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“Choose Today, Live Tomorrow”: A Content Analysis of Anti-Substance Use Messages Produced by Adolescents

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Adolescent-produced anti-substance use messaging is an increasingly popular and effective prevention strategy. However, little is known about the content of these messages and the production elements adolescents use to bring that content to life. In this article, we present a content analysis of 95 anti-substance use messages developed by 4-H club members across nine U.S. states as part of their participation in the media literacy program REAL media. Posters and videos were content-analyzed for target substance, prevention goal, message form, message content, persuasion strategies, and production elements. Results of the content analysis revealed that combustible tobacco (smoking) was the most popular target substance in the sample among the choices of alcohol, marijuana, e-cigarettes, and chewing tobacco. More youth developed messages with the goal of preventing substance use, rather than stopping current use. Slogans were used in the majority of messages, and nearly all messages took an informational form, rather than narrative or statistical form. Persuasion strategies covered in the curriculum, including fun with the group, unexpected, style, and endorsement were scarcely used. Finally, results showed that production value was high in this sample, reflected by the extensive use of color and variety of fonts and font sizes. Implications for future media literacy interventions and research are discussed.

Growing evidence links exposure to adolescent-produced anti-substance use messaging to shifts in attitudes toward substance use (Banerjee & Greene, 2007, 2006) as well as decreasing substance use behaviors (Miller-Day & Hecht, 2013; Warren et al., 2006). These messages are significant because research indicates unhealthy and costly levels of substances use among adolescents (Johnston, O’Malley, Miech, Bachman, & Schulenberg, 2016). Although some research has been dedicated to describing the messages themselves (e.g., Banerjee & Greene, 2013; Banerjee, Greene, Hecht, Magsamen-Conrad, & Elek, 2013; Gordon, Jones, Kervin, & Howard, 2018; Krieger et al., 2013), relatively little is known about which types of message content are most prevalent and resonant among adolescents, let alone about the process of message creation itself. What type of messages are produced most and reflect adolescents’ engagement with an intervention? Given that adolescent substance abuse remains a significant public health concern (Johnston et al., 2016) and adolescent-produced messages are increasingly used as a prevention intervention (Andrade et al.,

2018; Evans et al., 2016; Greene, 2013; Greene et al., 2016; Hecht, Colby, & Miller-Day, 2010; Lantz et al., 2000; Nelson & Arthur, 2003), research is needed to better understand and implement this effective prevention strategy.

Youth-generated prevention messages are part of broader strategy called “counter-marketing” that has emerged in substance use prevention in order to respond to the pervasive and influential marketing efforts of tobacco, alcohol, and other drug companies (Evans, 2016, 2008). In contrast to mainstream marketing, counter-marketing is a form of commercial marketing that seeks to respond to and combat pro-substance use messaging. With origins in the 1980s “War on Drugs,” counter-marketing has now become a regular fixture in adolescents’ media landscape such as the truth® campaign or Above the Influence. Although studies suggest the tens of billions of dollars spent on tobacco, alcohol, and drug advertising influence adolescent substance use (Strasburger, Jordan, & Donnerstein, 2010; Strasburger, Wilson, & Jordan, 2009), others consistently show that health-promoting (Dunlop, Wakefield, & Kashima, 2010; Wakefield, Loken, & Hornik, 2010) and anti-substance use (Evans, 2008) marketing decrease risks for negative health behaviors. Much of the success of the latter is owed to the benefits of social modeling by peers, which is central to forming knowledge and attitudes (Bandura, 1986). This raises important questions about the role of peer messaging in substance use prevention.

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In recent years, some effective peer-produced counter-marketing efforts have been guided by media literacy theory (see Greene et al., 2016). Media literacy seeks to counter the onslaught of pro-substance use messaging adolescents receive from mass media by engaging teens in critical thinking about substance use and the media, teaching them principles of media message development from a content and form perspective, and teaching them to produce and disseminate their own, youth-created messages to peer networks (Andrade et al., 2018; Banerjee & Kubey, 2013; Greene et al., 2016). Media literacy interventions grounded in theories of the theory of active involvement (TAI) (Greene, 2013) and cultural grounding (Hecht & Krieger, 2006) theorize that active participation in message production shapes consequent attitudes and behavior through cognitive changes that result from engagement. The TAI, in particular, articulates what features are activated in the message planning and production process of an intervention, providing a plausible link and theoretical explanation between media literacy active involvement interventions and the effect(s) they have on participants. The TAI has components described broadly in social cognitive theory, and the full model is presented in Figure 1. According to TAI, there are four phases of response that link exposure to the intervention with hypothesized cognitive and behavioral outcomes: engagement, immediate outcomes (e.g., knowledge, perspective taking and critical thinking), reflection or perceived discrepancy, and cognitions such as expectancies, norms, and intentions (see also Banerjee & Greene, 2016). Engaging youth to design their own messages is a core strategy of interventions rooted in TAI and reflects the philosophy of “from kids through kids to kids” from related research (Greene, Banerjee, Ray, & Hecht, 2017; Krieger et al., 2013).

