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Analysis of Participatory Photojournalism in a Widely Disseminated Skin Cancer Prevention Program

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This article describes the content of pictures submitted to a photo contest as part of a nationally disseminated skin cancer prevention program called Pool Cool. The aims of this analysis are to describe sun-safety behaviors and environmental supports depicted in the photos and to gain insight into pool staff perceptions of the program. A directed approach was used to assess the content of 1,886 photos submitted in 2005 and 2006. Staying in the shade and applying sunscreen were the most common sun-safety behaviors shown among children. Among adults and lifeguards, wearing sunglasses and a shirt with sleeves were most common. Most photos contained at least one sun-safety support, and half showed use of Pool Cool program materials. Most photos promoted the use of Pool Cool materials, sun-safety behaviors, or sun-safe pool environments. Participatory photojournalism is a low-cost and effective way to generate widespread interest and support for community health promotion programs.

Keywords: *cancer prevention; health promotion; image analysis; photography*

Many studies have used photo content analysis to examine the meaning and use of photographs in promoting initiatives that address various health issues (Carlson, Engebretson, & Chamberlain, 2006; Duerksen et al., 2005; Ferguson, Hardy, & Williams, 2003; Wang & Burris, 1997). Content analysis is a research technique that describes the content of communication, including text, photos, or any other meaningful matter, using objective, systematic, and quantitative methods (Kassarjian, 1977). Photo content analysis provides insight into the messages, meanings, and/or themes conveyed through photographs as part of a program or other initiative or to gain insight into people's perceptions about a topic (Coleman & Wasike, 2004; Dinklage & Ziller, 1989; Len-Rios, Rodgers, Thorson, & Yoon, 2005).

Public health programs are often evaluated through the eyes of researchers, examining aspects of the program such as efficacy, feasibility, and program processes. The literature provides less information on how these initiatives are perceived by program participants. "Participatory photojournalism" documents program participation and implementation through the eyes of participants and may reinforce core messages and strategies of a health promotion and prevention program. This article describes the content of photos submitted to a photo contest as part of a nationally disseminated effective skin cancer prevention program. According to social cognitive theory, there are continuous reciprocal interactions between people, their physical and social environments, and behaviors (Bandura, 1986). One would expect that participant photos could provide valuable information about the physical and social environments at participating pools as well as the individual sun protection behaviors of those photographed.

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The main aims are to describe and explore the sun-safe behaviors and sun-safety supports depicted in the photos and to gain insight into participants' perceptions of the program.

BACKGROUND

Pool Cool is a multicomponent skin cancer prevention program that was shown to have significant positive effects on children's sun protection behaviors and on sun-safety environments at swimming pools in a randomized trial (Glanz, Geller, Shigaki, Maddock, & Isnec, 2002). The program was also found to reduce sunburns among lifeguards in two ethnically and geographically different groups (Geller et al., 2001). After a pilot dissemination study demonstrated the acceptability and feasibility of the program in diverse community aquatic settings (Glanz, Isnec, Geller, & Spangler, 2002), a nationwide diffusion trial was launched.

METHOD

The diffusion trial took place from 2003 to 2006 and was designed to compare the effects of two strategies (Basic vs. Enhanced) for dissemination of the Pool Cool program. The study used a three-level nested experimental design (regions, pools, and individual study participants). Pools were clustered by region, and each cluster of pools (4-15 pools) had a field coordinator who served as a linking agent between the research team and participating pools. Field coordinators and their cluster of pools were stratified according to latitude (north–south) and pool size (large–small) and randomized to receive either the Basic or Enhanced program (Glanz, Steffen, Elliott, & O'Riordan, 2005).

The program has both educational and environmental components. Educational components include a leaders' guide, a series of eight sun-safety lessons to be taught at the start of swim lessons, a book of colorful illustrations to use with the lessons, and additional interactive sun-safety poolside activities. Environmental components include a Decision Maker's Guide to developing and implementing sun-safe pool policies, a 1-gallon pump bottle of sunscreen, and aluminum sun-safety signs to be placed around the pool area. Pools in the Enhanced group received these standard Pool Cool materials plus additional sun-safety incentive items, educational materials, and environmental resources (Glanz et al., 2005).

