**Preventing Marijuana Use through YouTube: A Content Analysis of Public Service Announcements for Behavior Change Theory**

**Abstract  
*Objective:*** YouTube videos that address marijuana use were assessed for their use of behavior change theories. These included constructs from the *Precede-Proceed Model (PPM), Transtheoretical Model (TTM), Social Cognitive Theory (SCT), Health Belief Model (HBM),* and *Theory of Planned Behavior (TPB).*  ***Methods****:* A content analysis of 151 videos for health behavior change theory contained in YouTube Public Service Announcements targeting marijuana use was conducted. Multiple regressions were then performed to measure the impact of descriptive variables and constructs in videos’ total theory score and view count. ***Results****:* YouTube videos generally lacked theoretical content. Scores ranged from 0-15 out of a possible 25. Half the videos in the sample were affiliated with a professional organization.  The majority of postings were dramatic or serious and humorous.  View count had a strong inverse relationship to theory.  While enabling factors were positively related to view count, the presence of reinforcing factors in videos was negatively related to view count. ***Conclusion****:* YouTube publications must utilize well-supported health behavior change theory to achieve a maximum effect on viewers’ health behaviors.  These publications should also incorporate the characteristics of videos with high view counts to ensure that the information reaches a larger audience.

*Keywords: Behavior Change, Health Behavior, Public Health, Health Promotion,*

*Web 2.0 Technologies*

**Introduction**

Traditional media campaigns, i.e. television, have been the main thoroughfare for health messages for many years in Public Health. The incorporation of theories of behavior change in developing these mass media interventions to prevent drug use has been suggested for many years in constructing traditional broadcast media.1 However, the proliferation of social media technologies, web 2.0 technology, has greatly expanded the capacity and reach of health campaigns.2 Using the internet as a mass medium to disseminate health information is important and should be treated similarly to early traditional campaigns that incorporate theory-based health communication.3 YouTube, in particular, has become a popular medium for displaying Public Service Announcements (PSAs). “PSAs are designed to inform or induce certain behaviors in specific audiences, generally for noncommercial profit using mass media-approaches.”4 PSAs published on YouTube that target marijuana use have not been effectively analyzed for health behavior change theory.

YouTube boasts over 800 million unique users who visit the site each month with 70% of its traffic originating from outside of the U.S., and, over 4 billion hours of video being watched each month.5 The site has been observed to play an important role in marketing and advertising.6 For example, the “Above The Influence” movement is an ongoing government sponsored campaign to address drug abuse that uses a variety of social media platforms – e.g. YouTube – to increase its reach to a wider audience.7 It is necessary for health communication practitioners to develop health messages based on theoretical constructs of behavior in order to communicate with a wide viewership and promote behavior change in social media.8

Marijuana is the most commonly used illegal drug in the U.S.9 About 46% of teens will have tried marijuana by the time they graduate from high school.10 In 2010 alone, approximately 29 million Americans ages 12 or older had abused marijuana at least once during the year.10 Research has proven the harmful effects of marijuana use on the brain. A prospective study of a birth cohort from 1972/1973 to age 38 addressing the effects of marijuana use on neuropsychological functioning, found that participants who had a dependence on marijuana from an early age (13 years) through adulthood had a significantly lower IQ than those who never used marijuana – those who never used marijuana showed no declines in IQ.11 In the past few years significant increases in marijuana use have become apparent especially among 10th and 12th graders for daily, current and past year use.9

The utility of these social media outlets when based on theory would be much more efficacious at identifying target behaviors and health communication strategies to promote behavior change.12 The inclusion of behavioral theory in health communications is critical in order to promote healthy and/or prevent unhealthy behaviors.13 The purpose of this study is to determine if PSAs uploaded to YouTube to address marijuana use contain appropriate theory to promote behavior change. The five theoretical models included in this study are: *PRECEDE-PROCEED Model (PPM), Transtheoretical Model (TTM), Social Cognitive Theory (SCT), Health Belief Model (HBM),* and *Theory of Planned Behavior (TPB).*

**Methods**

*Study Design*

A content analysis of health behavior change theory contained in YouTube Public Service Announcements (PSAs) targeting marijuana use was conducted. Two public health graduate students trained in health behavior theory coded a sample of videos.