Media literacy research shows that adolescents enjoy creating their own messages (Andrade et al., 2018; Banerjee & Greene, 2006; Greene et al., 2016; Kubey, 2000; Lee, Hecht, Miller-Day, & Elek, 2011), a process that increases engagement in other elements of the interventions (e.g., criticism and analysis). Engagement in production can be enhanced through dissemination and competition in contests (Greene et al., 2016), particularly when they involve social media (Andrade et al., 2018). Sharing messages online and competing for the effectiveness of their messages motivates adolescents to invest more energy and intervention-based knowledge and skills into their own anti-substance use messages. Thus, media literacy programs that incorporate message creation (grounded in planning), online message dissemination, and competition are fertile ground for investigations of adolescent-produced messages, their content and their effects.

This article presents results from a content analysis of adolescent-produced anti-substance use messages emerging from an evidence-based curriculum entitled REAL media. This unique message sample was generated by 4-H club members in nine geographically dispersed U.S. states who participated in the online REAL media intervention. This allowed us to examine a broader range of substances than previous work centering on messages about tobacco (Banerjee & Greene, 2013) and alcohol (Banerjee et al., 2013; Gordon et al., 2018). This is important because 38% of older adolescents report using marijuana at least once (CDC, 2017), adolescents use of smokeless tobacco remains steady, and e-cigarettes are now the most commonly used tobacco product in middle schools and high schools (CDC, 2018). E-cigarette use is not only increasing dramatically among adolescents (Centers for Disease Control and Prevention, 2018, 2015; Gostin & Glasner, 2014), exposure to e-cigarette and vaping messages online is as well (Emery, Vera, Huang, & Szczypka, 2014), making it an important target of media literacy interventions and analysis.

The REAL Media Program

REAL media immerses adolescents in an interactive, self-paced, online program that discusses persuasive media strategies, analyzes sample messages to increase youth awareness of the nature of media messages, and teaches them to critically identify message motives, tactics, and purposes. The curriculum culminates in a message planning and production activity.

During the final level that consists of message planning, the platform guides adolescents through their choices of target substance for their messages, persuasion strategies, and the production techniques available for their message creation. In open-ended sections of this process, the curriculum allows adolescents to develop their own ideas about their target audience, the missing information about their substance of choice in advertising, potential slogans, and how their chosen production components will grab their audience’s attention. Adolescents are further engaged in the message creation activity by recording their planning process on a “message planning guide” worksheet, which they submit along with their completed poster or video message after completing the curriculum. Once the planning process is completed, youth are offline to produce their own substance use prevention posters or videos.

The final engagement strategy of this intervention is the implementation of a social media contest in which adolescents submit their posters and videos which are reviewed for adherence to contest rules and (in)appropriate content and then posted to

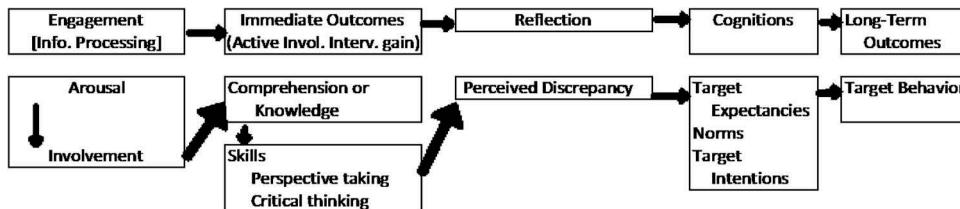


Fig. 1. TAI conceptual model (Greene, 2013).

a public Facebook page. Participants then are encouraged to recruit others to “consume” their message as they compete for prizes based on the most “likes” and “comments” their posts receive. Prior formative research on media literacy curricula finds that incentives and competition are important motivators for message planning participation (Greene et al., 2016). Moreover, the use of social media been shown to increase overall engagement in message creation (Andrade et al., 2018).

This program, thus, yields three types of adolescent-generated message elements that have not been analyzed in prior such interventions. First, the curriculum offers participants a choice of multiple substance options (alcohol, cigarettes, marijuana, chewing tobacco, and e-cigarettes). Patterns in decision-making of target substance in message creation not only adds to our knowledge of message creation, it can offer insight into the salience of substances in adolescents’ lives and their communities. Second, participants have the choice of targeting peers who do not use substances (i.e., convincing them not to start) or those currently using (i.e., convincing them to quit). These options allow for more nuanced content analysis. Finally, during the message planning, participants choose between video or poster formats and the addition of the video medium makes the production process as well as content of messages more complex. Adolescents had choices of various production elements to add to their messages, including sounds, music, dialogue, or scenes with storylines.

