

Portrayal of Alcohol Intoxication on YouTube

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Background: We aimed to characterize the content of leading YouTube videos related to alcohol intoxication and to examine factors associated with alcohol intoxication in videos that were assessed positively by viewers.

Methods: We systematically captured the 70 most relevant and popular videos on YouTube related to alcohol intoxication. We employed an iterative process to codebook development which resulted in 42 codes in 6 categories: video characteristics, character socio demographics, alcohol depiction, degree of alcohol use, characteristics associated with alcohol, and consequences of alcohol.

Results: There were a total of 333,246,875 views for all videos combined. While 89% of videos involved males, only 49% involved females. The videos had a median of 1,646 (interquartile range [IQR] 300 to 22,969) "like" designations and 33 (IQR 14 to 1,261) "dislike" designations each. Liquor was most frequently represented, followed by beer and then wine/champagne. Nearly one-half (44%) of videos contained a brand reference. Humor was juxtaposed with alcohol use in 79% of videos, and motor vehicle use was present in 24%. There were significantly more likes per dislike, indicating more positive sentiment, when there was representation of liquor (29.1 vs. 11.4, $p = 0.008$), brand references (32.1 vs. 19.2, $p = 0.04$), and/or physical attractiveness (67.5 vs. 17.8, $p < 0.001$).

Conclusions: Internet videos depicting alcohol intoxication are heavily viewed. Nearly, half of these videos involve a brand-name reference. While these videos commonly juxtapose alcohol intoxication with characteristics such as humor and attractiveness, they infrequently depict negative clinical outcomes. The popularity of this site may provide an opportunity for public health intervention.

Key Words: Alcohol, Intoxication, Social Media, YouTube, Qualitative Methods.

YOUTH AND YOUNG adult drinking is associated with an increase in health risk behaviors and negative consequences including fighting, sexual activity and victimization, tobacco and other drug use, suicide, automobile accidents, and development of alcohol dependence (Champion et al., 2004; Grant and Dawson, 1997; Hingson et al., 2002; Miller et al., 2007; Swahn and Bossarte, 2007). Indeed, alcohol remains the leading root cause of mortality and morbidity in both adolescence and young adulthood (Eaton et al., 2010; Office of the Surgeon General et al., 2007).

A variety of socio demographic, personal, and environmental factors have been linked to negative consequences of alcohol use in adolescence and young adulthood (Curran et al., 1997; Ellickson et al., 2001; Kuntsche and Jordan,

2006; Nash et al., 2005; Olds and Thombs, 2001; Primack et al., 2012a; Schulte et al., 2009). It has been established that media exposures to alcohol are among these factors (Anderson et al., 2008; Chung et al., 2010; Collins et al., 2007; Engels et al., 2009; Hanewinkel et al., 2007; Henriksen et al., 2008; McClure et al., 2009; Sargent et al., 2006). Due to the emergence of new, highly accessible media, youth ages 8 to 18 are now exposed to media messages 8 to 10 hours per day, even outside of school and work, and many of these exposures glamorize alcohol use (Austin et al., 2006; Bhana, 2008; Primack et al., 2009). For example, the average youth ages 8 to 18 is exposed to 35 references to explicit alcohol use daily in popular music alone, with the vast majority of these messages associating use of alcohol with social, sexual, and financial success (Primack et al., 2008, 2014). Both narrative (e.g., movies, TV shows) and persuasive (e.g., advertisements, merchandizing) media messages related to alcohol are associated with adolescent alcohol attitudes, initiation and patterns of use, and outcomes (Anderson et al., 2008; Chung et al., 2010; Collins et al., 2007; Engels et al., 2009; Hanewinkel et al., 2007; Henriksen et al., 2008; McClure et al., 2009; Sargent et al., 2006). For example, watching popular music videos that contain content relating to alcohol use has been independently associated with earlier drinking onset (Robinson et al., 1998; Van den Bulck and Beullens, 2005), increased consumption (Robinson et al., 1998; Van den Bulck and Beullens, 2005; Van den Bulck et al., 2006), and decreases in the perceived risks of drunk driving (Beullens and Van den Bulck, 2008).