*Sample*

A sample of YouTube videos was selected using the following search terms: “anti-marijuana PSA, short” and “anti-marijuana ad, short”; including the word ‘short’ yielded videos four minutes or less in the search results. Videos that were four minutes or less, had a view count of at least 1,000, and were specific to marijuana but were not music videos, news broadcasts, parodies, or was produced in a language other than English were included.

*Procedure*

Coders applied the search terms on October 20-21 which yielded a sample of 1,239 videos. Results were entered into an Excel worksheet, including video title and URL. These were reviewed and a total of 1,088 were excluded because they had view counts less than 1,000 or were irrelevant, parodies, reposted duplicate videos, non-specific to marijuana, or in a language other than English. This criterion produced 151 videos to be coded. A Qualtrix survey was created to evaluate the videos for theoretical content based on an adapted evaluation template developed by Doshi *et al*. (2003). This study incorporated the use of the PRECEDE-PROCEED model. This model addresses the underlying behavioral risks and protective factors and provides a foundation for applying theories for evaluating health behavior change.14 Collectively these theories measure predisposing, enabling and reinforcing factors found in the PPM and knowledge, cognitive strategies, behavioral strategies, emotion-focused strategies, and therapeutic interventions from TTM, SCT, HBM, and TPB respectively. Descriptive variables were also coded.

*Measurement*

Classification of videos included coder name, video title, URL, time length, view count, and appropriate categorization. Variables included whether the video was appropriately categorized, video affiliation, PSA reliability, pro-marijuana status, whether it was a foreign video, video tone, target audience, number of main actors, gender assessment, multicultural assessment, content validity, year of publication, presence of Precede/Proceed Model constructs, and use of Health Behavior constructs. Video affiliation was categorized as business, non-profit/NGO, private/individual, student, and/or government. PSA reliability was measured based on whether the video was affiliated with a professional organization. Videos were classified as pro-marijuana or anti-marijuana. Those produced in English outside of the U.S. were coded as foreign videos; there were also options for U.S.-based videos and unknown. Video tone was classified as humorous, dramatic/serious, sad, fear inducing, graphic, or other. Target audience options included teens, parents/guardians, teachers, health professionals, general/non-specific, and/or law enforcement. Videos were classified as having 1, 2-3, 4-5, or 6+ main actors. Gender was assessed as all male actors, all female actors, or male and female actors. A multicultural assessment was also performed, categorizing videos as including non-Caucasian actors, Caucasian actors, or both non-Caucasian and Caucasian actors. Content validity was measured based on the provision of at least one reference or professional peer review, versus the absence of both elements. Videos were also classified as 1999 or older; “yes” if the year of publication was explicitly stated in the video title or description, “no” if the video was newer, and “unknown” if the year of publication was unclear. Precede/Proceed Model and Health Behavior Theory constructs were dichotomously coded as present or not present.

*Interrater Reliability*

Interrater reliability was calculated using 10 videos. This yielded a kappa coefficient of 0.53, which demonstrates significant congruity between coders.15

*Analysis*

Each video was coded for 25 theoretical items, each accounting for 1 point (yes = 1, no = 0). The sum of each video’s theoretical items constituted its total theory score, which ranged from 0 to 25. A multiple regression was performed to analyze the effect of each non-construct variable on the overall theory score and view count. Data was analyzed using STATA statistical analysis software.

***Results***

Half the videos in the sample were affiliated with a professional organization. Most videos were comprised of being dramatic or serious (57%) and humorous (33%). Videos with one main actor were most common, with increasing the number of main actors was related to decrease in frequency. The majority of postings had all male actors (54%), while 36% featured mixed gender actors and 10% included only female actors. 66% of videos featured all white actors, while less than 30% included both white and non-white actors. The vast majority of videos (94%) did not provide references or details about professional peer review.