Research Question

The overall goal of this paper is to describe the adolescent-generated prevention messages created during REAL media:

RQ: What are the substantive themes and message format trends (as described through a detailed descriptive analysis of slogans in the message, message claims, persuasion strategies and production components) of adolescent-generated prevention messages?

METHOD

This study reports a content analysis of adolescent-produced messages developed during participation in an online media literacy program – REAL media – that makes innovative use of the e-learning format and social media channels to deliver prevention content to members of 4-H clubs. 4-H is a national organization focused on positive youth development that serves youth in rural, urban, and suburban communities in every state across the United States. The data are derived from a randomized clinical trial designed to evaluate the effectiveness of REAL media.

REAL media is a self-paced online curriculum designed to decrease substance use in adolescents by increasing their awareness of and efficacy in resisting advertising messages. The REAL media program was developed through multiple iterative stages involving target youth (described in Greene et al., 2017, 2018; Ray et al., 2019), and is based on Youth Message Development, a face-to-face media literacy curriculum designated as evidence-based by the Substance Abuse and Mental Health Services Administration’s National Registry of Evidence-based Programs

and Practices (Banerjee & Greene, 2016; Banerjee, Shuk, Greene, & Ostroff, 2015; Greene et al., 2016, 2015).

The curriculum is based on the Theory of Active Involvement’s (Greene, 2013) approach to media literacy and consists of five lessons or levels. Level 1 introduces concepts of media reach and cost, as well as media ethics. Level 2 focuses on target audience and persuasion strategies used in advertising. Level 3 identifies arguments or claims used in advertisements including missing information and counter-arguing. Level 4 focuses on attention-getting tactics and major advertising production techniques. In the fifth and final level, youth plan a counter-message (i.e., substance prevention message) targeting their peers. In contrast to harm reduction approaches to prevention (e.g., Midford et al., 2014), REAL media is aimed at reducing substance use overall. Thus, youth are asked to develop messages that encourage peers either to stop using or not to start. It is this prevention message (submitted for a contest) that is the focus of the current study.

Setting and Participants

The study was conducted in 4-H clubs in nine states (New Jersey, Pennsylvania, Ohio, West Virginia, Louisiana, Arizona, Illinois, Colorado, and Washington). At the time of study two of the states, Washington and Colorado, had legalized recreational marijuana for adults.

Recruitment was initiated at the state level through either local 4-H leaders or a statewide strategy. The project team made recruitment presentations to county leaders, club leaders, and at state events using in-person, telephone, video-conferencing, and live-streaming technologies. When youth demonstrated interest, parental consent forms were distributed and returned via email, mail, fax, text, and through the project website link directly to the research project team. Participants provided assent after research staff obtained parental consent. Only youth with parental consent who also assented to the surveys were included in the project.

The sample consisted of 639 4-H youth members across nine U.S. states between the ages of 13 and 17 years old ($M = 14.71$, $SD = 1.34$) at the time of the study pretest. Of these, 219 or 34% were male and 420 or 66% were female. Thirty-nine (6%) of the participants described themselves as Hispanic; 558 (87%) identified as being European-American or white, 22 (3%) as African-American or Black, 22 (3%) as Asian or Pacific Islander, 7 (1%) as American Indian or Alaskan Native, and 27 (4%) as some other ethnicity or not identified. Most participants 99% ($n = 630$) reported having a computer or tablet at home, with nine (1%) who did not.

The sample in the present study consisted of 95 youth who, after completing the REAL media program, planned and produced an anti-substance use message for submission to an online contest. The sample was 64% female and 85% white with an average age of 14.6 years.

Procedures

After assent, youth were randomly assigned to treatment ($n = 349$, 55%) or delayed use control ($n = 290$, 45%) conditions. The present study focuses only on the 95 intervention youth

who completed REAL media and submitted messages to the social media contest.

Study procedures were approved by a University Institutional Review Board. The project additionally employed a three-member Data Safety and Monitoring Board who reviewed study procedures and monitored compliance.