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However, although some of the fastest growing media exposures are those that involve the Internet, there has been little research examining Internet-based alcohol-related messaging. This is an important gap in the literature, because Internet sites such as video-sharing platforms can combine the compelling high production values of traditional media with influential peer-to-peer dialogue. For example, YouTube, which has been owned by Google since 2006, is currently the most popular video-sharing site in the world, with over 1 billion unique users each month (YouTube, 2014). Some of YouTube's most popular videos are official music videos, each of which generates millions of views and comments. However, YouTube also features user-generated material which can be highly compelling. While some viewers may be savvy enough to skeptically view music videos or advertisements, those same viewers may be compelled by a user-generated video emphasizing fun, humorous, and socially rewarding escapades by a group of friends.

Current conceptual models and empirical data suggest that adolescents are not passive receptacles of media messages, but that they coconstruct and contextualize them as participatory actors (National Association for Media Literacy Education, 2007). Further, they utilize various levels of anonymity on the Internet to explore and construct aspects of their identities that may be transferred into the offline world (Subrahmanyam and Šmahel, 2011; Valkenburg and Peter, 2011). Therefore, previous research has leveraged YouTube to explore various topics, such as academic publication (Kousha et al., 2012), political activism (Lim and Golan, 2011), and music therapy (Gooding and Gregory, 2011). However, to our knowledge, there has been no comprehensive attempt to analyze YouTube exposures related to alcohol, especially those which are viewed frequently by youth and young adults.

Thus, our primary aim was to characterize the content of leading YouTube videos related to alcohol intoxication. We focused on intoxication—rather than simply alcohol in general—because intoxication is directly linked with many of the more concerning clinical outcomes. Our second aim was to leverage the indicators of sentiment provided by YouTube (e.g., “likes” and “dislikes”) to begin to understand what factors associated with alcohol intoxication videos are associated with positive viewer sentiment. It was hoped that this information may help us to better understand viewers' pathways to unhealthy alcohol use, ultimately assisting development of interventions to interrupt these pathways. A third aim was to assess specific brands of alcohol depicted. By determining which brands were most commonly referenced, we hoped to provide additional information which may be valuable to intervention development.

MATERIALS AND METHODS

Video Search

We selected 5 terms synonymous with alcohol intoxication based on current research, including “drunk,” “buzzed,” “hammered,”

“tipsy,” and “trashed” (Levitt et al., 2009). We included in our sample all videos in the first 2 pages (20 “hits”) of results for each search, consistent with other studies in the area (Gordon et al., 2001; Leighton and Srivastava, 1999; Madan et al., 2003). For each key term, we used this strategy under 2 separate conditions of (i) sorting videos by search term “relevance” per YouTube's internal algorithm and (ii) sorting by the “view count” of videos to capture the most popular videos for each search term. This resulted in an initial pool of 200 videos (5 terms \times 20 hits \times 2 methods of sorting).

We then eliminated duplicate videos, which we defined as those in which more than half of the content or footage was identical. This occurs, for example, when someone copies previously posted material and adds a negligible amount of new material. We also eliminated irrelevant videos, which we defined as those that did not contain any references to any type of alcohol. For example, the search term “buzzed” retrieved several videos related to cutting hair (i.e., buzz cut) and was unrelated to alcohol. Videos where English was not the primary language (i.e., more than half of the dialogue was in a non-English language) were excluded. After eliminating extraneous videos, we had a sample size of 70 videos to analyze for alcohol-related content. We expected this number of videos to be sufficient based on prior similar work in this area. For example, Carroll and colleagues (2013) compared 61 waterpipe-related YouTube videos and 67 cigarette-related YouTube videos in a similar mixed-methods analysis. To ensure integrity of the data and facilitate analysis, we carefully retained appropriate video identification numbers and links as they were represented on the day of the search.

Codebook Development

Codebook developed followed general procedures established by Crabtree and Miller in their adaptation of qualitative research methods for health-oriented research (Crabtree and Miller, 1999). Three researchers with qualitative research experience examined 10 pilot videos and performed “in vivo” coding, which involves development of descriptive codes based solely on the audio-visual material. These individuals then met to discuss and compare their codes, adding, deleting, and/or collapsing codes together as necessary. These individuals then coded a second series of 10 pilot videos with the new tentative codebook and met again to combine codes. This iterative process continued until a final codebook was determined.