*[Table 1]*

The top 20 videos, which had the highest theory score, are presented in Table 1. There were no videos that received a score of 25, the closest receiving 15 points. Each measured the percentage of theory contained in each video amongst the various theoretical models. The following presents overall theory scores for videos 1-151: 1-22 (score of 0-1), 23-69 (score of 2-3), 70-108 (score of 4-5), 109-141 (score of 6-7), 142-145 (score of 8-9), 146-150 (score 10-12), and 151 (score of 15).

Table 2 identifies those constructs from the theoretical models that were included in the videos sampled. Predisposing factors, perceived risks, and general information were those constructs used most often in the sample.

*[Table 2]*

Two multivariate analyses were performed. In the first multiple regression analysis there was a significant positive association between predisposing factors and reinforcing factors and the dependent variable theory. The second multiple regression analysis for the dependent variable ‘view count’ revealed a significant positive association between enabling factors, target audience, pro marijuana, female actors, and videos that contained 6+ actors. Private or individual postings were also inversely related to theory.

**Discussion**

It has been established that marijuana is the most commonly used illegal drug in the United States.10,16 Few studies have addressed the mechanisms of health behavior change in relation to anti-marijuana PSAs found on the social media website YouTube. The importance of incorporating behavior change theory as part of mass media campaigns has been encouraged and documented.1,13 This study used a content analysis of 151 YouTube videos categorized as public service announcements targeting marijuana use. Results indicate that the majority of the sample lacked theoretical constructs related to health behavior change theory. Because YouTube has not specifically been studied for the promotion of anti-marijuana messages further research is merited to future PSA publication through this particular medium.

The results of this study support previous findings by Doshi *et al* 17 and Cowan *et al.* 18 which identified the lack of theoretical foundations in technological applications. Doshi *et al.* concluded that internet websites aimed at physical activity did not provide adequate incorporation of a theoretical approach while Cowan *et al.* concluded that apps for smartphones only had minimal theoretical content. *The* YouTube videos in the sample scored low in theory inclusion, with a mean of less than 20% of the possible score (4.16/25). In a context of ever-increasing use of media sources for health information, it is essential that YouTube publications utilize well-supported health theory to achieve the maximum effect on viewers. These publications should also incorporate the characteristics of videos with high view counts; this ensures that the information reaches a larger audience. The findings of this study indicate the need for increased theory incorporation in media-published sources of health information.

*Table 3*

Multivariate analyses for theory (Table 3) revealed that videos affiliated as ‘private/individual’, view count, and pro marijuana showed a statistically negative association. The lack of knowledge of behavior change theory of those in the ‘private/individual’ group could be a likely possibility. While it is the main focus to attract individuals to view PSA’s, it is possible that organizations post information to social media websites that do not reflect the preferences of its users.19 The statistically significant positive association of the constructs found in the PPM with theory score should influence its incorporation in future PSAs addressing marijuana use on YouTube.

The multiple regressions for view count, Table 4, showed a statistically significant positive association with pro marijuana videos. It would be of interest for future research to study the differences in pro marijuana and anti-marijuana videos to assess the dependent variables that influence view count – thus, reflecting the preferences of a wider audience to PSA messages. While the inclusion of limited theory is included in total view count, perhaps health communication practitioners should pursue a different approach to PSA production taking into consideration elements that attract a wide audience while still incorporating constructs of health behavior theory.

According to the results, “Pick Your Path Video – You Wake Up” scored the highest total theory score as it incorporated the greatest percentage of theoretical constructs (15/25). Although it did not yield the highest view count, the nature of the video could have future implications on the construction of PSAs that aim to target anti-marijuana behavior on YouTube. The video was designed to be interactive, allowing users to navigate a series of short videos based on decisions that the user makes at the end of each video. Lang, Schwarts, Chung, and Lee20 posited that people are assumed to be limited capacity information processors. As such, messages that elicit a response from the user could do well to engage the recipient’s knowledge, goals, and ability to perceive risky behavior and identify possible mediating intentions.