Message Sample

The message sample consisted of 95 anti-substance use messages – 82 posters and 13 videos – produced by intervention youth after completion of the REAL media curriculum. Youth planned their messages during the final “level” of the online curriculum, following prompts to select or describe their message medium (poster or video), the target substance of their message (choices), whether they wanted to prevent teen substance use or convince other teens to stop substance use, their target audience (choices), the persuasion strategies they would adopt (choices), and the production components they would leverage to create their poster or video message (choices). Throughout this process, youth were asked to think critically about why peers use particular substances, what are the effects of substance use, and ways to persuade other teens to live substance-free lives. At the end of the curriculum, youth were provided tips on producing their poster or video message, including use of visuals and characters, as well as storyboards, scripts, and sound. In addition, youth were asked to complete a “message planning guide,” which summarized their choices and message planning process (80% who submitted messages also submitted message planning guides). After completing the curriculum, participants were encouraged to refine their plans as desired and begin producing their message. Completed posters and videos were submitted online through the REAL media project website.

Qualitative Content Analysis

We used both deductive and inductive coding approaches to analyze messages. We first structured deductive coding by the message planning components outlined in the curriculum: message medium, message goals, target products, and persuasion strategies. Thus, the initial round of coding included message medium (poster or video), target products (alcohol, cigarettes, e-cigarettes, chewing tobacco, marijuana, and multiple products), message goal (goal of preventing substance use or goal of stopping substance use), and persuasion strategy. The four persuasion strategies we coded for were presented in the REAL media curriculum. The fun with the group strategy displays youth enjoying time together without the use of the substance. The unexpected strategy uses unexpected or funny characters, dialogue, or pictures to make the target audience pay attention to the message. The style strategy uses a physically attractive, desirable, or sophisticated person to illustrate non-use of the substance. Finally, the endorsement strategy involves displaying a celebrity or famous person enacting non-use behaviors.

Messages were also coded deductively for elements not covered in the final planning activity of the curriculum (but were covered as topics in the overall program), including slogans, claims, message form, and production components like the use of human and non-human characters, setting, color, image size,

object placement, and sound (see Table 1). Number of characters, number of fonts, and number of colors categories were given continuous numeric scores. All other coding categories were coded for presence (1) or absence (0) of the given item.

In the inductive stage of coding, we began with open coding message claims to generate themes and categorize concepts (Glaser & Strauss, 1967). Substantive themes of fear-based claims emerged, like the possibilities of jail-time or lung collapse, for instance. After open-coding, we conducted axial coding, merging categories thematically to yield broader thematic categories not already captured in our deductive coding scheme about message claims, which yielded novel categories like, for example, loss of control while under the influence of substances.

Coding Procedures

Two coders analyzed the sample of youth-created messages. Prior to coding, coders received training from a third coder to discuss categories and descriptions and collectively resolve any uncertainty over code meanings. After training, the coders were tested for intercoder reliability on 20% of the sample. We utilized Krippendorff's alpha to calculate intercoder reliability (Krippendorff, 2004a, 2004b) between the two coders and used alpha values over 0.7 as acceptable agreement (Lombard, Snyder-Duch, & Bracken, 2002). The overall alpha was at an acceptable level (.93), as were individual reliability estimates for message medium (1.00), target product (.95), message goal (1.00), slogans (1.00), message form (1.00), claims (.78), persuasion strategies (.82), and production components (.85). Disagreements were resolved by a third coder, resulting in 100% final agreement.

RESULTS

Results of the content analysis are separated into two sections: message content and message production. Message content included target substance, message goal, message form, type of slogan, claims, and persuasion strategies. Message production included message medium, use and number of characters (both human and non-human), setting, use of fonts and color, use of non-traditional image sizes, use of object placement, and use of sound (in video messages only). Thus, we present both substantive themes and message format trends across the sample. Table 2 presents descriptive statistics for the message content and production coding categories.

Message Content

Results of the content analysis revealed that combustible tobacco (smoking) was the most popular target substance of youth-created messages (48.4%), followed by alcohol (26.3%), marijuana (13.7%), e-cigarettes (10.5%), chewing tobacco (5.2%), and multiple substances (2.1%). More youth developed messages with the goal of prevention (58.9%) rather than that of stopping current substance use among their peers (41%), and this trend was stable across target substances. The curriculum introduced the idea of slogans as a method for getting an

