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Original

**Participant satisfaction with appearance-based versus health-based educational videos promoting sunscreen use: a randomized controlled trial**

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**Abstract**

**Background:** Increasing participant satisfaction with health interventions can improve compliance with recommended health behaviors and lead to better health outcomes. However, factors that influence participant satisfaction have not been well studied in dermatology-specific behavioral health interventions. We sought to assess participant satisfaction of either an appearance-based educational video or a health-based educational video promoting sunscreen use along dimensions of usefulness of educational content, message appeal, and presentation quality.

**Methods:** In a randomized controlled trial, participants were randomized 1:1 to view an appearance-based video or a health-based video. After six weeks, participant satisfaction with the educational videos was assessed.

**Results:** Fifty high school students were enrolled and completed the study. Participant satisfaction ratings were assessed using a pre-tested 10-point assessment scale. The participants rated the usefulness of the appearance-based video ( $8.1 \pm 1.2$ ) significantly higher than the health-based video ( $6.4 \pm 1.4$ ,  $p < 0.001$ ). The message appeal of the appearance-based video ( $8.3 \pm 1.0$ ) was also significantly higher than the health-based video ( $6.6 \pm 1.6$ ,  $p < 0.001$ ). The presentation quality rating was similar between the appearance-based video ( $7.8 \pm 1.3$ ) and the health-based video ( $8.1 \pm 1.3$ ),  $p = 0.676$ .

**Conclusions:** Adolescents rated the appearance-based video higher than the health-based video in terms of usefulness of educational content and message appeal.

**Keywords: patient satisfaction; sun protection; adolescents**

## **Introduction**

Epidemiological data indicate skin cancer risk is positively correlated with a greater number of sunburns and increased ultraviolet (UV) exposure during childhood [1-4]. Examining novel interventions that promote early adoption of sun protective behavior may impact how physicians discuss sun safety with younger patients.

Skin cancer prevention interventions have used various strategies to tailor education for younger target populations. For instance, message framing can influence healthcare decision-making by conveying health information in positive or negative terms [5]. Specifically, health messages that are “gain-framed” highlight the potential benefits of adopting a new behavior [6, 5, 7, 8]. In contrast, “loss-framed” messages emphasize the costs of *not* performing a specific behavior [6, 5, 7, 8]. Rothman et al. proposed that the relative persuasiveness of gain-framed or loss-framed health messages may vary upon the health behavior under consideration [5]. Particularly, gain-framed messages may better promote illness prevention behavior (e.g., wearing sunscreen to prevent skin cancer) because the risks of practicing such preventive behaviors are low [5]. On the contrary, loss-framed messages may better motivate illness detection behavior (e.g., self-examination for skin cancer) because the risk of practicing such behavior is relatively higher (i.e., the possibility of detecting a serious illness) [5].

The effectiveness of health interventions can be further improved through education tailoring. In particular, “health-based” and “appearance-based” messages have been used to educate patients [8]. Most early interventions are health-based in that they educate patients about the increase in skin cancer risk attributable to insufficient sun protection [9]. However, recent studies indicate that intentional UV exposure is correlated with personal beliefs that tanning enhances general appearance [10, 11]. Therefore, interventions that solely focus on the health risks of UV exposure may not be maximally effective in promoting behavior change. Appearance-based educational messages highlight how UV light can cause cutaneous damage and harm physical appearance. These messages may better address motivations behind the growing practice of tanning and may be more effective in promoting sun protective behavior in certain populations [8].

Enhancing participant satisfaction can be another means of increasing the effectiveness of health interventions. Satisfaction is a complex construct that represents how well an intervention meets the expectations of a patient [12]. Previous studies suggest that participant satisfaction can influence the acceptability of an intervention and the extent to which a patient integrates healthier behavior into everyday practice [12-14]. Although increasing participant satisfaction may help improve health outcomes [15], it has not been well studied within dermatology-specific behavioral interventions.

We previously demonstrated in a randomized controlled trial that an appearance-based educational video was more effective than a health-based educational video in promoting sunscreen use among adolescents [8]. The objective of this analysis was to apply quantitative measures of participant satisfaction to determine participant satisfaction with the educational videos.

## **Methods**

### **Study Procedures and Participants**

We conducted a randomized controlled trial at a high school located in Northern California from February through March 2012. Participants were randomized in a simple, 1:1, non-stratified randomization scheme. Randomization sequences were concealed within opaque numbered envelopes until interventions were assigned. A total of 50 participants were randomized to view either a 5-minute appearance-based educational video or a 5-minute health-based educational video.

