretest.

Student Perceptions of Project

Experimental group perceptions toward the project were predominantly favorable. Forty-eight percent rated the project as interesting or very interesting versus 22% who rated it as slightly interesting or not interesting at all. Forty-three percent rated the project as more interesting or a lot more

Table 2: Comparison of Significant Behavioral Changes Between Groups and by Gender.

ITEM	Experimental Group				Control Group			
	Pretest	Posttest	t	df	Pretest	Posttest	t	df
Overall Sample		Mean	Mean			Mean	Mean	
Fruit Juice Consumption	1.88	2.11	2.61*	91	2.27	2.08	0.77	94
Green Salad Consumption	1.25	1.43	2.46*	91	1.33	1.39	0.97	95
Baseball/Frisbee/Softball Participation	1.44	1.79	2.91*	93	1.52	1.75	1.67	94
Walk/Run/Bike for 30 minutes	2.94	3.12	1.13	93	2.86	3.29	2.38*	94
Moderate Run/Jog/Swim	2.25	2.46	1.53	92	3.12	2.82	1.99*	94
Tennis/Racquetball	1.09	1.20	1.57	93	1.29	1.67	3.18*	94
Females Only								
Fruit Consumption	1.73	2.02	2.96*	46	1.94	2.04	0.82	51
Fruit Juice Consumption	1.86	2.11	2.30*	45	2.51	2.08	0.99	50
French Fries, Potato Chip Consumption*	1.43	1.66	2.20*	46	1.62	1.56	0.60	51
Pastry/Donut Consumption	1.96	1.66	2.09*	46	1.94	1.87	0.60	51
Walk/Run/Bike for 30 minutes	2.77	3.02	1.05	46	2.65	3.21	2.46*	51
Tennis/Racquetball	1.05	1.26	2.35*	46	1.25	1.86	3.83*	51
Males Only								
French Fries/Potato Chip Consumption	1.41	1.69	3.00*	46	1.50	1.84	3.32*	43
Baseball/Frisbee/Softball Participation	1.46	1.91	2.25*	46	1.77	1.93	0.67	42
Moderate Run/Jog/Swim	2.18	2.39	1.34	46	3.16	2.63	2.56*	42

Note: Nutritional scores are based on 24-hour recall consumption frequency values of 0, 1, or 2 times. Physical activity behaviors are based on past 7-day frequency scores where 1=0 days; 2=1 day; 3=2 days; 4= 3 or 4 days; and 5=5 or more days. *denotes a higher score reflecting less consumption. N=df+1.
*$p<.05$.

interesting than other projects done in the class. Only 16% rated it less interesting. Forty-nine percent rated their group's media message as effective or very effective, whereas only 20% rated their message slightly effective or not effective at all. In terms of perceived behavioral change, 34% of those who participated in this project indicated an increase in their physical activity levels, and 42% indicated improved eating habits.

Perceived benefit of their own media message affecting a positive difference in their school was reflected in 76% of the responses. Perceived improvement in advocacy skills was reported by 46% in their ability to create an effective media message, 45% in their ability to create an action plan, 38% in their ability to contact the media and make a press release, 38% in their ability to speak in front of peers, and 41% in their ability to work effectively in a group. In comparison, only 7 to 10% reported a decrease in their advocacy skills, whereas 44 to 53% reported no change in their advocacy skills. Mean and standard deviation results by question item are provided in Table 3.

Predominant student verbatim responses indicated the Message Magic project was "fun" and provided opportunity for group interaction and working with others. The fact that they were engaged in a task with others rather than doing normal class work or book work appeared to be appealing. Students reported that they liked the sense of accomplishment they felt completing the project and satisfaction that they were doing something that would be helpful to others. The project also received a cluster of favorable responses related to the creativity and artistic elements intrinsic to the project. There was also a small cluster of positive responses related to learning how to eat better and the health benefits to the body. What students least liked about the project was the amount of work and time required to do the Message Magic project. However, many of the negative time-related responses reflected a need for more time so that they could do a better job rather than the project being too long. Other negative comments clustered around having too few resources to do the project, speaking in front of others, and having to think of a media message.

Student Variability by Teacher

A one-way ANOVA was conducted to determine student perceptual differences of the project by teacher. Each student project question was assessed for variability among the teachers participating in the study. Results indicated significant differences on all but three measures (those that related to two perceived personal behavior changes, and the value of the journal to the project). See Table 3 for F-score results by survey item. Data indicated students of two teachers consistently rated the project

Table 3. Student Ratings of ACS Message Magic Generation Fit Project, and Variability in Ratings by Teacher (*F*-values)