*Limitations*

Limitations of the study include the reposting of duplicate videos under various titles, uploaded by different YouTube users. Researchers controlled for this by excluding repeat videos from the sample. In order to minimize inter-coder differences only two coders were used.. Additionally, inter-relater reliability tests were performed to ensure a certain level of cohesion between them. Because the number of videos on YouTube is constantly changing, the entire sample was retrieved in a short time period. Lastly, there is no guarantee that the presence of theory in YouTube videos results in behavior change of viewers. This topic merits further investigation.

*Conclusion*

This study of the incorporation of health behavior theory into YouTube videos addressing marijuana use is novel. Its results can be used as a guide for health departments and other organizations aiming to publish health messages via the public domain, in order to maximize views and influence on audience. Further research is suggested to measure the effectiveness of health behavior theory on health behavior itself, specifically as it applies to social media publications. A randomized, controlled trial is recommended for this study.

**References**

**1.** Schilling RF, McAlister AL. Preventing drug use in adolescents through media interventions. *Journal of Consulting and Clinical Psychology.* 1990;58(4):416-424.

**2.** Paek H-J, Kim K, Hove T. Content analysis of antismoking videos on YouTube: message sensation value, message appeals, and their relationships with viewer responses. Health Education Research. 2010:(25)1085-1099.

**3.** Cassell MM, Jackson C, Cheuvront B. Health Communication on the Internet: An Effective Channel for Health Behavior Change? *Journal of Health Communication.* 1998;3(1):71-79.

**4.** Walther JB, DeAndrea D, Kim J, Anthony JC. The Influence of Online Comments on Perceptions of Antimarijuana Public Service Announcements on YouTube. *Human Communication Research.* 2010;36(4):469-492.

**5.** YouTube. YouTube Statistics. 2012. Available at: http://www.youtube.com/t/press\_statistics. Accessed November 8, 2012.

**6.** MEDIACO. Using YouTube. 2012. Available at: http://www.media.co.uk/newsletter/251006/get-your-brand-on-youtube.htm. Accessed November 8, 2012.

**7.** Office of National Drug Control Policy (ONDCP). Above The Influence. 2012. Available at: http://www.drugabuse.gov/ondcp/ondcp-fact-sheets/above-the-influence-ATI. Accessed November 11, 2012.

**8.** Kapp JM, LeMaster JW, Lyon MB, Zhang B, Hosokawa MC. Updating Public Health Teaching Methods in the Era of Social Media. Public Health Reports2009:(124)775-777.

**9.** National Institute on Drug Abuse (NIDA). Marijuana. 2012. Available at: http://www.drugabuse.gov/drugs-abuuse/marijuana. Accessed November 11, 2012.

**10.** National Institute on Drug Abuse (NIDA). Topics in Brief: Marijuana. 2012. Available at: http://www.drugabuse.gov/publications/toics-in-brief/marijuana. Accessed November 8, 2012

**11.** Meier MH, Caspi A, Ambler A, et al. Persistent cannabis users show neuropsychological decline from childhood to midlife. Proceedings of the National Academy of Sciences of the United States of America. 2012:(109)E2657-2664.

**12.** Newbold KB, Campos S. Media and Social Media in Public Health Messages: A Systematic Review. McMaster Institute of Environment & Health2011. Available at: http://www.mcmaster.ca/mieh/documents/publications/Social%20Media%20Report.pdf. Accessed November 8, 2012.

**13.** Fishbein M, Cappella JN. The Role of Theory in Developing Effective Health Communications. *Journal of Communication.* 2006;56:S1-S17.

**14.** Glanz K, Rimer BK, Viswanath K. Health Behavior and Health Education: Theory, Research, and Practice. Fourth ed. USA: Jossey-Bass; 2008:408-418.