During this process, the codebook developers used a hybrid approach involving grounded theory in combination with prior conceptual work. We thought it was appropriate to begin with grounded theory, which involves developing codes purely based on the data, in order to fully capture the richness of the data. However, we also felt it was important to add or alter codes as necessary in the context of prior work related to media exposures and substance use. For example, prior research based on Social Cognitive Theory (Bandura, 2001) suggests that uptake of risky behaviors is increased when media viewers are exposed to messages which juxtaposed those behaviors with positive characteristics, such as humor, and negative consequences (Fischer et al., 2011). Therefore, while the initial codebook did not contain explicit assessment of humor, this variable was added for conceptual reasons. Similarly, we added variables describing alcohol-related behaviors known to be associated with substantial morbidity and mortality (e.g., active intoxication, heavy consumption, and dependence).

In order to finalize the codebook, all codes were operationally defined to make them clear, concise, and relevant to observable phenomena within the videos.

Coding Procedures

We followed general coding procedures outlined in prior similar research (e.g., Carroll et al., 2013). Two trained coders worked

independently to review and code the entire sample of videos. Training consisted of an ordered sequence of activities including didactic components and practice coding on other texts. While many content analyses only include double-coding for a small proportion of texts (Crabtree and Miller, 1999), we opted to double-code all videos both because this was feasible and also because we felt it improved the ultimate value of the data. Coding was performed using a computerized database template to facilitate and systematize coding. For the variables coded, we computed inter-rater reliability, expressed in terms of Cohen's κ (Carroll et al., 2013). While nearly all coefficients were in the excellent range ($\kappa > 0.80$) in the final coding, coders' impression of the age of participants was not reliable. Therefore, this variable was omitted from analyses. For all other variables, coders and the principal investigator worked together to achieve consensus for the few disagreements that remained. Because there were so few discrepancies, adjudication was easily achieved.

Measures

Our final codebook contained 42 codes in 6 categories: video characteristics, character socio demographics, alcohol depiction, degree of alcohol use, characteristics associated with alcohol, and consequences of alcohol.

Video Characteristics. There were 3 codes in this category. First, coders determined whether music was absent, incidental, or integral. Production quality was assessed as poor, moderate, or professional. A final code in this category asked coders whether the video personally engaged viewers. For example, a generic scene from a television show in which actors interact with one another only was coded as not personally engaging the audience, while a homemade video in which the primary actor directly looked into the camera and addressed the viewer was coded as personally engaging the audience.

Character Socio demographics. This category included 5 binary variables which captured sex and race/ethnicity. For these variables, coders focused on "primary individuals," who were defined as those individuals pictured in an active role in the video, such as speaking, performing music, or interacting directly with a speaker or performer. For example, the star of a music video and other prominent characters (such as band members) would be defined as primary individuals. However, if the video panned to a group of cheering fans, these individuals would not generally be defined as primary individuals. Binary variables enabled coders to describe pictured individuals as male, female, Caucasian, African-American, and Hispanic. These categories were not mutually exclusive, because a video might picture both females and males, and it might feature individuals of multiple different racial and/or ethnic groups. While we originally intended on assessing age, our inter-rater reliability was inadequate in this area. We also aimed to assess Asian or Pacific Islander and Native American race, but coders did not find any examples of these.

Alcohol Depiction. This category contained 6 codes. First, 2 dichotomous variables assessed whether alcohol was represented in the audio and video tracks, respectively. Three binary variables were used to determine whether beer, wine, or liquor were present. Champagne was included in the "wine" category. Finally, a binary variable described whether an alcohol brand name was noted, and an associated open field was used to capture specific names of these brand references.

Degree of Alcohol Use. Three binary variables assessed active intoxication, heavy consumption, and dependence. Active intoxication was coded if there was readily apparent slurring of speech, awkwardness of movement, reduction of social inhibitions, or other signs of acute intoxication. Heavy consumption was based on occurrences in the video clip such as chugging, drinking multiple shots, or

similar behavior. To provide some consistency with current definitions of binge alcohol use, coders were given rough guidelines of defining heavy use as involving at least 4 to 5 drinks in a single sitting. Dependence was coded if there was a specific reference to being a "drunk," being an "addict," or depiction of physical tolerance or withdrawal.