Table 1. Deductive coding structure and descriptions

Coding Category and Sub-Category	Definition
Slogans	Written words that communicate the essence of the advertisement's selling proposition. Written words in the message communicate the message clearly, without reference to the image. Written words in the message communicate the message only in conjunction with the image.
a. Stand-alone slogan b. Image-related slogan	
Message Form	The type of structure of the message.
a. Narrative	The message depicts a character and conflict faced by the character. This form may loosely resemble a story.
b. Didactic/Informational	The message depicts various characters or themes highlighting a message, but does not appear to be a story form.
c. Statistical	The message contains information about someone's relative risk of negative consequences; usually expressed in ratio (4 out of 5 people ...) or percentages (75% people of people who smoke ...)
d. Multiple forms	Message is using more than one form.
Claim*	A claim is a statement/argument about the benefits that may happen to you from NOT using a product or doing some other activity.
a. Fear-based	Emphasizes risk of death/injury/punishment/illness to self; visual of arrest, accident, ambulance, hospital or symbolic representation of loss, injury or death.
b. Identity-based	Focuses on establishing a nonuse identity (i.e., communicating a personal, relational, or social identity that prohibits substance use).
c. Rational	Advocates analytical thinking and decision making (e.g., "It's your decision. Choose wisely", "Avoid! Don't go if you think it's a bad idea").
d. Modeling	Demonstrates people enacting nonuse behavior.
e. Negative social consequences	Depicts the act of using substance as undesirable, distasteful, or irresponsible. This code is similar to fear appeals, except that the focus is on negative social (rather than physical) outcomes.
f. Peer pressure	Portrays interpersonal encounters in which an individual resists an attempt to influence his or her perspective or behavior (e.g., drug offer)
g. Goal achievement	Evokes positive emotions about the present or goals for the future (e.g., avoiding drugs to do well in sports or go to college).
h. Sexual encounter	Information in the ad about risky sexual exposure due to substance use (e.g., rape, unplanned pregnancy).
i. Comparison-based	Both types of information (negative and positive consequences of substance use) contained in the message to highlight the importance of NOT using a substance (e.g., college students with their diplomas in hand vs. college students hung over). This could also include comparison between users versus non-users.
j. Before-after depictions	Depictions of before and after consequences of substance use, to highlight the importance of NOT using a substance.
Production Components	Production techniques used to package the claims in order to appeal to target audience
a. People*	Identifiable characters present in the message.
Humans	Humans as characters.
Puppets	Puppets as characters.
Animated characters/cartoons	Animated characters/cartoons as characters.
b. Number of characters	Number of characters in the message.
c. Setting*	Depiction of a clear setting identified in the message.
d. Font	Use of varied fonts identifiable in the message (size or type).
e. Use of color (posters only)	Number of colors used in the message
f. Image size	Use of non-traditional sizes to illustrate the main point in the message (e.g., alcohol bottle or beer can larger than the human).
g. Object placement	Use of objects (e.g., alcohol bottle/can, car crash, or a serious health consequence) placed in the middle of the written message (poster) or video frame or in a way that draws attention.
h. Sound (videos only)	Use of sound in the video messages.
Narration-only	Voice narration in the message.
Background music only	Background music highlighting the message.
Narration + Background music	A combination of voice narration and background music in the message.
Special sound effects	Glass shattering, scream, gunshot, etc.
Narration + special sound effects	A combination of the two sounds

(Continued)

Table 1. (Continued)

Coding Category and Sub-Category	Definition
Background music + special sound effects	A combination of the two sounds
Narration + Background music + special sound effects	A combination of the three sounds
MISCELLANEOUS	Anything else that does not fit with any of the above codes

* Coding categories are NOT mutually exclusive.

Table 2. Prevalence of content and production categories in teen anti-substance use messages

Categories	Frequency	Average
Message Content		
Target Substance		
Alcohol	25	26.3%
Tobacco	46	48.4%
E-cigarettes	10	10.5%
Chewing Tobacco	5	5.3%
Marijuana	13	13.7%
Multiple substances	2	2.1%
Goal		
Stop substance use	39	41.0%
Prevent substance use	56	58.9%
Slogan		
Stand-alone	44	46.3%
Image-related	44	46.3%
Form		
Narrative	8	8.4%
Didactic/Informational	89	93.7%
Statistical	4	4.2%
Multiple forms	6	6.3%
Claim*		
Fear-based	70	73.7%
Identity-based	20	21.0%
Rational	19	20.0%
Modeling	34	35.8%
Negative social consequences	2	2.1%
Peer pressure	4	4.2%
Goal achievement	22	23.2%
Sexual encounter	0	0%
Comparison-based	33	34.7%
Before-after depictions	8	8.4%
Persuasion strategies		
Fun with the group	18	18.9%
Unexpected	10	10.5%
Style	1	1.0%
Endorsement	3	3.2%
Message Production		
Medium		
Poster	82	86.3%
Video	13	13.7%
Presence of Characters*		
Humans	58	61.0%

Table 2. (Continued)

Categories	Frequency	Average
Puppets/Animated characters	17	17.9%
Number of Characters		
Humans	3.29 (SD = 6.7)	
Puppets/Animated Characters	0.43 (SD = 1.2)	
Setting*		
Social (party, beach, sporting event)	20	21.1%
Home (living room, bathroom, bedroom)	7	7.3%
School	8	8.4%
Dangerous (accident site, jail/prison, hospital/rehab, graveyard)	5	5.2%
Fonts		3.1 (SD = 2.3)
Colors		10+**
Image Size	0	0%
Object Placement	10	10.5%
Sound (13 videos only)		
Narration only	3	23.1%
Background music only	3	23.1%
Narration and background music	1	7.7%
Special sound effects	1	7.7%
Narration and special effects	1	7.7%
Background music and special effects	1	7.7%
Narration, background music, and special sound effects	2	15.4%

*Categories were not mutually exclusive.