**15.** Landis JR, Koch GG. The Measurement of Observer Agreement for Categorical Data. *Biometrics.* March 1, 1977;33(1):159-174.

**16.** Centers for Disease Control and Prevention (CDC). Trends in the Prevalence of Marijuana, Cocaine, and Other Illegal Drug Use National YRBS: 1991–2011. 2012.

**17.** Doshi A, Patrick K, Sallis JF, Calfas K. Evaluation of Physical Activity Web Sites for Use of Behavior Change Theories. *Annals of Behavioral Medicine.* 2003;25(2):105.

**18.** Cowan LT, Van wagenen SA, Brown BA, et al. Apps of Steel: Are Exercise Apps Providing Consumers With Realistic Expectations? A Content ANalysis of Exercise Apps for Presence of Behavior Change Theory. Health Education & Behavior2012. doi:10.1177/1090198112452126

**19.** Thackeray R, Neiger BL, Smith AK, Van Wagenen SB. Adoption and use of social media among public health departments. Vol 12. *BMC Public Health.* 2012;(12)6.

**20.** Lang A, Schwartz N, Yongkuk C, Seungwhan L. Processing Substance Abuse Messages: Production Pacing, Arousing Content, and Age. *Journal of Broadcasting & Electronic Media.* 2004;48(1):61-88.

Tables & Figures

Table 1. Top 20 videos according to theory score

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Theory Score*** | ***Video Title*** | ***TTM%*** | ***SCT%*** | ***HBM%*** | ***TBP%*** | ***View Count*** |
| **15** | Pick Your Path Video 1 – You Wake UP | 57.1 | 60 | 100 | 100 | 54627 |
| **12** | Harper’sNew Anti-Pot Ad Campaign | 57.1 | 46.6 | 100 | 100 | 139,550 |
| **12** | Anti-Drug Commercial | 50 | 46.6 | 80 | 83.3 | 6,380 |
| **10** | Tic Tic – ONDCP Ad Propoganda | 42.8 | 33.3 | 60 | 50 | 2,992 |
| **10** | Marijuana Does Not Make You Attractive/Anti-Marijuana PSA Video | 50 | 40 | 60 | 66.6 | 51,120 |
| **10** | Anti-Marijuana PSA Educational Video – Talking to Your Kids | 64.2 | 40 | 40 | 66.6 | 18,284 |
| **9** | Anti-Pot Anti-Marijuana Public Service Announcement Video/PSA | 42.8 | 40 | 60 | 50 | 13,260 |
| **8** | above the influence commercial | 35.7 | 33.3 | 40 | 33.3 | 79,868 |
| **8** | Pete’s Couch | 35.7 | 26.6 | 80 | 83.3 | 18,324 |
| **8** | “That’s illegal” – 90’s anti-drug commercial | 35.7 | 40 | 30 | 33.3 | 53,519 |
| **7** | What are the long term effects of weed? Marijuana Use | 28.5 | 13.3 | 60 | 66.6 | 176,715 |
| **7** | The Worst Anti-Drug Movie Ever | 35.7 | 26.6 | 60 | 66.6 | 578,511 |
| **7** | Don’t Smoke Weed and Drive (1 of 2) HILARIOUS | 35.7 | 20 | 20 | 50 | 3,342 |
| **7** | Anti-Drug pSA-Gateway (marijuana) | 35.7 | 26.6 | 80 | 50 | 13,121 |
| **7** | “No Joints”, Anti-marijuana rap video PSA, production company sample | 35.7 | 33.3 | 60 | 50 | 1,843 |
| **7** | StopProp19.com Ad OPPOSING Yes on Prop. 19 Marijuana Legaliz.flv | 28.5 | 20 | 60 | 66.6 | 4,466 |
| **7** | Stoned Drivers Are Killers / Anti-Marijuana Anti-Pot PSA Video | 35.7 | 20 | 80 | 83.3 | 48,853 |
| **7** | Anti-Marijuana PSA Educational Video – Talking To Your Teens | 25.5 | 26.6 | 20 | 33.3 | 13,409 |
| **7** | Turtle Tips: Marijuana (PSA, early 90s) | 35.7 | 33.3 | 20 | 33 | 614,304 |
| **7** | Vintage “Pot Hurts” anti-drug PSA, 1984 | 21.4 | 26.6 | 40 | 50 | 9,217 |