Characteristics Associated with Alcohol Use. This category assessed whether various other characteristics were juxtaposed with the alcohol use. Three codes were used to determine whether alcohol was associated with positive characteristics or attributes including humor, games (such as drinking games or challenges), and physical attractiveness. Because factors such as humor and attractiveness can be subjective and often require a frame of reference, these were defined as likely to be humorous or attractive to the intended audience of the video. Four additional separate codes assessed whether there were other substances present, including tobacco, marijuana, cocaine/crack, or other drugs. Finally, 3 codes assessed factors including aggression, injury, or use of a motor vehicle.

Consequences of Alcohol. Variables assessed consequences of alcohol use in 7 different categories: physical, cognitive, emotional, sexual, social, legal, and economic. Each variable had 3 levels: negative, neutral, or positive. For example, physical consequences would be coded as negative if alcohol was associated with bodily harm, physical injury, acute hangover symptoms (e.g., headache, light sensitivity, nausea), or vomiting. As another example, emotional consequences would be coded as positive if alcohol was associated with positive affect, such as happiness, joy, excitement, or enthusiasm. For each variable, consequences were coded as "neutral" if there were no positive or negative consequences or if there were both types of consequences in roughly equal measure.

User Sentiment. We captured numerical video data related to user sentiment, including the number of views, likes, and dislikes. Because we saved each video's metadata to a static document at 1 point in time, each of these pieces of data was a unique whole number. We then created 2 specific variables of interest: likes per view and likes per dislike, which capture different types of sentiment. "Likes per view" offers a sense of viewer *engagement*, because it captures what proportion of those exposed care enough to express a positive sentiment. "Likes per dislike," however, captures the degree of viewer *positivity* among those who care to offer any sentiment. To create the "likes per dislike" variable, we added 1 to both the numerator and denominator. We did this to avoid division by zero, because 3 of the videos had no dislikes.

Analysis

We first assessed the percentage of videos in each code category. We then computed measures of engagement and positivity (likes per view and likes per dislike) for each of the coded variables. To determine whether these differences were statistically significant, we used nonparametric methods, because these measures of engagement and positivity were non normal. For binary coded variables, we used Mann-Whitney *U*-tests, and for coded variables with more than 2 categories, we used Kruskal-Wallis tests. We considered significant values as those with $p < 0.05$, and we conducted all analyses in Stata 13.0 (Statacorp, College Station, TX).

RESULTS

Sample

Of the 200 videos retrieved, 38 (19%) were excluded for being duplicates, 78 (39%) for being irrelevant, and

14 (7%) for being in languages other than English. The 70 remaining videos lasted a median of 229 (interquartile range [IQR] 169 to 294) seconds. Each video had been viewed a median of 132,939 (IQR 9,283 to 3,998,532) times, for a total of 333,246,875 views for all videos combined. The videos had a median of 1,646 (IQR 300 to 22,969) “like” designations and 33 (IQR 14 to 1,261) “dislike” designations each.

Code Frequencies

Video Characteristics. Music was often incidental (56%) and less frequently absent (23%) or integral (21%). Production quality was poor, moderate, or professional in approximately equal proportions (Table 1). Almost half (46%) of videos were coded as directly engaging with the viewer.

Socio demographic Data. As discussed above, age categories were not included because this variable did not exhibit sufficient inter-rater reliability. While 89% of videos involved males, only 49% involved females. The most apparent racial groups were Caucasians and African-Americans (Table 1).

Alcohol Depiction. While 81% of videos portrayed alcohol or intoxication in the audio track, only 69% had such portrayals in the video track; 57% represented alcohol in both the audio and video tracks. Liquor was most frequently represented, followed by beer and then wine (Table 1). Nearly one-half (44%) of videos contained a brand reference. Because some videos contained more than one brand, there were a total of 55 brand references, representing 36 brands (Table 2). Of the 55 total brand references, liquor brands were most frequently represented ($n = 36$, 65%), followed by beer ($n = 15$, 27%) and then wine or champagne ($n = 4$, 7%).