During the last two summers of the diffusion study, pools in the Enhanced group were invited to participate in a "Frequent Applier" program, created to reward pools that were more active and involved in the Pool Cool program and the cause against skin cancer. Pools earned Frequent Applier points for increased program participation and could redeem the points for prizes such as additional incentive items and environmental supports.

As part of the Frequent Applier program, each pool was provided with a logo-designed disposable camera containing 27 exposures. Staff were encouraged to take photos of the Pool Cool program in action, and pools received three points for submitting the photos to a Pool Cool photo contest. The selection of winning photos was a two-step process. First, a panel of judges made up of Pool Cool research staff selected their favorite photos within four predetermined categories: Sun Safe Group, Sun Safe Pool Environment, Pool Cool in Action, and Most Creative. Then, students, faculty, and staff members at the research headquarters voted on the final winning photographs in each category.

Coding of Photo Content

Digital copies of all photos were organized by pool, region, and year, and each photo was assigned a unique 11-digit identification number, indicating the year, region, and pool. Photos that appeared unintentional (e.g., a picture of the ground), photos of the pool name only (used for identification purposes), those in which at least three fourths of the picture was blurry or indistinguishable, those that did not appear to be taken in a pool environment, and duplicate photos were excluded from analysis. In the case of duplicate photos from the same pool, only one copy was analyzed.

A directed approach was used to analyze photo content, and research staff used theory and relevant research findings to guide the development of the initial coding categories (Hsieh & Shannon, 2005). A coding form was developed specifically to collect the following information

about each photo: (a) location of the photo (inside vs. outside); (b) number and type of people in the photo (children, pool staff, and/or other adults); (c) sun-safety behaviors occurring in the photo; (d) number and type of shade structures in the photo; (e) number of sun-safety signs, Pool Cool program materials and incentive items, and other sun-safety supports visible in the photo; and (f) theme(s) of the photo. When recording information about sun-safety behaviors occurring in the photo, coders recorded the number of children, lifeguards, and other adults shown applying sunscreen, wearing a hat, wearing sunglasses, wearing a shirt with sleeves, and/or staying in the shade. When coding photo themes, coders were instructed to indicate the primary theme and up to two secondary themes from a list of themes provided on the coding form. Theme options were Pool Cool lessons in action, Pool Cool poolside activity, promotion/use of Pool Cool materials, sun-safe group pose, sun-safe pool environment, and fun/humorous sun-safety. For the category "Pool Cool poolside activity," the coder was instructed to also specify which poolside activity was occurring in the photo. An additional category labeled "other" was included with space for a description of the photo to capture themes that did not fit into the main list of themes.

Two research staff coded all photo content. The staff initially coded all photos from a randomly selected pool (n = 26 photos) to check for interrater reliability. If any kappa values for item agreement were below the acceptable level (kappa = 0.8), the discrepancies were discussed and resolved. The two coders continued to double-code photos until acceptable interrater reliability was reached (kappa = .92). Interrater reliability was rechecked twice during the coding process to ensure that consistent coding was maintained between the two raters (kappas = .83 and .86).

After initial coding was completed, photos with a theme coded as "other" were reviewed to see if additional themes emerged. One additional sun-safety-related theme ("promotion/use of sunscreen") was identified. Several additional themes not related to sun safety were also identified. A theme labeled "people" was used to capture photos of lifeguards, children, or other pool patrons that did not appear to promote sun-safety in any way. A theme labeled "swimming lessons" was used to capture photos of swimming lessons taking place at the pool. This category did *not* include photos of Pool Cool sun-safety lessons being conducted during swimming lessons. A category labeled "pool area" was used to capture photos of the pool area in which there were no visible sun-safety supports or promotion of sun safety. Finally, a category labeled "fun/humorous (other)" was used to capture humorous photos that did not appear to be related to sun-safety or sun-safety promotion.

