

# **HHS Public Access**

Author manuscript *J Health Commun.* Author manuscript; available in PMC 2021 February 01.

Published in final edited form as:

J Health Commun. 2020 February 01; 25(2): 150-158. doi:10.1080/10810730.2020.1719242.

## Posting Post-Blackout: A Qualitative Examination of the Positive and Negative Valence of Tweets Posted after "Blackout" Drinking

Jennifer E. Merrill, PhD<sup>a,\*</sup>, Rose Marie Ward, PhD<sup>b</sup>, Benjamin C. Riordan, MSc<sup>c</sup>

<sup>a</sup>Department of Behavioral and Social Sciences, Center for Alcohol and Addiction Studies, Brown University School of Public Health, Providence, Rhode Island, U.S.A.

<sup>b</sup>Department of Kinesiology and Health, Miami University, Oxford, Ohio, U.S.A.

<sup>c</sup>Discipline of Addiction Medicine, Central Clinical School, Faculty of Medicine and Health, University of Sydney, Sydney, Australia

## Abstract

Alcohol-induced memory loss (i.e., blackout) is a consequence of drinking that is both common and associated with additional negative outcomes. The goal of the present study was to use publicly available Twitter data to better understand cognitions and emotions following blackouts. Tweets containing key terms (e.g., "black out,") were collected over four days in 2018. Using NVivo software, we coded all post-blackout Tweets for valence (positive, negative, neutral). Within each valence category, we reviewed Tweets to identify themes. Among Tweets coded with a positive valence, themes included pride in blacking out, pride in ability to function despite blackouts, blackouts as a shared social experience, and overall positive views of a drinking experience despite blackouts. Among tweets coded with a negative valence, themes included the experience of other negative consequences on blackout nights, blackouts as unexpected/unplanned, blackouts as motivator of change, and blackout-related negative emotions. Additionally, Tweeters expressed pride in avoiding blackouts during drinking events. Findings provide insight into why not all individuals describe blackouts negatively, by analyzing specific statements made in a public forum following a blackout. Such insight may inform interventions targeting those who report this risky outcome of drinking, including those that could be delivered via social media.

## Keywords

blackout; alcohol-induced memory loss; Twitter; social media; valence

Data Availability Statement Data are available from the first author upon request.

<sup>&</sup>lt;sup>\*</sup>Correspondence concerning this article should be addressed to: Jennifer E. Merrill Ph.D., Assistant Professor (Research), Department of Behavioral and Social Sciences, Center for Alcohol and Addiction Studies, Brown University, Box G-S121-5, Providence, RI 02912, Phone: (401) 863-5165, Fax: (401) 863-6697, Jennifer\_Merrill@brown.edu.

Declaration of Interest Statement

The authors declare no conflicts of interest related to this research.

Merrill et al.

Alcohol use is a major risk factor for disability and death worldwide, and is associated with both short-term consequences (e.g., hangovers, injury) and more serious long-term consequences (e.g., cirrhosis; (Griswold et al., 2018)). One acute consequence of heavy drinking is a blackout, defined as a period of anterograde amnesia in which a person actively engages in behaviors while drinking but does not retain memories for those events (Hingson, Zha, Simons-Morton, & White, 2016). Blackouts are common; one third to half of young adult drinkers report having had this experience (American College Health Association, 2012; Hingson et al., 2016; Jennison & Johnson, 1994; Wetherill & Fromme, 2016; White & Ray, 2013). Blackouts are linked to a higher likelihood of injury and emergency department care than drinking alone (Mundt & Zakletskaia, 2012; Mundt, Zakletskaia, Brown, & Fleming, 2012) and are prospectively associated with sexual revictimization in college women who had been victimized as adolescents (Valenstein-Mah, Larimer, Zoellner, & Kaysen, 2015).

Because blackouts are both common and harmful, individuals' personal experiences with and subjective evaluations of blackouts are relevant for prevention and intervention efforts. Work to better understand such subjective evaluations has been conducted primarily via survey methodology among college student drinkers. For example, in one study, 12% of young adults were not bothered at all by blackouts (White & Ray, 2013). Other survey work indicated that blackouts are rated as only "somewhat" bothersome by those college students who have experienced them (Barnett, Merrill, Kahler, & Colby, 2015; Merrill, Read, & Barnett, 2013).

Such findings can be understood in greater depth via a handful of qualitative studies. In one study of 50 college students with a history of blackouts (White, Signer, Kraus, & Swartzwelder, 2004), 50% felt scared, 8% embarrassed, 4% worried, 4% angry, and 4% guilty after their most recent blackout. On the other hand, 26% felt indifferent and 8% were amused. Likewise, in a recent focus group study of blackouts with 50 college students (Merrill, Miller, DiBello, Singh, & Carey, 2019), the majority of blackouts were described negatively, but there were some notable positive, neutral, and mixed reactions. Of note, participants in both of these studies were asked to reflect back on all prior experiences with alcohol-induced memory loss, yet it is possible that reactions to such events change over time. No study has examined blackout evaluations closer in time to when they were experienced, and qualitative work on blackouts among samples that are not limited exclusively to college students is lacking. Further, it is possible that the cognitions and emotions that are expressed on Twitter regarding recent blackouts differ from those that research participants are willing to share in a focus group study.