**More than half of messages included photographs, which were coded as more than 10 colors.

audience's attention (and stimulating recall). Slogans were widely used in this sample (92.6%). Although the group that employed slogans was split in their use of stand-alone and image-related slogans, tobacco messages featured more image-related (58.0%) than stand-alone slogans (36.9%). Messages were overwhelmingly informational in form (93.7%) rather than narrative (8.4%) or statistical (4.2%) in form; a small proportion of messages used multiple message forms (6.3%). The didactic messages varied in their content, with the most common emergent theme the presentation of negative health consequences like lung cancer, addiction, and premature aging.

(Continued)

The REAL media program explored the topic of message claims extensively. The curriculum content covered topics such as how advertisements make claims about what a product promises to offer, whereas counter-ads, like those youth would eventually create, make claims about products that advertisers tend not to mention. The most popular type of claim put forth in the sample was a fear-based claim (73.7%). Inductive analyses revealed that the dominant fear appeals used in these messages dealt with the life-threatening nature of substance use, the risks of cancer and other physical diseases, the risk of financial hardship, the loss of a successful future, and the loss of control. Of those themes, the risk of death was most common. Figure 2 presents an example of an anti-smoking message utilizing a death-centered fear appeal. The next most common types of claims presented in the messages were comparison-based claims (34.7%) and claims featuring models of substance-free living (35.8%). These two claim types were also found to be interrelated. In particular, modeling proved to be a key component of many comparison-based claims because negative health behaviors were generally juxtaposed with images of non-use or

"positive" behaviors. Relatedly, it is important to note that because claims categories were not mutually exclusive, many messages like those alluded to above featured more than one type of claim. For example, there were several messages that combined comparison claims with fear appeal (see Figure 3). Finally, 23.2% of youth grounded their claims in goal achievement (e.g., graduating high school), 21% made identity-based claims (e.g., being a cool or fun non-user), and 20% based their claims in the need for rational decision-making (e.g., "Don't throw your life away. Think before using marijuana"). Persuasion strategies covered in the REAL media curriculum were the last content element of messages and were scantily used within this sample. Of the four strategies, the fun with the group strategy was most prevalent (18.9%), followed by the unexpected strategy (10.5%), the endorsement strategy (3.2%), and the style strategy (1.0%).

Message Production

Adolescents predominantly chose a poster over a video for their message medium (86.3%). After choosing their medium, youth were prompted during the message planning segment of the curriculum to decide on characters they might include and the setting for the events they would represent. Human characters were present in 61.0% of messages. Puppets or animated characters appeared in 17.9% of messages. The average number of humans represented among the sample messages was 3.29 ($SD = 6.7$), with the average number of puppets or animated characters 0.43 ($SD = 1.2$). As for setting, social settings (parties, the beach, and sporting events) were the most commonly used settings among the deductive categories coded for (21.1%), followed by school (8.4%), home (7.3%), and dangerous settings (accident sites, jail/prison, hospital/rehab, graveyard) (5.2%). However, our inductive analysis showed that streets, sidewalks, and alleys were also common settings in the messages, totaling 14.7% overall. Streets were the settings selected



Fig. 2. Example of message that uses fear appeal.

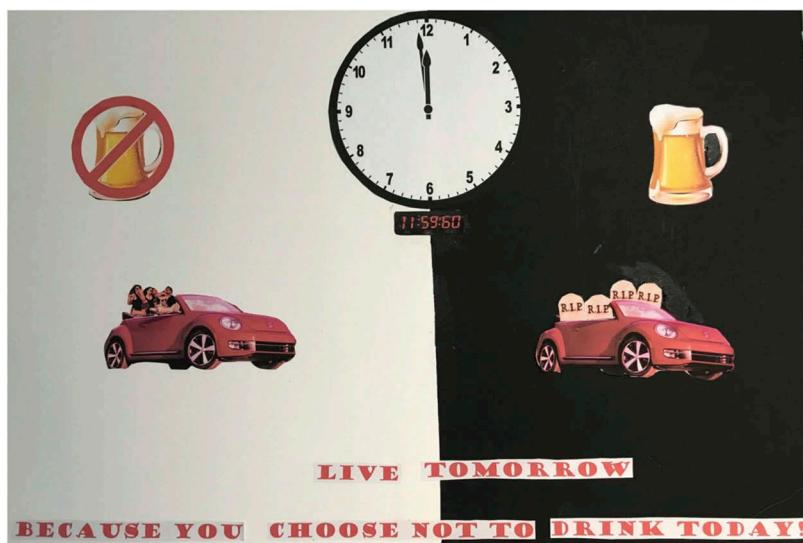


Fig. 3. A comparison- and fear-based anti-alcohol message.

for a variety of scenes such as car crashes, homelessness, and police encounters. Combining street settings with the other dangerous settings we deductively coded for, dangerous sites overall were almost as common as social settings (19.9%).