Protection of Participant Rights and Welfare

The protocol for the diffusion study received approval from the institutional review boards at the University of Hawaii in 2003 and Emory University from 2004 through 2008. The collection of additional information from participant photographs was considered exempt from further IRB approval because it involved the study of existing data documents in such a manner that subjects could not be identified (U.S. Department of Health and Human Services, 2005).

Data Analysis

Data analysis was a two-stage process. Both stages of analysis focused on computing frequencies and percentages, and analyses were done for both the overall sample and by year. In the first stage of analysis, the unit of analysis was a single photo. Frequencies were computed for photo location and photo theme. The percentage of photos containing Pool Cool items, shade structures, sun-safety signs, and other supports were computed along with the percentage of photos depicting more than one sun-safety support and the percentage of photos not depicting any sun-safety supports.

In the second stage, the unit of analysis was an individual person or item within the photos. For analyses of information about sun protection behaviors depicted in the photos, the unit of analysis was one person. The total number and percentage of children, lifeguards, and other adults engaging in each of five key sun-safety behaviors (applying sunscreen, wearing sunglasses, a hat, or a shirt with sleeves, and staying in the shade) in the photos were computed, while stratifying by photo location (outside vs. inside). For analyses of information about lifeguard stands shaded by umbrellas, the unit of analysis was a single lifeguard stand. The percentage of occupied lifeguard stands covered by an open umbrella and percentage of unoccupied lifeguard stands with an open or closed umbrella on the stand were computed.

Chi-square tests were used to assess differences between 2005 and 2006 photos. Analyses were computed using SPSS 16.0.

RESULTS

In 2005, 58 of the 201 pools in the Enhanced group submitted photos for the photo contest, and in 2006, 43

TABLE 1
Percentage of Children, Lifeguards, and Other Adults Engaging in Sun-Safety Behaviors

	Outside: 1,645 Photos (87.2%)	*Inside: 241 Photos (12.8%)*
Children	*n* = 5,608 children	*n* = 117 children
Sunscreen	900 (16.0)	13 (11.1)
Sunglasses	72 (1.3)	1 (0.9)
Hat	127 (2.3)	4 (3.4)
Shirt with sleeves	545 (9.7)	18 (15.4)
Shade	1,306 (23.3)	N/A
Lifeguards	*n* = 1,407 lifeguards	*n* = 235 lifeguards
Sunscreen	118 (8.4)	43 (18.3)
Sunglasses	584 (41.5)	86 (36.6)
Hat	231 (16.4)	53 (22.6)
Shirt with sleeves	379 (26.9)	121 (51.5)
Shade	379 (26.9)	N/A
Other adults	*n* = 633 adults	*n* = 29 adults
Sunscreen	8 (1.3)	4 (13.8)
Sunglasses	253 (40.0)	9 (31.0)
Hat	95 (15.0)	3 (10.3)
Shirt with sleeves	283 (44.7)	14 (48.3)
Shade	168 (26.5)	N/A

TABLE 2
Percentage of Photos Containing Sun-Safety Supports[a] (*n* = 1,886 Photos)

Number of photos containing . . .	n *(%)*
Pool Cool items	927 (49.2)
Shade structures[b]	792 (42.0)
Pool Cool sun-safety signs	129 (6.8)
Other sun-safety supports	70 (3.7)
At least one sun-safety support	1,395 (74.0)
More than one type of sun-safety support	622 (33.0)
No visible sun-safety supports	491 (26.0)

[a]Photo could contain more than one of the sun-safety supports listed above.
[b]Includes shade from tents, awnings, umbrellas, trees, and building shade.

of 126 Enhanced group pools submitted photos. A total of 2,198 photos were submitted (1,251 photos in 2005 and 947 photos in 2006). Three hundred twelve photos were excluded from analyses because they were blurry or unclear (54 photos), were duplicates (158 photos), did not appear to be taken in a pool setting (21 photos), or were photos of the pool name taken for identification purposes (79 photos). Of the photos submitted in 2005, 1,108 (88.6%) were coded. Seven hundred seventy-eight (82.2%) of the photos submitted in 2006 were coded, for a total of 1,886.