Understanding how blackouts are evaluated is important, as more negative evaluations may increase the likelihood of making naturalistic reductions to one's drinking (Barnett et al., 2015; Merrill et al., 2013). Notably, those who endorsed feeling scared following a blackout were more likely than those who were not scared to report changing their drinking as a result of the blackout (White et al., 2004). In other words, negative evaluations of blackouts had implications for behavior change.

## Twitter as a Platform for Alcohol and Blackout Research

Social networking website use is near ubiquitous, especially among young adults (Smith & Anderson, 2018). One of the most popular social networking websites is Twitter, where users post short blogs (i.e., "Tweets") that others can interact with by replying, sharing ("re-Tweeting"), or liking (Smith & Anderson, 2018). Twitter has become increasingly popular in the past decade, with millions of Tweets written daily. Unlike other social networking platforms (e.g., Facebook, Snapchat), most Twitter posts are public. One study showed that around 2% of all Tweets posted during the month of March 2015 (which includes St. Patrick's Day) included references to alcohol (Alhabash et al., 2018). Further, most young adults report posting about their alcohol use on social networking sites (Egan & Moreno, 2011; Erevik, Torsheim, Vedaa, Andreassen, & Pallesen, 2017). Recent research also indicates that alcohol-related posting relates to real-world behaviors. For example, researchers have found that there is a link between how much a person tweets about alcohol and their willingness to use alcohol (Litt et al., 2018).

Given the number of unprompted alcohol-related Tweets, Twitter provides a useful platform through which to better understand cognitions and emotions about specific alcohol-related consequences like blackouts. Indeed, researchers have begun to use Twitter as a tool to understand alcohol related behavior. In our own recent work, we examined expressions of intention to blackout on Twitter (Riordan et al., in press). We focused on a subset of tweets that mentioned keyword variations of blackout (e.g., blacking out, blacks out), and limited our analyses to those tweets that were clearly posted prior to a drinking event. Findings revealed that Tweeters express clear and specific motivations for blacking out, falling into two primary categories: celebration and coping. Notably, in the data collected for this study, several additional Tweets were coded as having been posted *following* a blackout, and were not considered in our prior work. Such data provide the opportunity to better understand how people reflect on their recent blackout experiences, whether or not those experiences were motivated by some goal.

Other work using Twitter data has focused on the sentiment/valence of tweets that reference substance use. This work reveals that alcohol (vs. non-alcohol) tweets depict more positive emotions (Alhabash et al., 2018) and that the majority (79%) of alcohol tweets are proalcohol (Cavazos-Rehg, Krauss, Sowles, & Bierut, 2015). While we know that Tweets generally referencing alcohol are most often positively valenced, whether the same is true for Tweets referencing an ostensibly negative consequence of drinking, such as blackouts, is unknown. Posting content reflecting positive aspects of alcohol on social media has been shown to predict future alcohol use levels among Norwegian college students (Erevik, Torsheim, Andreassen, Vedaa, & Pallesen, 2017). As such, better understanding of the precise ways that individuals describe their experiences during and following blackouts may have implications for understanding naturalistic change in drinking and/or for identifying intervention targets (e.g., cognitions related to blackouts that may promote continued heavy drinking).

## The Present Study

Whereas prior work highlights that there is variability in the ways in which blackouts are subjectively evaluated, the more precise cognitions and emotions surrounding prior blackout experiences, especially those that just recently occurred, are not well understood. The present study was an attempt to gain a deeper understanding of and generate hypotheses regarding the specific ways in which blackouts are experienced as positive or negative events. We qualitatively analyzed a sample of Twitter content to better understand how Tweeters discuss their prior blackout events on a social media platform.

## **Materials and Methods**

Publicly available Tweets were used for study data, obtained via NVivo's NCapture browser plugin (QSR International Pty Ltd, 2019). NCapture uses Twitter's Application Program Interface (API) to obtain tweets that can be imported into NVivo software for subsequent coding. We collected global English language Tweets posted between Thursday April 26<sup>th</sup> 2018 and Sunday April 29th 2018 that contained one of the following terms (with or without a hashtag): "black out," "blackout," "blacking out," "blacked out," or "blacks out." Of note, Twitter's API limited (a) the timeframe in which Tweets could be collected (those posted in past 7 days) and (b) the number of Tweets that could be collected at one time (max = 18,000every 15 minutes). As such, for the term "blackout," which occurred more than 18,000 times, we allowed for fifteen minutes between each NCapture search and we collected tweets with this term multiple times over the weekend period of study. This resulted in an initial set of 39741 Tweets. However, we removed 21528 re-Tweets (i.e., a Tweet that was reposted verbatim), 2032 Tweets that were not in the English language, and 11445 Tweets deemed upon review by the research team as unrelated to alcohol (e.g., other types of "blackouts" such as power outages). This process resulted in a final data set of 4736 original tweets for analysis.

Within the NVivo12 software, each Tweet in this final dataset (including any images or url links) was coded by at least two of the three authors. Coding decision details and summaries of these discussions of coding were logged during team meetings. For example, we kept notes on which author was assigned to coding which subsets of data, reminders on agreed upon meanings of each code, apparent reasons for any coding discrepancies observed and a plan for resolving them. Ultimately, coding occurred in two stages. First, we categorized the timing of the Tweet (posted in anticipation of a future drinking event vs. in reflection upon a prior drinking event). In the present study, we analyzed only the latter (post-drinking, n = 2,313). Across keyword files and coders, average agreement rates were 88.3% for post-drinking; and average kappa was .75.