Teens utilized several other production elements to enhance their messages. Some used different fonts to emphasize some parts of a message and deemphasize others. Overall, youth used an average of 3.1 different fonts and/or font sizes ($SD = 2.3$). Use of color was another method for emphasis within a message. Because more than half of messages utilized photographs, which had a wide range of colors and shades, the average amount of colors used in the messages was over 10 (10+). Two other coding categories were image size and object placement. Although no adolescents used a non-traditional image size to draw attention to their messages, 10.5% of adolescents placed particular objects in the center of their message to do so. For example, in a message about the negative consequences of smoking, a large image of a mouth and smile with missing and stained teeth appeared in the middle of the slogan, "If smoking kills your smile, is it really worth your while?"

Finally, use of sound was an important production component for youth producing video messages (13.7%). Of the 13 videos in the sample, one used narration only, one used background music only, and the remaining videos used some combination of sound types, such as the combination of background music and narration or the combination of background music and special sound effects. Video messages, though relatively few, showed high production value. Some prioritized editing, carefully tying together scenes to highlight a narrative arc. Others used the contrast of black and white and color film to depict two possible endings of an important choice. One particularly sophisticated video utilized the technique of stop-motion animation to illustrate the consequences of driving while high on marijuana.

DISCUSSION

This article presents results from a content analysis of 95 anti-substance use messages produced by 4-H club members who used the REAL media program. The analysis yielded four major findings. First, when given the option to choose which substance to target in their messages, nearly half of this sample chose combustible tobacco. This finding is surprising if we expect teens to produce messages about the most commonly used substance among adolescents nationwide: alcohol (Johnston et al., 2016). However, the preponderance on smoking prevention among tobacco messages might not be surprising since prevention efforts have led to significant decline in smoking initiation in the broader adolescent population since the 1990s (Johnston et al., 2016). Recent research also demonstrates that most adolescents today not only hold negative views on smoking but are much more aware of its risks than adolescents of the early 2000s (McKelvey & Halpern-Felsher, 2017). The present findings of the resonance of smoking prevention messages might suggest that adolescents regularly observe smoking in their communities and recognize it as

a risk. The findings might also suggest a broader anti-smoking culture among today's adolescents.

It is also possible that adolescents did not produce alcohol messages because of perceived social norms regarding alcohol use and desirability. Although alcohol is the most commonly used substance among adolescents, evidence remains that the majority of adolescents do not drink (Johnston et al., 2016). Future interventions could consider additional methods to correct misperceptions of alcohol use or to introduce correcting peers' norm misperceptions as a persuasion strategy. Changing perceived norms has not only been shown to decrease actual use (e.g., Perkins, Linkenbach, Lewis, & Neighbors, 2010), it might also encourage the creation of anti-alcohol messages; youth may be more likely to counter pro-alcohol attitudes if they believe most peers do as well. Another path toward shifting norms of alcohol use is to immerse adolescents in positive social talk about an intervention, which can lead to more anti-substance use injunctive norms (Choi, Hecht, & Smith, 2017). Interventions could incorporate priming tools for positive social talk among participants (e.g., group work or chat rooms that center on positive lessons learned) to make more available peers' negative attitudes toward alcohol use.

The second major finding of this study is the prevalence of fear-based claims. Extensive research points to the ineffectiveness of fear-based messages because they incite adaptive behaviors aimed at danger control (e.g., Roskos-Ewoldsen, Yu, & Rhodes, 2004). The reactance effect may be especially pronounced among adolescents who are fiercely protective of their emerging independence. Emphasizing efficacy in health messages, contrary to fear-based messages, is most likely to yield positive health behavior change (Ort & Fahr, 2018). Only when paired with high-efficacy messages, other scholars show, could strong fear appeals lead to message acceptance and not defensiveness (Witte & Allen, 2000). The REAL media curriculum, itself, discourages fear-based messages because pilot work indicated that they were a dominant adolescent-generated message strategy. In one part of the curriculum, the narrator says "It is important not to sound 'preachy' or try to scare people. Those messages rarely work well. Instead, try to create a **positive** message about how not using substances is good or alternative ways to have fun." Despite warnings of the ineffectiveness of fear-based messages, these adolescents continue to produce them. All of this considered, this finding suggests that the fear appeal strategy is ingrained in the substance use prevention repertoires of adolescents. Although these messages are prevalent, however, this popular theme might not be effective when disseminated to peers. Because related research on gain-framed and loss-framed messages show evidence that gain-framed messages could be more effective at promoting some forms of disease prevention (O'Keefe & Jensen, 2007), future interventions might consider methods to encourage gain-framed messages that highlight positive outcomes of avoiding substance use.