ITEM	Mean	S.D.	F-value
How interesting was the work you performed to complete the group project?	3.44	1.12	17.41*
Compared to other projects that you have completed in this class how interesting was this project?	3.44	1.06	13.60*
How effective was your group's media message in promoting healthy eating and/or being physically active in others?	3.75	1.28	7.20*
How useful to you was keeping a journal in helping you learn about media messages?	2.42	1.26	1.14
Compared to your physical activity habits prior to participating in this project, how much more or less active are you now?	3.40	0.87	0.32
Compared to your eating habits prior to participating in this project, how much better or worse are your eating habits now?	3.42	0.81	1.39
Compared to their physical activity habits prior to participating in this project, how much more or less active are your classmates now?	3.26	0.74	4.51*
Compared to their eating habits prior to participating in this project, how much better or worse are your classmates'eating habits now?	3.19	0.58	4.96*
As a result of this project how much of a positive difference has your group made in your school or community?	2.67	1.23	3.67*
Compared to how you felt prior to your participation in this group project, how much more or less confident do you feel in your ability to create media messages that influence other people to eat healthier and/or be more physically active?	3.49	0.87	5.39*
Compared to how you felt prior to your participation in this project, how much more or less confident are you in your ability to create an action plan?	3.50	0.96	3.76*
Compared to how you felt prior to your participation in this project, how much more less confident are you in your ability to contact the media or develop a press release?	3.43	0.94	4.61*
Compared to how you felt prior to your participation in this project, how much more or less confident are you in your ability to speak in front of a group of your peers?	3.43	0.95	2.50*
Compared to how you worked in a group prior to participating in this project, how much more or less effective are you in working in a group?	3.51	0.91	2.54*

Note: All questions are based on a 5-point Likert-type scale where 1 denotes the lowest (negative) score; 3 denote a neutral score; and 5 the highest (positive) score. Student N=154; teacher N=6.
*$p<.05$

significantly higher (more favorable) than the other teacher groups, and students from one teacher group consistently rated the project significantly lower than the other teacher groups. Student verbatim responses from the two high-performing teacher groups and the low-performing teacher group reinforced the notion of teacher variability in the execution of the Message Magic project as demonstrated in the ANOVA results.

DISCUSSION

Data suggest the ACS Generation Fit project Message Magic was an engaging educational intervention that had a positive behavioral impact on adolescent students, especially girls. The fact that participants demonstrated more improved nutritional and physical activity behaviors than the control group suggests the project may be a useful one to implement. Specifically, the finding that physical activity behaviors outside class did not decrease among participants, and even increased slightly among boys, despite the project being implemented during their regular physical education classes, was encouraging. This is potentially significant given that class time normally provided opportunity for regular activity. Subsequently, it was expected that outside activity patterns would have decreased. Further, although the intent of the project was to enhance health advocacy skills and promote healthy behaviors within the school or community, girls indicated a cluster of improved nutritional behaviors that suggest the project was having a behavioral impact on participants even though no direct intervention was aimed at improving their personal eating habits.

We identify three programmatic and

theoretical explanations for these results: (1) the participatory elements of the project (group work, no book work, creativity, media-oriented, fun); (2) the media analysis and creation dynamic may have influenced student behavior by covertly positioning a behavior in a higher priority in their mind; and (3) self-directed learning may have motivated and influenced student health decisions.

Students intimate that the message is the medium. That is, health information will impact behavior if the context in which they learn it (or in this case use it) is interesting and engaging. If health educators create an environment that is engaging, then students' health knowledge, skills, and behavior may be positively impacted. Rote memorization of health-related information from institutionalized information sources, within the context of the traditional teacher-student environment, has not shown positive results in health information retention, critical analysis, or behavior change (Kirby, 1992; Turning Points, 1989). Turner, Norman, and Zunz (1993) suggested that a paradigm shift from traditional lecture and instructional methods to engaged, self-directed learning in health education is necessary if we wish to move adolescents to healthier behaviors. Results suggest that this ACS project makes that shift.

Today's adolescents are also much more media savvy than previous cohorts due to the sheer bombardment of media channels in today's society (Villani, 2001). The technological and media-based culture of today with the myriad of electronic mediums and channels predispose adolescents to a host of value-laden messages that can potentially threaten healthy behavior (Villani, 2001). However, immersion in a media-based culture may also promote an interest in and savvy toward media messaging. Student comments and ratings of this project reflect and support this notion. They have become media and message consumers and may have a cultural bias toward the messages that bombard them from multiple directions (Brown & Witherspoon, 2002). Analyzing and creating media messages may appeal to their cultural interests, making this ACS project more interesting and fun than traditional health education knowledge-based approaches. They are aware of the impact media images have on body image and behavioral choices, and having the opportunity and challenge to use the same medium to create a counter message seemed to promote interest and learning because it reflects their cultural reality.