Participants were eligible for the study if they were English-speaking, at least 13 years of age, and able to hear and view the educational videos. All participants were required to obtain parent/guardian informed consent and provide assent to participate. This study protocol was approved by the Institutional Review Board at the University of California Davis (IRB Protocol Number 251825).

### **Description of Educational Videos**

The two videos were similar in production and can be viewed online (health-based video: <http://youtu.be/wJ5nJLa6gtY> and appearance-based video: <http://youtu.be/jQDPKMItMCM>). Both videos featured the same multi-racial actress and engaged our target audience with popular culture references, humor, animation, and computer generated graphics.

The educational content was tailored for each video. Specifically, the appearance-based video emphasized how regular sunscreen use could help prevent premature photoaging. It also described how UV overexposure contributes to the development of wrinkles, sagging skin, and uneven skin tone. In contrast, the health-based video discussed how increased UV exposure and insufficient sun protection could increase skin cancer risk over time. The video also presented images of different skin cancers and reviewed how delayed detection of melanoma could lead to a poorer prognosis.

Each video used both gain-framed and loss-framed health information. For example, the appearance-based video discussed how wearing sunscreen could help maintain younger appearing skin (gain-framed) but also mentioned that not wearing sunscreen could lead to skin damage (loss-framed). Similarly, the health-based video explained how proper sun protection could prevent skin cancer (gain-framed) but also discussed how not wearing sunscreen could lead to melanoma (loss-framed).

## Scales and Measures

The satisfaction survey was administered at the end of the study (i.e., six weeks after viewing the educational video). We used three measures to evaluate participant satisfaction with the educational videos: evaluation of usefulness of the educational material, message appeal, and presentation quality. Each measure was assessed on a 10-point scale (1 indicating the lowest level of satisfaction and 10 indicating the highest level of satisfaction on that specific dimension). For example, usefulness of the educational material was measured by asking, "Please rate the usefulness of the educational material on a scale of 1 to 10, with 1 being least useful and 10 being most useful." Presentation quality was assessed with the question, "Please rate the presentation quality of the educational material on a scale of 1 to 10." Similarly, appeal was measured by asking, "Please rate how much you liked or enjoyed learning the educational material in the video on a scale of 1 to 10." These questions have been pre-tested in a prior study [16].

## Statistical Analysis

Data were analyzed according to an intention-to-treat approach using software (SPSS 20.0, IBM Corp, Armonk, NY). Chi-square tests were performed for categorical variables. Mann-Whitney test (non-parametric) was used to analyze continuous variables for between-group comparisons due to relatively modest sample size. Two-tailed tests were performed for all statistical analyses and  $P < 0.05$  was considered statistically significant.

## Results

Fifty participants enrolled and completed the study. The two study groups had no statistically significant differences in baseline characteristics (Table 1).

The appearance-based video received a mean ( $\pm$  standard deviation) usefulness rating of  $8.1 \pm 1.2$ , which was significantly higher than the usefulness rating of the health-based video ( $6.4 \pm 1.4$ ,  $p < 0.001$ ). The appeal of the appearance-based video ( $8.3 \pm 1.0$ ) was significantly higher than the health-based video ( $6.6 \pm 1.6$ ,  $p < 0.001$ ). The quality of presentation between the appearance-based video ( $7.8 \pm 1.3$ ) and health-based video ( $8.1 \pm 1.3$ ) was not significantly different ( $p = 0.676$ ).

**Table 1.** Demographic factors of participants randomized to the appearance-based video and health-based video.

	Appearance-based (n=25)	Health-based (n=25)	p value
<b>Sex</b>			
Female	19 (76%)	21 (84%)	0.725
Male	6 (24%)	4 (16%)	
<b>Age</b>			
Mean $\pm$ SD	17.1 $\pm$ 0.88 years	17.2 $\pm$ 0.44 years	0.991
<b>Ethnicity</b>			
White	3 (12%)	1 (4%)	0.609
Non-white	22 (88%)	24 (96%)	
<b>Skin type</b>			
Burns easily, difficult to tan	6 (24%)	5 (20%)	0.675
Tans after initial burn	4 (16%)	6 (24%)	
Tans easily, difficult to burn	15 (60%)	14 (56%)	

## No. of sunburns in last year

Mean  $\pm$  SD

1.08  $\pm$  1.11

1.00  $\pm$  1.12

0.801

Number of cases followed by percentages (in parentheses).