A third key finding is the popularity of poster messages over video messages. By and large, video production requires more effort than generating posters and also more familiarity with editing. Although the REAL media program offered tips for

putting together an effective video message, it is possible these adolescents might have benefitted from additional guidance while working with this medium. Because videos require technology and often other human resources, future interventions should consider ways to connect and assist teens during the process of message production, especially if the media literacy program is self-paced and independent like REAL media.

The fourth major finding of this analysis is the high production value of the messages. Compared with adolescent messages produced in time- and resource-limited classroom settings (e.g., Banerjee & Greene, 2013; Banerjee et al., 2013; Gordon et al., 2018; Krieger et al., 2013), which often featured hand-written slogans and rudimentary drawings (often generated from a small group), messages produced from the REAL media program – independently and outside of school and 4-H club time – featured more detailed and carefully designed images. Specifically, the extensive use of different fonts and colors (color photographs in particular) in messages suggests that when given time to produce a message outside of the curriculum setting, teens produce messages of greater visual sophistication, a marker for the planning and effort invested in the intervention. Moreover, such thoughtful designs might lead to greater persuasiveness of the messages. For instance, using different font sizes allows teens to emphasize catchy slogans and staggering statistics, and photographs provide more realistic and vivid illustrations for grabbing audiences' attention. Recent research also shows that photos, color, and fonts are visual ad components to which teens respond well (Andrade et al., 2018), which reflects established findings on the effectiveness of high sensation value messages (Morgan, Palmgreen, Stephenson, Hoyle, & Lorch, 2003; Palmgreen & Donohew, 2003). To the extent that the self-paced e-learning model allows teens the time needed to produce more nuanced anti-substance use messages, this finding has important implications for future media literacy interventions geared toward message planning and production.

As posited by the TAI (Greene, 2013), the findings suggest that youth involvement in message development is a necessary component of peer influence campaigns because it triggers aspects of self-reflection and engagement that would underlie any lasting change. Results indicated a preference for poster messages over video messages and the content analysis revealed that youth participants planning and producing these messages utilized a number of production components to enhance their messages. This immersion or engagement in message planning and production can lead to cognitive changes within the participants as well as in youth being exposed to these messages, a type of proliferation effect. Identification of active involvement intervention components as well as the steps in the process of effects for youth developing the messages and youth message exposure will extend the tenets of the TAI, mediation processes, and contribute further to our understanding of youth engagement in prevention interventions, especially those interventions grounded in peer influence models.

Future research could address a number of unanswered questions based on this research including connecting message development to change processes. One study could combine content analyses with data on social proliferation to assess what types of messages and strategies were deemed most effective in peer

networks. Recent research has suggested social proliferation and competition lead to greater overall engagement in media literacy interventions (Andrade et al., 2018; Greene et al., 2016), but the effects of such activities are largely unexamined. Additionally, no study to date has sought to isolate the message planning role in effects, for example, comparing the revisions between an initial message plan and a message produced with the expectation that youth who have substantial revision would produce more sophisticated messages (and potentially effects on the message producer). Another study could investigate the effects of message creation participation on substance use behaviors by analyzing this outcome for both those who do participate and those who do not participate in this activity. Finally, future research could compare messages with content of curriculum responses to address questions related to whether youth who accurately respond to curriculum content create systematically different message content or format from those who do not accurately process intervention content.

Given the increased production value of messages created as part of the REAL media program, media literacy interventions should consider implementing self-paced program components. This study suggests that the more time adolescents have to brainstorm, gather resources, and produce their messages, the more complex and persuasive their messages might be. Such adolescent-produced messages could be the basis of important research on the effectiveness of peer messaging.

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Conflicts of Interest

Kathryn Greene, Smita Banerjee, and Michael Hecht disclose intellectual property interests in the REAL media curriculum.

Human rights

All procedures involving human participants were in accordance with institutional review board ethical standards and with the 1964 Helsinki declaration and its later amendments. IRB protocol approval #15-544Rc (Rutgers University).

Informed Consent

Informed consent from parents and youth assent was obtained from all study participants.

Welfare of Animals

This article does not contain any studies with animals performed by any of the authors.

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