The process of creating a media message to promote physical activity and good eating habits may also force the participants to think more critically about their own behavior. To create a message and produce a media product requires the participants to research why these behaviors are beneficial and/or the health consequences of not adopting them. The project however does this covertly rather than overtly (as is the case with classic lecture-based health education). Students are doing research and analysis to create a health media/advocacy product. They are not engaged in the project for the purpose of changing their own behavior. But over the course of the project the self-reported behavioral data reflect some significant and positive health behavior change among participants. The decision to eat better, for example, may have been the result of focusing on messages necessary to advocate healthy nutritional behavior. In other words, they may have become their own best consumers. It is also plausible that participants were merely giving socially desirable responses. This being the case, there should have been change in the control group as well via a Hawthorne effect, but this was not found. However, the scales used in this study assess a 1-day dietary consumption and a 7-day recall of exercise behavior, not value rankings of nutrition and exercise behavior. It is less likely that these scales would be vulnerable to socially desirable responses.

Among project participants, the gender difference for eating behavior change was somewhat dramatic. Girls indicated a cluster of significantly healthier eating changes. Apart from the possible inherent media-based mechanism of the project, one reported reason girls in the study may have eaten better is that they have more of a social proclivity toward healthy eating patterns than boys (Kelder et al., 1995). This is supported by other research that found older adolescent girls tended to eat more fruits and vegetables and fewer high-fat foods than adolescent boys (Robinson & Killen, 1995). In comparison, boys have consistently reported being more physically active than girls, even though they also spend more time watching television (Kelder et al., 1995; Robinson & Killen, 1995). However, the question remains as to why this occurred in the experimental group, but not in the control group? Perhaps through the analysis of media messages, which serve to create and establish subjective norms, participants reacted in gender-specific manners. Girls focused on dietary behaviors and boys on physical activity behaviors (Brown & Witherspoon, 2002; Sallis, 1993). This notion is supported by the social cognitive theory, which emphasizes the importance of role models and the subjective norm as major influences on health decisions being made by young people (Bandura, 1977).

Development of advocacy skills was a major component of this project. Based on the self-reported results it appears this project had a positive impact on skill development. Significant skill improvement was reported by 38 to 46% of the students. Teachers unanimously reported to ACS project supervisors that the project was effective in developing all student advocacy skills targeted in the project. The teacher perceptions may be based on the practical and engaging components of the project. Students learn behaviors by actively doing them rather than passively learning about them. This has been long advocated in the health education literature (Scales, 1991). Christopher, Nangle, and Hansen (1993) suggest that health-related educational activities that incorporate social skills are essential to developing advocacy skills such as those targeted in this project. In addition, the problem-solving nature of the activity

coupled with a social context may have the potential for a greater impact on behavior (Tisdelle & St. Lawrence, 1988). The behavioral changes demonstrated in this study seem to support this notion.

One caveat to the outcomes in this study was that project effectiveness was significantly determined by the teacher. Anecdotally, interviews with ACS project supervisors indicated that teachers who were more enthused about the project and followed the ACS training more exactly had much higher and more positive outcomes than teachers who were noticeably less enthused and exact. Cullen and colleagues (1999), in an assessment of the impact of school organizational factors on school health promotion program outcomes, also found that teacher job satisfaction and organizational climate had a direct relationship with program effectiveness. This may have been partly responsible for the teacher variability in outcomes and project ratings.

Despite the significant behavior changes among the project participants, overall there was little significant difference in behavior measures at posttest between the project participants and the control group. This could reflect a lack of sensitivity in measurement. Although the instruments employed in this study were appropriate, they may not have been sensitive enough. Indeed, self-reported measures of adolescent dietary and physical activity behavior levels are a continual problem (Brener et al., 2002). In addition, this study was conducted over an 8-week period that spanned the late winter to spring season. As the weather became more favorable to outdoor physical activity, it may have led to a slight improvement in physical activity patterns among the control group (e.g., increased participation in baseball, softball, and racquet sports). However, this extraneous variable is less applicable to the dietary behavior changes demonstrated among female project participants.

Limitations

Although the results indicate that the ACS Generation Fit Message Magic project had positive outcomes and significant behavioral changes, results must be interpreted conservatively. The self-report nature of data needs to be taken into account as well as the potential for participants to provide socially desirable responses.

There is the possibility for a Type II error in this study in that data allows for a rejection of a false null hypothesis; however, the direction and/or source of inference may be mistaken. There may be some other extraneous variable that accounts for the differences in behavior changes between the control and experimental groups. The finding that there was very little difference in behaviors at posttest between the two groups suggests overall effectiveness of the project in eliciting healthy behaviors may not be as dramatic as the within-group project participant (especially female) changes would indicate. In addition, not all teachers implemented the control group instruction as required (Type III error). Some allowed the control group to engage in physical activity during their regular class time. Finally, there were differences in survey response rates due to student absences, failure to turn in the survey, and incomplete data on the survey that may have introduced some bias into the results. However, the final sample size was suitable for analysis, and response rates and demographic distributions between the two groups were comparable.

CONCLUSION

Despite these limitations, data suggest the Message Magic: Selling Healthy Eating and Physical Activity project of the American Cancer Society's Generation Fit program may be a viable educational activity to promote positive health behaviors and health advocacy skills among adolescents. It proved to be a positive educational experience for students; however, more studies are recommended to determine whether the project can consistently impact positive behavior change across a wide variety of student populations.

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