Next, we coded these post-drinking tweets for valence (i.e., emotional directionality), using three categories. Following a codebook, a positive valence code was applied to Tweets in which the drinking experience was described in a positive light (e.g., the drinker was happy about the recent drinking event, or described some positive outcome). A negative valence code was applied to Tweets in which the drinking experience was described in a negative light (e.g., the drinker felt regretful, or described some negative outcome). A neutral valence

Merrill et al.

code was applied to Tweets in which the content that was neither clearly positive nor negative (e.g., simply stating that one blacked out). The three researchers overviewed an initial subset of the post-drinking Tweets, and discussed codes to resolve discrepancies before proceeding with the rest of the coding process. Next, all remaining Tweets were independently coded by at least two of the three researchers. The number of coding discrepancies in each category that were present once coding was complete are described below in the results.

Finally, via thematic analysis, summaries of concepts and themes were generated from detailed reviews of coded data. Specifically, each author reviewed the complete set of tweets coded within each group (positive, negative, neutral) and independently created a table of potential themes, characterized by redundancies in the written messages. Next, we discussed overlap and points of departure in our independently identified themes, and created a master table of themes upon which we all agreed and corresponding Tweets. All authors agreed on this final table of themes. In the results section, a select set of representative verbatim Tweets for each theme are presented.

## Results

Out of a total of 2313 post-drinking Tweets, the majority were coded by the research team as neutral (1223, 52.9%). Additionally, 355 were coded as positive valence (15.3%) and 863 were coded as negative valence (37.3%). Of note, particularly because each Tweet was coded by two authors, but also because we agreed that more than one valence code could potentially apply within the same Tweet, Tweets could be coded as more than one valence. A total of 93 Tweets were coded as both negative and neutral, 42 as both positive and neutral, and 32 as both negative and positive. No Tweets were coded into all three categories. Nonetheless, these frequencies suggest that in retrospection of a drinking event, blackouts are more often described negatively than positively. Tweets coded as neutral typically involved simple statements about the occurrence of blackout drinking, without any indication of whether it was a positive or negative experience (e.g., "Always black out when I drink," "Sometimes I just black out and buy things cuz I felt it was necessary at the moment," and "My boy & I drank three bottles of wine last night & got blackout"). All meaningful themes that emerged were determined through review of those Tweets coded as positive or negative and are described below. Tweets representative of each theme are presented in Table 1.

#### Positive Valence of Blackout following a Drinking Event

**Pride in blacking out; blacking out as an achievement.**—One theme that emerged indicated that some tweeters were proud to have blacked out, or perceived blacking out as an accomplishment. In some cases, blackouts were described as a special skill.

**Pride in ability to function in other ways during and/or outside of blackouts.**— The second theme that emerged suggested that individuals took pride in accomplishing other tasks or avoiding other consequences while blacked out. Related to this, others commented on having balance between being responsible at times despite blacking out other times.

Page 6

The overall drinking experience may be viewed positively despite a blackout and/or other negative consequences.—Within this theme, Tweeters described how despite a blackout, the drinking event was "worth it," enjoyable, or resulted in some kind of positive outcome.

**Blackouts can be as a shared/social experience.**—Another theme to emerge was that blackouts occur in a social context, and may be celebrated as an experience that is shared with others. Often, peers were tagged in these Tweets.

#### Negative Valence of Blackout following a Drinking Event

**Blackouts may be accompanied by a range of negative emotions.**—A number of the Tweets that were coded with a negative valence noted a particular negative emotion that the individual was experiencing. These included self-hate, stress, regret, shame, and disappointment.

#### Other negative consequences occur on nights characterized by blackouts.-

Within the Tweets examined in this study (where a recent blackout was mentioned), a range of other negative consequences of drinking were also noted. Relative to other themes, a greater number of representative Tweets are included in Table 1 for this theme in order to display the several unique types of negative consequences that were described. These included (a) missing out on something exciting such as a concert or festival due to the blackout, (b) hangover or vomiting, (c) embarrassment, (d) needing to be taken care of by others, (e) injury, (f) spending or loss of items (g) "hook-up" consequences.

**Blackouts are sometimes unexpected/unplanned.**—Some Tweeters described having blacked out when they told themselves they would not blackout (or not drink at all). A similar theme did not emerge from reviews of the positive valence Tweets, suggesting that blackouts that are unplanned or unexpected are less favorably perceived. Interestingly, these Tweets also highlighted that blackout drinking may be a pattern for some.

**Blackouts can lead to some desired or actual change in behavior.**—After a recent blackout, some Tweeters publicly expressed a desire to stop drinking (or stop drinking to the point of blacking out) in the future. As can be seen, for many of these Tweeters, it appeared as though blacking out had become an unwanted pattern rather than a one-time experience. Others reflected on experiences further in the past, describing how they had already changed their drinking as a result of blackouts, and in some cases described this change over time as a process of growing up.

#### Valence of Tweets following the Absence of Blackout

While the vast majority of the post-drinking Tweets described an experience where a blackout or blackout drinking occurred, some Tweeters reacted to the absence of a blackout. A final theme that emerged was individuals expressing pride or pleasure due to the absence of blacking out. Representative Tweets within this theme included "*I didn't get black out drunk last night I'm so proud of myself,*" "*Last night was so much fun…thankful I didn't* 

black out," and "Wait hold on when you don't blackout Friday nights you feel pretty good on Saturday mornings."