Degree of Alcohol Use. While 86% of videos portrayed active intoxication and 33% portrayed bingeing, only 7% referred to dependence.

Characteristics Associated with Alcohol. Humor was commonly associated with alcohol use and was present in 79% of videos, while games and attractiveness were each present in about one-fifth of videos. The most common other substance represented was tobacco (14%), while marijuana and cocaine were each represented in 4% of videos. Aggression, injury, and use of a motor vehicle were present in 14, 19, and 24% of videos, respectively (Table 1).

Consequences of Alcohol. Consequences were most positive in the emotional realm, followed by social and then sexual. No positive consequences were coded in the cognitive, economic, and legal categories. The most strongly negative

consequences were cognitive, followed by physical, legal, and then economic (Table 1).

Viewer Sentiment

There were a median of 9.4 (IQR 3.8 to 34.3) “like” designations per 1,000 views in the complete sample. There were a median of 23.2 (IQR 10.5 to 47.7) “like” designations for each “dislike” in the sample.

Video Characteristics. Compared with the other categories, viewers expressed more engagement (likes per 1,000 views) for videos with incidental music and moderate production values. They also overwhelmingly expressed more likes per 1,000 views for videos which directly engaged the viewer (31.0 vs. 4.5, $p < 0.001$). Compared with the lowest category, both upper-level categories for music and production variables received more positivity (likes per dislike) (Table 1).

Socio demographic Data. No socio demographic characteristics achieved our a priori criteria for significance ($p < 0.05$) for either outcome variable.

Alcohol Depiction. Compared with those that did not, videos with visual portrayal of alcohol received more likes per 1,000 views (14.9 vs. 4.0, $p = 0.04$). While no other alcohol depiction characteristics achieved significance for the likes per view variable, one was very close. In particular, there were more likes per 1,000 views among those videos with a brand reference compared with those without (25.4 vs. 6.3, $p = 0.055$). For the outcome of likes per dislike, there was more positive sentiment for videos with alcohol in the audio, alcohol in the video, those featuring liquor, and those with a brand-name reference (Table 1).

Degree of Alcohol Use. There were fewer likes per dislike when intoxication was portrayed versus no intoxication (20.9 vs. 69.1, $p = 0.004$).

Characteristics Associated with Alcohol. There were more likes per 1,000 views when humor was present versus when no humor was present (13.2 vs. 4.1, $p = 0.02$) and when games were present versus no games (31.3 vs. 7.5, $p = 0.007$). There were more likes per dislike when attractiveness was present versus no attractiveness (67.5 vs. 17.8, $p < 0.001$) and when there was no injury versus injury (26.7 vs. 7.0, $p = 0.02$).

Consequences of Alcohol. For sexual and social consequences, there were more likes per 1,000 views for the “neutral” categories compared with either of the extreme categories. With regard to the outcome of likes versus dislikes, there was also higher sentiment for the more positive videos in the cognitive, emotional, and physical consequences categories (Table 1).

Table 1. Associations Between Video Characteristics, Socio-demographic Data, and Alcohol Types with Viewer Engagement and Positivity