## Discussion

Developing interventions that promote early adoption of sun protective behavior can significantly decrease future risk for skin cancer. We previously reported that an appearance-based educational video was more effective than a health-based educational video in promoting *sunscreen use* among adolescents [8]. Examining components of interventions that increase effectiveness in promoting sun-protective behaviors is imperative and may inform clinical practice.

Past interventions have employed various strategies to improve adoption of sun protective behaviors. Framing educational messages to convey positive aspects of practicing a specific behavior (i.e., gain-framing) or negative aspects of not performing a behavior (i.e., loss-framing) is commonly utilized to increase persuasiveness of health information [5]. However, systematic reviews provide mixed results regarding the effectiveness of message framing [6, 17]. Recently, Gallagher et al. performed a systematic review of 94 studies to compare the persuasive impact of message framing on various health behaviors [6]. The review found that gain-framed messages appeared to be more effective than loss-framed messages in promoting preventive behaviors [6]. However, a Cochrane review that included 35 studies involving 16,342 participants concluded that message framing did not have a consistent effect on the health behavior of patients [17].

Although our educational videos used a balanced approach to present both gain-framed and loss-framed health information, each video contained tailored education. As previously mentioned, adolescents who viewed the appearance-based video applied sunscreen more frequently at 6-week follow-up than those who viewed the health-based video [8]. Although it appears that tailored education may help to better promote sunscreen use, O'Keefe et al. reported in a systematic review that neither message framing nor tailored education significantly enhanced the persuasiveness of educational messages promoting skin cancer prevention [18]. Hence, it may be inaccurate to attribute greater effectiveness of the appearance-based video to tailored education alone.

The mixed systematic review results suggest that additional factors need to be evaluated to improve effectiveness of behavioral health interventions. One such factor is participant satisfaction. Studies have shown that patients who are satisfied with the delivery of health interventions are more likely to participate in health care decision-making and more adherent to the intervention overtime [12-14]. However, the role of participant satisfaction in dermatology-specific interventions is not well characterized. We sought to apply quantitative measures of satisfaction to our educational videos promoting sunscreen use.

We found that the appearance-based video was rated higher in terms of usefulness of the educational content and message appeal. Discussing photoaging may have resonated more with our young target audience. Additionally, promoting sun protective behaviors that reduce the risk of premature skin aging may be considered more useful. In contrast, skin cancer risk may seem less pertinent to our study population and less effective in motivating health behavior change.

Though direct data are lacking, the possible relationship between usefulness of an intervention and improved outcomes is described in other studies [16, 19]. Armstrong et al. reported that an online video was more effective in promoting sunscreen use and had higher usefulness rating than a written pamphlet [16]. Moreover, participants with alcohol use disorder and depression rated the usefulness of supportive text message reminders high and perceived that these text messages helped them to remain abstinent from alcohol and improved mental health [19]. Interventions that are considered more useful by patients may also be better at influencing behavioral change.

The appearance-based video was also rated higher in terms of educational message appeal. Hedonic psychology helps explain the relationship between educational message appeal and behavioral change [20]. Specifically, Hedonic theory posits that individuals are motivated to adopt behaviors that are associated with high perceived value (e.g., bring pleasure) and avoid behaviors with low perceived value (e.g. bring displeasure) [20]. For instance, Schneider et al. reported that adolescents with a positive affect towards an acute exercise task would be more likely to participate in regular exercise [21]. In adults, positive affect also predicted increased likelihood of engaging in future exercise [22].

In this study, focusing on the short-term risk of UV light on physical appearance may have increased the salience of sun protection and consequently the perceived value of such behavior. This may be especially pertinent among adolescent patients who have

lower perceived risk of experiencing disease, such as skin cancer [23]. Therefore, concentrating on long-term skin cancer risk attributable to excessive UV exposure may carry lower perceived value and may be less effective in changing behavior.

Our results need to be interpreted in the context of the study design. To our knowledge, a standardized questionnaire measuring satisfaction with health interventions is not currently available. However, the questionnaire used in this study has been pre-tested in prior studies. Additional research can further define the role of satisfaction in dermatology-specific interventions using additional quantitative or qualitative methods.

Health behavior is complex, and numerous intervention components contribute to effective promotion of sun protective behavior. Although delivering accurate and up-to-date medical information is essential, framing educational messages that resonate well with target audiences may be equally important. Moreover, designing interventions that are sensitive to the changing preferences and needs of patients is a vital component of improving satisfaction and can maximize the effectiveness of future health interventions.

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