## Discussion

The present study was the first to qualitatively analyze the valence of publicly posted Tweets about recent alcohol-induced blackouts and/or blackout drinking. Our data collection techniques allowed us to gain in-depth understanding of cognitions and emotions related to recent blackouts, without the potential bias that could occur in the context of researcher presence (e.g., focus groups). Within Tweets coded as positive, themes that emerged included pride in blacking out, pride in ability to function despite blackouts, blackouts as a shared social experience, and overall positive views of a drinking experience despite blackouts. Within Tweets coded as negative, themes included the experience of other negative consequences on blackout nights, blackouts as unexpected/unplanned, blackouts as motivator of change, and blackout-related negative emotions. Additionally, Tweeters expressed pride in having avoided blackouts during drinking events. Below we discuss how these themes fit with prior work, and inform future research investigations and potentially even interventions.

Two themes that emerged from Tweets with a positive valence involved the emotion of pride. Data used in the present study – in Tweeters' own words – allowed us to deeply explore the context of such pride. For some Tweeters, the pride was directly related to having engaged in blackout drinking, with some suggestion that this was in fact the objective for the night out. For others, pride was expressed with respect to having acted in some responsible manner, either during the drinking event, or more generally in other aspects of life. A third theme involved an overall positive evaluation of the drinking event (e.g., having had fun), despite having blacked out. While prior qualitative work also showed that some blackouts are accompanied by positive emotions such as excitement (Merrill et al., 2019) or amusement (White et al., 2004), our findings related to the specific emotion of pride following a blackout are novel.

Though possible that the sense of pride or other positive emotions expressed were genuine, it is also possible that drinkers expressing positive emotions related to blackouts are subject to cognitive dissonance (Festinger, 1957). Specifically, one may initially hold a negative attitude towards this high-risk type of drinking behavior. Yet, when encountered with a situation in which their behavior is inconsistent with that attitude (i.e., recent blackout), they may change – and in this case publicly express – their attitude toward blacking out to be more positive. Nonetheless, this cannot be gleaned from the present data. Regardless of the specific source of pride or the psychological reason behind it, it is possible that the link between blackout drinking behavior and this emotion may serve to positively reinforce such drinking behavior in the future.

Tweets coded with a positive valence also included reference to blackout drinking that was clearly a social experience. Tweeters tagged their friends in posts, alluding to the collective experience of the drinking event. Prior work has revealed that the social context of a blackout may influence how it is subjectively evaluated, such that if blackouts were more

common or acceptable in one's friend group, or if friends reacted positively (e.g., finding the blackout funny rather than something to be ashamed of), the individual would evaluate their own blackout more positively (Merrill et al., 2019). The social experience of alcohol-induced memory loss is worthy of future, targeted research investigations.

Within negatively-valenced Tweets, Tweeters described hating themselves, feeling stressed, ashamed, regretful, and disappointed in themselves. These findings are consistent with prior qualitative work (Merrill et al., 2019; White et al., 2004). Further, such emotions are not surprising when considering the second theme within negative-valence Tweets, which highlighted the range of other negative events that occur alongside blackouts. Participants described not only missing out on something they had looked forward to due to memory loss, but also consequences such as feeling sick or hungover, embarrassing oneself, and inconveniencing others who had to take care of them. The present study extends prior crosssectional survey work indicating that individuals who report blackouts also report a range of other negative consequences in the past 6 months (Hingson et al., 2016), by showing that there may be an overlap between blackout drinking and other negative consequences at the event- (rather than just person-) level.

Blackouts that were unexpected by the drinker were described in Tweets coded with a negative valence, consistent with prior work suggesting that unanticipated blackouts were more negatively evaluated (Merrill et al., 2019). Additionally, Tweets describing unexpected blackouts also seemed to highlight the repetitive nature of blackouts for some, suggestive of impaired control over drinking. As higher frequency of blackouts is associated with more negative outcomes in longitudinal work (Wilhite & Fromme, 2015), Tweeters indicating unplanned and multiple blackouts may be in particular need of intervention.

Tweets coded negatively also included those that seemed to prompt a motivation to change drinking behavior. Some Tweeters described already having made changes in part due to prior blackout experiences, while others suggested that their most recent blackout was a reason to change. Though in the present study we are unable to examine how the content of Tweets is related to actual behavior, our findings can be considered within behavioral theories. Individuals who describe their blackout experiences positively may be at risk for continued heavy drinking, whereas those who described blackouts negatively may make changes to their drinking behavior. Indeed, prior research shows that more negative evaluations of recent consequences are associated with downward changes in drinking behavior (Barnett et al., 2015; Merrill et al., 2013). As such, an interesting future direction might involve identifying individuals who Tweet negatively-valenced blackout content and delivering online intervention material at an opportune time (i.e., when they may be motivated to change).

A final theme that emerged described thoughts and emotions following the absence (rather than presence) of a blackout. In these cases, Tweeters were often pleased with having had avoided this consequence, despite heavy drinking. Of note, they appeared to be reacting to the expectation that they may have/should have had a blackout but did not. Considered with the behavioral framework noted above, those individuals who described drinking events where they may have expected a blackout to occur, but did not experience one, could also be

a risk for continued heavy drinking due to this absence of a punishing outcome. That is, they may believe it is safe to drink heavily and that they are immune to negative outcomes, which could serve to perpetuate risky drinking patterns.