Most of the photos coded were taken outside (87.2%). Table 1 shows the percentage of children (*n* = 5,725), lifeguards (*n* = 1,642), and other adults (*n* = 662) visibly engaging in each of five sun-safety behaviors in photos taken outside and in photos taken inside. Among children, staying in the shade was the most frequently depicted sun-safety behavior in the photos (23.3% of children in outside photos), followed by wearing/applying sunscreen (16.0% of children in outside photos). Among lifeguards, wearing sunglasses was the most common sun-safety behavior depicted in the photos, and 41.5% of lifeguards in photos taken outside were wearing sunglasses. Among other adults, wearing a shirt with sleeves was the most often shown sun-safety behavior (44.7% in outside photos), followed by wearing sunglasses (40.0% in outside photos).

The percentage of lifeguard stands in the photos (*n* = 570) visibly protected by umbrellas was computed for both occupied and unoccupied stands. Of the 212 occupied lifeguard stands visible in the photos, 68.9% were shaded by an open umbrella. Of the 358 unoccupied lifeguard stands visible in the photos, 32.1% were shaded by an open umbrella or had an unopened umbrella attached to the stand. Table 2 shows the percentage of photos containing sun-safety supports. Most photos (74.0%) contained at least one sun-safety support, and Pool Cool items were visible in almost half of the photos.

The frequencies of primary and secondary themes of the photos were also computed (Table 3). The most common primary themes were promotion/use of Pool Cool materials (27.1%), people (17.8%), and sun-safe pool environment (13.0%). Promotion of or use of the Pool Cool materials (22.4%) and sun-safe pool environment (12.5%) were the most common secondary themes.

Differences between 2005 and 2006 photos were also analyzed. There was no significant difference in the number of photos submitted per pool or coded per pool between the two years. Children in photos taken outside in 2006 were significantly more likely to be wearing or applying sunscreen (20.10% vs. 13.68%, $p < .001$), wearing sunglasses (1.74% vs. 1.02%, $p = .02$), wearing a hat or visor (3.62% vs. 1.47%, $p < .001$), and staying in the shade (25.41% vs. 22.05%, $p = .004$) than children

TABLE 3
Primary and Secondary Themes of the Photos (n = 1,886 Photos)

	Primary Theme	*Secondary Theme*
Promotion of/attention to the Pool Cool program		
Promotion/use of Pool Cool materials	511 (27.1)	422 (22.4)
Pool Cool poolside activity	187 (9.9)	9 (0.5)
Pool Cool lessons in action	174 (9.2)	1 (0.1)
Promotion of general sun safety		
Sun-safe pool environment	245 (13.0)	236 (12.5)
Fun/humorous sun safety	63 (3.3)	50 (2.7)
Promotion/use of sunscreen	84 (4.5)	0 (0.0)
Sun-safe group pose	56 (3.0)	22 (1.1)
Photos that do not appear to promote sun safety[a]		
Fun/humorous	80 (4.2)	9 (0.5)
People	335 (17.8)	0 (0.0)
Swimming lessons	55 (2.9)	0 (0.0)
The pool area	52 (2.8)	0 (0.0)
Other	44 (2.3)	0 (0.0)

Note: Photos were coded with one primary theme and up to two secondary themes.
a. No Pool Cool program materials or sun-safety supports were visible in these photos.

in photos taken outside in 2005. However, children in photos taken outside in 2005 were significantly more likely to be wearing a shirt with sleeves than children in photos taken outside in 2006 (12.46% vs. 7.98%, $p < .001$).