Variable	N (%)	Engagement: likes per 1,000 views (median) ^a	Positivity: likes per dislike (median) ^a
<i>Video Characteristics</i>			
<i>Music</i>			
None	16 (23)	2.5	6.7
Incidental	39 (56)	28.5	29.5
Integral	15 (21)	4.1	32.1
<i>Production</i>			
Poor	22 (31)	4.9	9.9
Moderate	25 (36)	33.9	32.1
Professional	23 (33)	6.3	29.5
<i>Viewer engaged</i>			
No	38 (54)	4.5	20.1
Yes	32 (46)	31.0	25.0
<i>Character Socio demographics</i>			
<i>Male</i>			
No	8 (11)	4.2	23.4
Yes	62 (89)	11.3	23.2
<i>Female</i>			
No	36 (51)	11.2	19.7
Yes	34 (49)	9.1	32.1
<i>Caucasian</i>			
No	14 (20)	17.9	24.2
Yes	56 (80)	9.1	23.2
<i>African-American</i>			
No	53 (76)	9.5	19.5
Yes	17 (24)	5.3	34.2
<i>Hispanic</i>			
No	63 (90)	9.2	20.2
Yes	7 (10)	26.6	32.1
<i>Alcohol Types</i>			
<i>Audio</i>			
No	13 (19)	5.3	15.9
Yes	57 (81)	10.0	28.2
<i>Visual</i>			
No	22 (31)	4.0	9.4
Yes	48 (69)	14.9	28.2
<i>Beer</i>			
No	45 (64)	13.2	19.5
Yes	25 (36)	7.8	28.2
<i>Wine</i>			
No	64 (91)	10.5	21.7
Yes	6 (9)	7.2	37.7
<i>Liquor</i>			
No	31 (44)	7.9	11.4
Yes	39 (56)	11.6	29.1
<i>Brand reference</i>			
No	39 (56)	6.3	19.2
Yes	31 (44)	25.4	32.1
<i>Degree of Alcohol Use</i>			
<i>Intoxication</i>			
No	10 (14)	28.4	69.1
Yes	60 (86)	8.1	20.9
<i>Bingeing</i>			
No	47 (67)	8.3	19.9
Yes	23 (33)	11.0	29.1
<i>Dependence</i>			
No	65 (93)	10.0	23.2
Yes	5 (7)	6.3	29.1
<i>Characteristics Associated with Alcohol</i>			
<i>Humor</i>			
No	15 (21)	4.1	19.5
Yes	55 (79)	13.2	26.7
<i>Games</i>			
No	58 (83)	7.5	20.1
Yes	12 (17)	31.3	30.8

Continued.

Table 1. (Continued)

Variable	N (%)	Engagement: likes per 1,000 views (median) ^a	Positivity: likes per dislike (median) ^a
<i>Attractiveness</i>			
No	53 (76)	7.9	17.8
Yes	17 (24)	16.6	67.5
<i>Tobacco</i>			
No	60 (86)	9.4	24.0
Yes	10 (14)	9.4	15.8
<i>Cannabis</i>			
No	67 (96)	9.2	23.2
Yes	3 (4)	22.6	29.5
<i>Cocaine/Crack</i>			
No	67 (96)	9.2	23.2
Yes	3 (4)	30.5	26.7
<i>Other drug</i>			
No	68 (97)	9.7	24.0
Yes	2 (3)	2.2	11.6
<i>Aggression</i>			
No	60 (86)	10.8	24.0
Yes	10 (14)	7.4	15.4
<i>Injury</i>			
No	57 (81)	11.6	26.7
Yes	13 (19)	5.3	7.0
<i>Use of a motor vehicle</i>			
No	53 (76)	11.6	23.2
Yes	17 (24)	6.2	29.1
<i>Consequences of Alcohol</i>			
<i>Cognitive consequences</i>			
Negative	45 (64)	7.9	17.8
Neutral	25 (36)	11.6	55.0
Positive	0 (0)	NA	NA
<i>Economic consequences</i>			
Negative	3 (4)	7.9	11.4
Neutral	67 (96)	9.5	24.7
Positive	0 (0)	NA	NA
<i>Emotional consequences</i>			
Negative	4 (6)	7.6	19.4
Neutral	36 (51)	14.9	16.1
Positive	30 (43)	8.9	36.6
<i>Legal consequences</i>			
Negative	6 (9)	17.6	42.6
Neutral	64 (91)	9.4	21.7
Positive	0 (0)	NA	NA
<i>Physical consequences</i>			
Negative	17 (24)	5.3	15.9
Neutral	52 (74)	24.0	25.0
Positive	1 (1)	11.0	46.4
<i>Sexual consequences</i>			
Negative	2 (3)	3.5	53.6
Neutral	58 (83)	14.9	21.6
Positive	10 (14)	3.1	33.2
<i>Social consequences</i>			
Negative	12 (17)	4.8	17.9
Neutral	43 (61)	25.4	20.2
Positive	15 (21)	6.6	40.5

^aBold values indicate differences at a level of $p < 0.05$ on Mann-Whitney U -tests (for dichotomous variables) or Kruskal-Wallis tests (categorical variables).