Other prior work reveals the way "negative" consequences of drinking are subjectively evaluated may depend on a range of factors including concurrent positive consequences (Merrill, Rosen, Boyle, & Carey, 2018; Merrill, Rosen, Walker, & Carey, 2018), and that the evaluation of blackouts in particular is largely dependent on what else happened during the drinking event (Merrill et al., 2019). Likewise in the present study, those Tweets coded positively likely (and in many cases clearly) followed from blackouts that were accompanied by a fun time or other positive outcomes during the drinking event, whereas those coded negatively described blackout drinking events where other negative consequences of drinking occurred.

It is interesting to consider the true meaning and/or motivation behind the public posting of some of the Tweets examined in this study. Other work shows that individuals may tend to post Tweets about alcohol for entertainment (Hendriks, Gebhardt, & van den Putte, 2017). Here, even when people described that a blackout was negative or embarrassing, they were not too ashamed to describe it publicly, which perhaps calls into question how badly they feel about it. Instead, they may use posting on Twitter as a way to get attention. This may even occur via "likes" on the post, which could be perceived by the Tweeter as positive reinforcement for their described behavior. Further, even the many Tweets that were categorized as "neutral" may influence social norms in a meaningful way. Others in one's network who view Tweets simply stating that a peer has blacked out may believe that this behavior is more normative than it actually is, even if no approval or disapproval is expressed. Examining the responses by those in one's social network to Tweets such as those analyzed in the present study is an interesting future direction. Additionally, future research might involve surveying individuals who post about blackouts or other risky behaviors to better understand their motivations for doing so.

#### **Limitations and Strengths**

The goal of the present study was not to generalize our findings to any broad population. Twitter users might be a select group of people who use social media (Moreno et al., 2016); and, of course, data came only from those who were willing to discuss blackout behavior on this particular public forum, which likely does not represent the larger population of drinkers. Additionally, Tweeters might post more "moderate" material indicating that it underestimates the severity of their behaviors (Hendriks et al., 2017; Hendriks, van den Putte, & Gebhardt, 2018). As noted, it is challenging to deduce the true emotional valence behind any given Tweet, as even when discussing one's blackouts in a negative light, an individual was clearly not too ashamed to describe it publicly. In other words, it is difficult to know whether the written words within a Tweet truly reflect one's thoughts and feelings about blackouts. As such, our conclusions are made tentatively, and future research is required.

One limitation with using Twitter is that we cannot describe the demographics of our sample and link certain themes to different demographic groups. Future research efforts could

Merrill et al.

involve contacting and surveying participants of interest identified based on their Twitter posts, to examine whether and how variables such as age, gender, race, ethnicity, and typical drinking behavior may impact the presence and/or specific content of public posts about blackouts. Further, we only collected Tweets over one weekend period and the content of blackout-related Tweets may vary over time (i.e., blackout-related Tweets during large events may be evaluated more positively). While millions of Tweets are posted per day, for our analysis we had access to fewer than 5000 Tweets referencing blackouts over a period of four days. Additionally, because the majority (53%) of the Tweets we collected were coded as neutral, the number of Tweets that could then be used to understand the emotional valence of blackouts was limited. Future studies that use larger data sets and machine learning to code a greater number of Tweets will be valuable to the field.

Despite these important limitations, access to publicly posted Tweets provided a way to gain insight into how people think and feel about an important public health concern – alcohol-induced blackouts. We were able to collect a relatively large set of data points (i.e., Tweets) in a short period of time. While we cannot describe our sample demographics, our participants likely spanned several races, ethnicities, gender identities, and geographic locations. Further, our data were not subject to biases that may be present in traditional research contexts (e.g., answering questions in a way that makes one appear favorable to the researcher). Some of our data clearly come from underage drinkers, and those just turning 21 (the legal drinking age in the U.S.). Such individuals may be less inclined to self-report on blackouts in the context of research, but our ability to access their Tweets provided a way to qualitatively understand their experiences. We believe these strengths counteract the limitations inherent in this type of data collection and analysis.

## Conclusions

There is variability in the ways in which past blackout drinking events are described on a social media platform, with both positive and negative themes emerging from the data. Our findings provide insight into some of the specific emotions and cognitions experienced following heavy drinking or "blackout drinking" occasions that in some cases resulted in memory loss. The current study's data also highlights the potential for Twitter as a platform on which to intervene with problem drinkers. As others have noted, social media is a way for people to communicate health behaviors and may be a potential venue for future interventions (Steers, Moreno, & Neighbors, 2016). Here, Tweeters who expressed negative emotions or cognitions related to recent blackouts may be in a state of motivation to change, which could be capitalized on by interventionists. Future research may benefit from continued use of social media platforms such as Twitter to both understand and intervene upon problem drinking behavior.10

## Acknowledgments

**Funding:** This study was supported training support provided by a grant from the National Institute on Alcohol Abuse and Alcoholism to Jennifer E. Merrill (K01AA022938).