There were fewer significant differences found in the sun-safety behaviors of lifeguards and other adults between the two years. Lifeguards in photos taken outside in 2006 were significantly more likely to be wearing sunglasses (44.62% vs. 39.40%, $p = .05$) and wearing a hat (18.87% vs. 14.76%, $p = .04$) than lifeguards in photos taken outside in 2005. However, lifeguards in photos taken outside in 2005 were significantly more likely to be wearing a shirt with sleeves than lifeguards in photos taken outside in 2006 (30.24% vs. 22.05%, $p = .001$). Lifeguards in photos taken inside in 2006 were significantly more likely to be wearing a hat (28.78 vs. 13.54, $p = .01$) and wearing a shirt with sleeves (59.71 vs. 39.58, $p = .002$).

Adults in photos taken outside in 2005 were significantly more likely to be wearing a hat than adults in photos taken in 2006 (17.77% vs. 10.46%, $p = .01$). Adults in photos taken outside in 2006 were significantly more likely to be staying in the shade than adults in photos taken outside in 2005 (34.73% vs. 21.57%, $p < .001$).

There were no significant differences between photos from the two years regarding the percentage of occupied or unoccupied lifeguard stands in the photos that were shaded. However, photos submitted in 2005 were significantly more likely to contain at least one sun-safety support (77.4% vs. 69.0%, $p < .001$) and significantly more likely to contain Pool Cool items (53.0% vs. 43.7%, $p < .001$) than photos submitted in 2006. Photos submitted in 2005 were also significantly more likely to contain multiple sun-safety supports (40.1%) than photos submitted in 2006 (40.1% vs. 34.5%, $p = .01$).

There were significant differences in the distributions of photo themes in 2005 and 2006. Photos submitted in 2005 were significantly more likely than photos submitted in 2006 to have the following themes: promotion or use of Pool Cool materials (29.42% vs. 23.78%, $p < .001$), Pool Cool lessons in action (10.38% vs. 7.58%, $p = .04$), sun safe pool environment (14.17% vs. 11.31%, $p = .04$), and promotion or use of sunscreen (5.78% vs. 2.57%, $p < .001$). Photos submitted in 2006 were significantly more likely than photos submitted in 2005 to have the following themes: fun or humorous sun safety (5.14% vs. 2.08%, $p < .001$), people (21.72% vs. 14.98%, $p < .001$), or swimming lessons (5.40% vs. 1.17%, $p < .001$).

DISCUSSION

Information about which preventive measures are more commonly and less commonly used is important to consider when raising awareness and educating the public about healthy behaviors and health promotion. Such information may guide future program development and help to address the needs of particular audiences. Lifeguards and other adults were observed wearing hats, sunglasses, and shirts with sleeves much more frequently than the children. Among children, staying in the shade was the most common sun-safety behavior observed, but even this behavior was observed in less than one fourth of the children in the photographs. Sunscreen use could not be accurately assessed in the photographs but is an important form of protection from UV exposure, especially in outdoor pool settings where it is less practical for individuals to cover up with protective clothing. The children applying sunscreen in photos were often participating in a Pool Cool poolside activity that uses colored sunscreen. Children were rarely observed wearing hats or sunglasses. Sunglasses are not commonly worn among children,

and other research also suggests that children at outdoor pools use sunglasses less frequently than pool staff or parents at the pool (O'Riordan, Glanz, Gies, & Elliott, 2008). Although children were least likely to be engaging in sun-safe behaviors in the photos, the results indicate that sun protection behaviors need improvement among all three groups.

In addition to sun-safe behaviors, environmental supports for sun safety are a key component of the Pool Cool intervention and can have positive effects on the sun safety of the patrons and the staff at outdoor pools. The high prevalence of sun-safety supports in the photos suggests that pool staff recognize environmental supports as an important component of the Pool Cool program and as a strategy for improving sun safety at outdoor pools. The decrease in percentage of photos depicting sun-safety supports or Pool Cool items from 2005 to 2006 is worth noting. The summer of 2005 was the first opportunity the pool staff had to participate in the Pool Cool photo contest. By the 2nd year of the photo contest, the novelty of the photo contest or enthusiasm for the program itself may have started to wane among pool staff and this might account for fewer photos showing environmental supports. The results do not necessarily reflect a decrease in the use of sun-safety supports or Pool Cool items because the photos cannot be assumed to be representative of all situations. However, the results suggest that efforts to keep health education programs fresh, new, and exciting may maximize program participation and, ultimately, the impact of the program.