DISCUSSION

In this study, we analyzed 70 YouTube videos retrieved using a systematic process involving search terms related to alcohol intoxication. These videos had been viewed about a third of a billion times. About half of these videos depicted females, while nearly 90% depicted males. We found that a large proportion of the videos (44%) contained alcohol

Table 2. Specific Brand Names Represented in the Sample of 70 Videos

Brand	Type of alcohol	General category	Number of representations
1800	Tequila	Liquor	1
Absolut	Vodka	Liquor	2
Amstel	Beer	Beer	1
Aspall	Hard Cider	Beer	1
Bacardi	Rum	Liquor	1
Bud Light	Beer	Beer	2
Budweiser	Beer	Beer	2
Captain Morgan	Rum	Liquor	2
Carlsberg	Beer	Beer	1
Coors Light	Beer	Beer	2
Crown Royal	Whiskey	Liquor	2
Cristal	Champagne	Wine	1
DeKuyper	Liqueur	Liquor	4
Four Loco	Alcoholic Energy Drink	Beer	1
Franzia	Wine	Wine	1
Goldschlager	Liqueur	Liquor	1
Grolsch	Beer	Beer	1
Jack Daniels	Whiskey	Liquor	3
Jagermeister	Liqueur	Liquor	3
Jameson	Whiskey	Liquor	1
Jim Beam	Whiskey	Liquor	2
Ketel One	Vodka	Liquor	2
Kozel	Beer	Beer	1
Makers Mark	Whiskey	Liquor	1
Malibu	Rum	Liquor	1
Midori	Liqueur	Liquor	1
Modelo	Beer	Beer	1
Moet	Champagne	Wine	1
Patron	Tequila	Liquor	2
Red Stripe	Beer	Beer	1
Sierra Nevada	Beer	Beer	1
Skyy	Vodka	Liquor	3
Smirnoff	Vodka	Liquor	2
Southern Comfort	Liqueur	Liquor	1
Three Olives	Vodka	Liquor	1
Veuve Clicquot	Champagne	Wine	1

brand references and that liquor was represented more commonly than beer, wine, or champagne. Additionally, while 86% of videos portrayed active intoxication, only 7% contained references to alcohol dependence. Finally, we found that viewer sentiment was most strongly positive when the video depicted humor, games, attractiveness, and when there was no intoxication or injury present.

It is a noteworthy finding in itself that videos such as these have been viewed so many times. In particular considering the challenge of integrating anti-alcohol programming into educational venues, it may be valuable to explore the viability of leveraging this dissemination medium for prevention-related information (Kupersmidt et al., 2010; Lee and Cheng, 2010). While many different types of videos were examined, none of them were sanctioned public health interventions.

Males were depicted more commonly than females in this group of videos. This may be because males tend to report more frequent episodic drinking relative to females (Chavez et al., 2011) and alcohol use is perceived as more socially acceptable for males (De Visser and McDonnell, 2012). Whatever the reason, this information may help to target interventions. For example, knowing that there is a higher

instance of male characters may indicate that the male audience is more apt to be influenced by false perceptions found in YouTube videos. Therefore, future interventions debunking alcohol-related myths propagated on social media may be useful to target toward males.

The proportion of videos containing alcohol brand references was relatively high (44%). Previous research on popular music suggests that about one-quarter of songs containing alcohol references refer to a specific brand (Primack et al., 2012b). Frequent brand mentions may suggest that there was industry influence, but there was no clear indication of this. In particular, while we did intend to code for advertisements, no examples were noted. However, in the future, there may be more explicit advertising via this medium. This is consistent with the alcohol industry's overall trend toward expanding its marketing activities from traditional to social media sources (Nicholls, 2012).

Another reason that there may have been many alcohol brand references is that brands are important to users. Brand identity and loyalty are carefully considered by the industry (Mosher, 2012). However, in clinical settings, we tend to ask users about types of alcohol, such as beer and liquor, without referencing brands. This may represent a missed opportunity. In particular, because individuals are so familiar with and motivated by specific brand identities (Lin et al., 2012; Mosher, 2012), asking about those brands may help clinicians to better understand patient alcohol use and subsequently to intervene. An implication of this heavy exposure to alcohol brand references is that these video exposures may be potent in terms of encouraging alcohol use. This is because references to alcohol branding, whether or not they are placed by the industry, can serve as advertising (Lin et al., 2012). Additionally, exposure to alcohol brand references in popular media has been empirically linked to alcohol use outcomes (Primack et al., 2014). Therefore, it will be valuable to assess the potential impact of exposure to videos such as these alongside other more traditional media sources.