## References

- Alhabash S, VanDam C, Tan PN, Smith SW, Viken G, Kanver D, ... Figueira L (2018). 140 characters of intoxication: Exploring the prevalence of alcohol-related Tweets and predicting their virality. SAGE Open, 8, 1–15.
- American College Health Association. (2012). American College Health Association-National College Health Assessment II: Reference Group Executive Summary Spring 2012. Hanover, MD: American College Health Association.
- Barnett NP, Merrill JE, Kahler CW, & Colby SM (2015). Negative evaluations of negative alcohol consequences lead to subsequent reductions in alcohol use. Psychol Addict Behav, 29(4), 992–1002. doi:10.1037/adb0000095 [PubMed: 26168225]
- Cavazos-Rehg PA, Krauss MJ, Sowles SJ, & Bierut LJ (2015). "Hey Everyone, I'm Drunk." An Evaluation of Drinking-Related Twitter Chatter. J Stud Alcohol Drugs, 76(4), 635–643. [PubMed: 26098041]
- Curtis BL, Lookatch SJ, Ramo DE, McKay JR, Feinn RS, & Kranzler HR (2018). Meta-Analysis of the Association of Alcohol-Related Social Media Use with Alcohol Consumption and Alcohol-Related Problems in Adolescents and Young Adults. Alcoholism: Clinical and Experimental Research, 42(6), 978–986. doi:10.1111/acer.13642
- Daniulaityte R, Chen L, Lamy FR, Carlson RG, Thirunarayan K, & Sheth A (2016). "When 'Bad' is 'Good'": Identifying Personal Communication and Sentiment in Drug-Related Tweets. JMIR Public Health Surveill, 2(2), e162. doi:10.2196/publichealth.6327 [PubMed: 27777215]
- Egan KG, & Moreno MA (2011). Alcohol references on undergraduate males' Facebook profiles. American journal of men's health, 5(5), 413–420.
- Erevik EK, Torsheim T, Andreassen CS, Vedaa Ø, & Pallesen S (2017). Disclosure and Exposure of Alcohol on Social Media and Later Alcohol Use: A Large-Scale Longitudinal Study. Frontiers in psychology, 8, 1934–1934. doi:10.3389/fpsyg.2017.01934 [PubMed: 29163308]
- Erevik EK, Torsheim T, Vedaa O, Andreassen CS, & Pallesen S (2017). Sharing of Alcohol-Related Content on Social Networking Sites: Frequency, Content, and Correlates. J Stud Alcohol Drugs, 78(4), 608–616. [PubMed: 28728643]
- Festinger L (1957). A theory of cognitive dissonance: Stanford University Press.
- Goodwin DW, Crane JB, & Guze SB (1969). Phenomenological aspects of the alcoholic 'blackout'. The British Journal of Psychiatry, 115, 1033–1038. doi:10.1192/bjp.115.526.1033 [PubMed: 5386992]
- Griswold MG, Fullman N, Hawley C, Arian N, Zimsen SR, Tymeson HD, ... Salama JS (2018). Alcohol use and burden for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. The Lancet, 392(10152), 1015–1035.
- Guest G, MacQueen KM, & Namey EE (2012). Applied Thematic Analysis. Thousand Oaks, CA: Sage Publications.
- Hartzler B, & Fromme K (2003). Fragmentary blackouts: their etiology and effect on alcohol expectancies. Alcohol Clin Exp Res, 27(4), 628–637. doi:10.1097/01.alc.0000062743.37558.c8 [PubMed: 12711925]
- Hendriks H, Gebhardt WA, & van den Putte B (2017). Alcohol-Related Posts from Young People on Social Networking Sites: Content and Motivations. Cyberpsychol Behav Soc Netw, 20(7), 428– 435. doi:10.1089/cyber.2016.0640 [PubMed: 28650223]
- Hendriks H, van den Putte B, & Gebhardt WA (2018). Alcoholposts on Social Networking Sites: The Alcoholpost-Typology. Cyberpsychol Behav Soc Netw, 21(7), 463–467. doi:10.1089/ cyber.2017.0729 [PubMed: 29995528]
- Hingson R, Zha W, Simons-Morton B, & White A (2016). Alcohol-Induced Blackouts as Predictors of Other Drinking Related Harms Among Emerging Young Adults. Alcoholism: Clinical and Experimental Research, 40(4), 776–784. doi:10.1111/acer.13010
- Jennison KM, & Johnson KA (1994). Drinking-induced blackouts among young adults: results from a national longitudinal study. Int J Addict, 29(1), 23–51. [PubMed: 8144268]
- Litt DM, Lewis MA, Spiro ES, Aulck L, Waldron KA, Head-Corliss MK, & Swanson A (2018). # drunktwitter: Examining the relations between alcohol-related Twitter content and alcohol

willingness and use among underage young adults. Drug and Alcohol Dependence, 193, 75–82. [PubMed: 30343237]