Although the photos from 2005 were more likely to feature sun-safety supports, the 2006 photos showed more individuals engaging in sun-safe behaviors. Actual changes in use of sun-safety supports or sun-safe behaviors could not be measured by the photo data, but they may be interpreted as reflecting how much participants focused their attention on behaviors and/or environments. Thus, the results suggest a trend in which participants focused on portraying sun-safe *environments* in the 2005 photos and focused more on sun-safe *behaviors* in the 2006 photos. Most likely, pools that introduced changes into the pool environment (such as adding shade structures) did so early on, and they may have wanted to highlight these positive changes to the pool environment in their 2005 photos (the 1st year of the photo contest). In 2006, the pools likely had not made many additional changes to the pool environment and thus may have focused their lenses on pool staff and patrons engaging in sun-safety behaviors. This does not indicate that they removed or neglected environmental supports but may reflect their being less novel in 2006.

The themes of the photographs provide valuable information about participant perceptions of the Pool Cool program. Pool staff were encouraged to take photos of the Pool Cool program in action, and the majority of the photos captured the key messages of the Pool Cool program, even when the photos did not contain specific references to Pool Cool. These findings indicate that the main messages of the program were consistently and effectively communicated to participants. This is particularly important because the pool staff taking the photos were also responsible for delivering the Pool Cool program to the children at the pool.

Thirty percent of the photos did not contain any visible sun-safety supports or program materials and did not show any individuals engaging in sun-safe behaviors. Most of these photos were simply photos of people. Because pools were given a disposable camera with 27 exposures, it is to be expected that some of the photos the staff members took would be fun or playful photos taken without necessarily relating directly to the Pool Cool photo contest.

Strengths and Limitations

This article provides insight into participant perceptions of a skin cancer prevention program through the content analysis of 1,886 participant photos. The high volume of photos analyzed is unique and gives a new perspective on program implementation, use of program materials, and sun protection behaviors among individuals at the pools. The inability to determine the intentions behind the photographs is a significant limitation. Also, sunscreen use could not be fully measured by photos. Coders were only able to note individuals who were visibly applying sunscreen or were wearing the blue- or purple-colored sunscreen used as a poolside activity, and sunscreen use could not be accurately compared to the other sun-safety behaviors depicted in the photos.

► CONCLUSIONS

Participatory photojournalism is a unique way to document participant perceptions of health promotion and prevention programs as well as perceptions of the social and physical environments around them. The main objective of the Pool Cool program is to increase awareness, motivation, and sun protection practices among children ages 5 to 10 who take swimming lessons, their parents, aquatics staff, and other pool users. The program provides staff at participating pools with the sun-safety knowledge and tools to be role models and teachers to the children taking swimming lessons,

and it is important that staff perceptions of the Pool Cool program are in line with the main messages and goals of the program. The photos submitted by pool staff focused on sun-safe behaviors, sun-safe environmental supports, and Pool Cool program materials, all of which are important aspects of the program. However, the results suggest a need to further improve sun protection among the children, their parents, and the staff at the pools. Public health practitioners developing and implementing ongoing health education interventions should make efforts to keep their interventions new, fresh, and exciting for participants over time. Novel ways of engaging participants can enhance program participation and effectiveness. Furthermore, public health educators should encourage the maintenance of positive environmental changes and the general upkeep of such additions.

Participatory photojournalism is a low-cost and effective way to engage participants and generate interest and support for a program while also providing insight into participant perceptions of a program. Given the success of participatory photojournalism within the context of the Pool Cool program, public health practitioners should consider applying this strategy to other health promotion and prevention programs.

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