Another noteworthy finding of this study was that liquor was the most commonly depicted type of alcohol, followed by beer and then wine or champagne. This pattern persisted with regard to the types of alcohol *brands* mentioned. Liquor brands comprised nearly two-thirds of all brand mentions, while beer and wine were noted only 27 and 7% of the time, respectively. This is an interesting and unexpected finding, because beer is more commonly consumed than liquor in the United States (World Health Organization, 2014), and the majority of videos we studied came from the United States. Additionally, this emphasis on liquor is concerning, given the high alcohol content of liquor and its potential for morbidity and mortality, especially among youth. It may be valuable for future qualitative research to examine in greater detail possible reasons behind this emphasis on liquor, including whether industry involvement may be a factor.

It is not surprising that 86% of the videos we studied portrayed active intoxication and that 33% of videos displayed heavy episodic use, because we explicitly developed a search

strategy related to intoxication. However, it is interesting to note that only 7% of all videos referred in any way to alcohol dependence, such as indicating tolerance or withdrawal. In reality, the prevalence of dependence among individuals exhibiting this amount of intoxication and/or heavy episodic use is much higher. However, it is common for media to portray the fun, humorous side of alcohol use while deemphasizing more serious concerns and consequences (Primack et al., 2008). For example, in order to sell more music, music videos may tend to portray positive feelings and situations over negative consequences. Similarly, individual users who take amateur videos of alcohol-related events may be more likely to upload those to a site such as YouTube if the portrayal is positive or humorous rather than if it is degrading or damaging. Consequences of these potential disparities between representation and reality may be important to consider; for example, youth heavily exposed to these videos may develop a skewed sense of the true nature and consequence of heavy alcohol use.

Our study was innovative in its examination of associations between video characteristics and viewer sentiment. On social media sites such as YouTube, there is a substantial usual bias in favor of “like” designations over “dislike” designations. For example, in our sample of videos, there were a median of 23.2 like designations for each dislike designation. However, examination of differences in this ratio based on video characteristics was illuminating. For example, when games were present in the video, the number of likes per 1,000 views was higher than when games were not depicted (31.3 vs. 7.5). Other characteristics associated with positive viewer sentiment included humor and attractiveness. Conversely, depiction of injury and intoxication were associated with *fewer* likes per dislike. This serves as a valuable and common-sense reminder that viewers tend to enjoy watching humor and attractiveness while they are less appreciative of unpleasant depictions such as bodily harm. Interestingly, our results suggest that in and of itself intoxication was regarded as relatively unpleasant by viewers. However, as noted above, potential selection biases may result in positive qualities, such as humor, being juxtaposed with intoxication in a preponderance of Internet-associated videos.

Limitations

Studies of Internet user-generated content sites are inherently limited because access to them represents only 1 point in time. We tried to minimize this limitation by sampling from the most popular video-sharing site using 2 different sampling methods—by popularity and relevance. Nevertheless, our results may not be generalizable to other samples of user-generated and posted videos at other times. Also, we were limited in that our sample was collected through a YouTube search using keywords. Although this is the only feasible way to gather a large number of videos that are alcohol related, this is a possible limitation because the videos must

contain a textual reference to our keywords, either in its description or title. Another limitation is that subjectivity is inherent in the coding of variables such as production quality and humor. To minimize this concern, we developed a comprehensive codebook with detailed criteria for codes, we had 2 people code each video, and we adjudicated the coding in cases of disagreement. However, this remains a potential limitation. Finally, our coding of individuals in videos was based on appearances and may not correspond to how they self-identify.

CONCLUSIONS

This study suggests that Internet videos depicting alcohol intoxication have been heavily viewed, and that nearly half of these videos involve a brand-name reference. While these videos commonly juxtapose alcohol intoxication with characteristics such as humor and attractiveness, they infrequently depict negative clinical outcomes. This disparity between representation and reality may affect viewers' perceptions regarding alcohol use. Finally, the popularity of YouTube may provide an opportunity for public health intervention.

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