- Martinez LS, Hughes S, Walsh-Buhi ER, & Tsou MH (2018). "Okay, We Get It. You Vape": An Analysis of Geocoded Content, Context, and Sentiment regarding E-Cigarettes on Twitter. J Health Commun, 23(6), 550–562. doi:10.1080/10810730.2018.1493057 [PubMed: 29979920]
- Merrill JE, Miller MB, DiBello AM, Singh S, & Carey KB (2019). How do college students subjectively evaluate "blackouts"? Addict Behav, 89, 65–69. doi:10.1016/j.addbeh.2018.09.022 [PubMed: 30261483]
- Merrill JE, Read JP, & Barnett NP (2013). The way one thinks affects the way one drinks: Subjective evaluations of alcohol consequences predict subsequent change in drinking behavior. Psychology of Addictive Behaviors, 27(1), 42–51. doi:10.1037/a0029898 [PubMed: 22985054]
- Merrill JE, Rosen RK, Boyle HK, & Carey KB (2018). The influence of context in the subjective evaluation of "negative" alcohol-related consequences. Psychol Addict Behav, 32(3), 350–357. doi:10.1037/adb0000361 [PubMed: 29658727]
- Merrill JE, Rosen RK, Walker SB, & Carey KB (2018). A qualitative examination of contextual influences on negative alcohol consequence evaluations among young adult drinkers. Psychology of Addictive Behaviors, 32(1), 29–39. doi:10.1037/adb0000339 [PubMed: 29355331]
- Miller MB, Merrill JE, DiBello AM, & Carey KB (2018). Distinctions in Alcohol-Induced Memory Impairment: A Mixed Methods Study of En Bloc Versus Fragmentary Blackouts. Alcohol Clin Exp Res, 42(10), 2000–2010. doi:10.1111/acer.13850 [PubMed: 30152868]
- Mundt MP, & Zakletskaia LI (2012). Prevention for college students who suffer alcohol-induced blackouts could deter high-cost emergency department visits. Health Aff (Millwood), 31(4), 863– 870. doi:10.1377/hlthaff.2010.1140 [PubMed: 22422503]
- Mundt MP, Zakletskaia LI, Brown DD, & Fleming MF (2012). Alcohol-induced memory blackouts as an indicator of injury risk among college drinkers. Inj Prev, 18(1), 44–49. doi:10.1136/ ip.2011.031724 [PubMed: 21708813]
- QSR International Pty Ltd. (2019). NCapture Help. Retrieved from http://helpncapture.qsrinternational.com/desktop/welcome/welcome.htm
- Riordan BC, Merrill JE, & Ward RM (in press). "Can't Wait to Blackout Tonight": An Analysis of the Motives to Drink to Blackout Expressed on Twitter. Alcoholism, Clinical and Experimental Research.
- Smith A, & Anderson M (2018). Social Media Use in 2018. Pew Research Center.
- Steers MN, Moreno MA, & Neighbors C (2016). The Influence of Social Media on Addictive Behaviors in College Students. Curr Addict Rep, 3(4), 343–348. doi:10.1007/s40429-016-0123-x [PubMed: 28458990]
- Valenstein-Mah H, Larimer M, Zoellner L, & Kaysen D (2015). Blackout Drinking Predicts Sexual Revictimization in a College Sample of Binge-Drinking Women. J Trauma Stress. doi:10.1002/ jts.22042
- Wetherill RR, & Fromme K (2016). Alcohol-Induced Blackouts: A Review of Recent Clinical Research with Practical Implications and Recommendations for Future Studies. Alcohol Clin Exp Res, 40(5), 922–935. doi:10.1111/acer.13051 [PubMed: 27060868]
- White AM, Signer ML, Kraus CL, & Swartzwelder HS (2004). Experiential aspects of alcoholinduced blackouts among college students. Am J Drug Alcohol Abuse, 30(1), 205–224. [PubMed: 15083562]
- White HR, & Ray AE (2013). Differential evaluations of alcohol-related consequences among emerging adults. Prevention Science. doi:10.1007/s11121-012-0360-8
- Wilhite ER, & Fromme K (2015). Alcohol-Induced Blackouts and Other Negative Outcomes During the Transition Out of College. Journal of Studies on Alcohol and Drugs, 76(4), 516–524. doi:10.15288/jsad.2015.76.516 [PubMed: 26098026]

Themes emerging from post-drinking Tweets about blackouts.