Table 2. Percentage of how often theoretical constructs appeared in total sampling

|  |  |  |
| --- | --- | --- |
| ***Construct*** | ***Frequency*** | ***Total Theory %*** |
| **Predisposing Factors** | 103 | 68.21 |
| **Enabling Factors** | 22 | 14.57 |
| **Reinforcing Factors** | 51 | 33.77 |
| **General Information about Marijuana Use**  **Emphasis on increasing knowledge** | 89  56 | 58.94  37.09 |
| **Cognitive Strategies**  **Perceived Benefits**  **Perceived Barriers**  **Perceived Risks**  **Self-efficacy**  **Self-talk**  **Perceived Social Norms** | 58  33  78  23  10  64 | 38.41  21.85  51.66  15.23  6.62  42.38 |
| **Behavioral Strategies**  **Self-monitoring**  **Realistic Goal Setting**  **Stimulus control**  **Self-reward**  **Social Support**  **Modeling/Vicarious Learning**  **Relapse Prevention** | 1  14  2  2  49  22  1 | .66  9.27  1.32  1.32  32.45  14.57  .66 |
| **Emotion-focused strategies**  **Negative Stimuli**  **Stress Management**  **Negative Affect Management** | 5  1  1 | 3.31  .66  .66 |
| **Negative Social Influence** | 42 | 27.81 |
| **Therapeutic interventions**  **Skill building/overview**  **Motivational Readiness** | 17  8 | 11.26  5.30 |
| **Follow-up/Ongoing Feedback** | 52 | 34.44 |

*Mean= 4.16, Mode= 3, SD=2.54, Range= 0-15, Highest possible score = 25*

Table 3. Multiple Regression Analysis for Theory Score

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **Coefficient** | **Standard Error** | **tValue** | **pValue** | **95% Confidence Interval** |
| **View count** | -6.30e-07 | 1.59e-07 | -3.95 | 0.000 | [-9.4e-07,-3.15e07] |
| **Predisposing Factors** | .438 | .078 | 5.63 | 0.000 | [.284, .592] |
| **Enabling Factors** | .637 | .100 | 6.36 | 0.000 | [.439, .835] |
| **Reinforcing Factors** | .442 | .084 | 5.25 | 0.000 | [.277, .609] |
| **Videos affiliated as “private/individual” produced** | -.173 | .079 | -2.18 | 0.031 | [-.330, -.016] |
| **Pro-marijuana** | -.224 | .112 | -2.00 | 0.048 | [-.447, -.002] |

*Note*. Number of observations = 151, R2 = .607

Table 4. Multiple Regression Analysis for View Count

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **Coefficient** | **Standard Error** | **tValue** | **pValue** | **95% Confidence Interval** |
| **Enabling Factors** | 184.51 | 47.88 | 3.85 | .000 | [89.86, 279.15] |
| **General Target Audience** | 87.73 | 37.62 | 2.33 | .021 | [13.36, 162.09] |
| **Pro Marijuana** | 110.39 | 50.49 | 2.19 | .030 | [10.59, 210.19] |
| **Female Actors** | 133.44 | 55.10 | 2.42 | .017 | [24.52, 242.19] |
| **6+ Actors** | 115.09 | 50.45 | 2.28 | .024 | [15.37, 214.82] |
| **Reinforcing Factors** | -73.33 | 35.37 | -2.07 | .040 | [-143.26, -3.40] |

*Note*. Number of observations = 151, R2 = .191