| Theme   | Representative Ouotes  |
|---|--|
|   | Tweets coded with positive valence   |
| Pride in blacking out; blacking<br>out as an achievement  | <ul> <li>Them: can speak 5 languages and ended world hunger; Me: I can blackout in random places</li> <li>Honestly I'm goma make a calendar filled with my favorite picture of when I blacked out that month for 2019</li> <li>Black out achieved</li> <li>Accomplished what I wanted to this weekend! Blacked out and had an amazing time with friends! Yeer:</li> </ul>  |
| Pride in ability to function in<br>other ways during and/or<br>outside of blackouts.  | <ul> <li>Also black out drunk me seems to make sure he gets enough water so it's all good</li> <li>Even if im blackout drunk, i ALWAYS wash my makeup off before bed #adulting.</li> <li>I took my last comm exam blacked out and got a B</li> <li>Apparently I went grocery shopping today, while blackout drunk. And I did a pretty good job</li> <li>I cant believe I blacked out but have no hangover. God was truly looking out for me.</li> <li>I teamted some important shift in The Marine Corps. Like how to fully function without sleep and black out drunk</li> <li>"I work 60 hours a week so I CAN black out on my days off. It's equality</li> <li>If's kinda funny how you learn two sides of a person. One side we are presenting in class. Other side we are both black out dancing on the bar. Thanks college.</li> </ul>   |
| The overall drinking<br>experience may be viewed<br>positively despite a blackout<br>and/or other negative<br>consequences. | <ul> <li>Blacked out and apparently acted a fool. Fuck it I had fum from what I remember</li> <li>I blacked out, got punched in the head, almost fought, and almost got hit by a bus but it was all worth it</li> <li>@(removed) Bro I've actually work up from a blackout, and was happy from whatever the fuck I did in my blackout. Woke up with Extra money in my pocket and a pack of bagels by my bed, haven't been happier since</li> <li>Yesterday was a blast I got to pet 3 dogs then I got blackout drunk and danced by myself for hours at the bar.</li> </ul>   |
| Blackouts can be as a shared/<br>social experience.   | <ul> <li>@[removed] The look of black out in each of our eyes tells a story of our friendship love you always. Wish the cosmo was still open so we could go try to not throw up on ourselves at the bar</li> <li>I like people who blackout with me</li> <li>Here's to more unplanned, penniless, blackout nights! @[removed] @[removed] @[removed] @[removed] @[removed]</li> </ul>   |
|   | Tweets coded with negative valence   |
| Blackouts may be<br>accompanied by a range of<br>negative emotions.   | <ul> <li>I actually hate myself why did one drink turn into me being black out drunk</li> <li>When you blackout and wake up stressing hard</li> <li>Most of the time I don't drink just because I think alcohol tastes nasty, but when I do feel like drinking, I literally don't stop until I black out and the next morning I always regret it so bad</li> <li>I used to get drunk, shiftaced dunk, humiliate myself. The next day I'd feel shame &amp; regret ever drinking. It humbled me. I don't have that anymore</li> <li>So I got blackout drunk last night and I am so disappointed in my actions. I fucked up bro</li> </ul>  |
| Other negative consequences<br>occur on nights characterized<br>by blackouts  | <ul> <li>• Cutted that I literally remember 0 if Rene la nice last night#hlackout #thingstookaturn #overdue."</li> <li>• "@(removed) I went to see Killswitch and trivium. Killswitch cancelled their show and I black out during trivium set. What an idiot</li> <li>• On nights out i really need to behave myself and not get blackout drunkthis hangover is so severe ive debated calling for some medical assistance and an IV drip #prayforing.</li> <li>• San ice to say I black out when I got in bed and puked my brains out 4 times</li> <li>• San to say I black out when I got in bed and puked my brains out 4 times</li> <li>• San to say I black out when I got in bed and puked my brains out 4 times</li> <li>• San to say I black out when I got in bed and puked my brains out 4 times</li> <li>• I didn't mean to blackout. Thx for babysiting</li> <li>• I didn't mean to blackout drunk ass get home last night after being left alone. Thank you. You helped a very drunk and vulnerable stranger when you didn't have to There saill hope out there</li> <li>• I got black out drunk at my cousin's wedding. fell, smacked my head on the concrete and knocked myself out. I like to keep it classy</li> <li>• Cot blackout drunk on a party bus, woke up naked curled up on my nom's couch with a broken arm and a huge pile of newspapers I must've stolen from people's yards???). Later I'd learn that someone else on that bus broke a fool and someone else broke a rib. NOBODY KNOWS HOW</li> </ul> |

Author Manuscript

| <ul> <li>One would think that at 31,1 would be smart enough to eat before going out to drink at night and not get blackout hammered, phone</li> <li>Cori made out with me while I was black out drunk. Not only is that a violation of my human rights, she also got me sick</li> <li>Cori made out with me while I was black out drunk. Not only is that a violation of my human rights, she also got me sick</li> <li>Cori made out with me while I was black out drunk. Not only is that a violation of my human rights, she also got me sick</li> <li>Lot I never want to black out ever again. Back in February I woke up to a text saying I had a fun night with you Finding out I Blonde</li> <li>A to very think to urself im not gonna get blackout and then here u are blackout</li> <li>Every night I say I'm not gonna get blackout and then here u are blackout</li> <li>Every night I say I'm not gonna get blackout any more I need to stay away from liquor honestly I just get sad, black out ever all and to a method to a confused</li> <li>desired or actual change in</li> <li>editemoved L miaooo I haven't been black out drunk in like 2 years cuz I hate not knowing what I did</li> <li>Friday's use to be about geting black out drunk in like 2 years cuz I hate not knowing what I did</li> <li>Friday's use to be about geting black out drunk and regretting life the next day. Now it's all about regretting the fact that I mat</li> </ul> |   |
|---|---|
|   | <ul> <li>One would think that at 31, I would be smart enough to eat before going out to drink at night and not get blackout hammered, forget how I got home, and lose my phone</li> <li>Cori made out with me while I was black out drunk. Not only is that a violation of my human rights, she also got me sick</li> <li>LoI I never want to black out ever again. Back in February I woke up to a text saying I had a fun night with you Finding out I hooked up with a 30 year old at Bottled Blonde</li> </ul>  |
|   | absolutely not drinking that you black out into an oblivion you never even knew existed<br>set blackout and then here u are blackout<br>koutbut I do. Disappointed but definitely not surprised   |
| nap in bed.   | <ul> <li>damn. I've got to like not black out downtown anymoreI need to stay away from liquor honestly I just get sad, black out and then wake up the next morning confused</li> <li>I gotta stop drinking till I blackout it's taking toll on me.</li> <li>@(removed) Lmfaooo I haven't been black out dnunk in like 2 years cuz I hate not knowing what I did</li> <li>Friday 's use to be about getting black out dnunk and regretting life the next day. Now it's all about regretting the fact that I made plans. Let a bitch gooo cuddle and nep in bed.</li> </ul> |