

Virtual Pub Crawl: Assessing the Utility of Social Media for Geographic Beer Research in the United States

Alexander Savelyev
Texas State University

Delorean Wiley
Texas State University

Colleen C. Myles
Texas State University

Paepin D. Goff
Texas State University

ABSTRACT

(Re)localized craft ferments have taken hold of the public imagination. Moreover, beer has become an important economic and social driver, making it an increasingly popular focus for academic study and for public policy. We surveyed the existing literature and found that most beer-related geographic research was based on historical, cultural, and economic analyses. To broaden the horizons for beer research, especially given its increasing prominence in public perceptions of taste, we examined how big data sources might be leveraged to add narrative and description to the geographic study of beer. As little is known about the utility or validity of big data sources on this topic, we investigated the presence of seven beers in two online social media communities, BeerAdvocate and Twitter. By combining qualitative and quantitative approaches, vis a vis the analysis of geo-tagged social media data, we assess the potential for researchers to examine beer attributes in more granular ways. We find that BeerAdvocate is useful in terms of identifying both spatial, temporal, and thematic attributes about specific beers and breweries in a systematic way while Twitter is primarily used to re-broadcast contributions made on other platforms. Further, the results of our investigation provide information about the abundance, validity, and content of beer posts within two social media communities, directing further studies concerned with assessing the geographic taste(s) for (craft) beer in the United States.

KEY WORDS

Craft Beer, Geography, Social Media, Taste, Methods

INTRODUCTION

Craft beer in the United States has experienced meteoric growth in the past several decades; “local” beer, produced by microbreweries in identifiable communities, in particular, has grown increasingly popular (Garavaglia & Swinnen, 2017). While still only a small segment of the overall beer market, these (re)localized craft ferments have taken hold of the public imagination (Acitelli, 2017; Hindy, 2014). More importantly, beer has become an important economic and social driver (Reid & Gattrell, 2017; Slocum, Kline; Cavaliere, 2018), making it an increasingly popular focus for academic study (Patterson & Hoalst-Pullen, 2014) and for economic and social development policies (Garavaglia & Swinnen 2018; Kline, Slocum, & Cavaliere, 2017; Myles & Breen, 2018; Williams, 2017).

As a material good, beer is no longer (only) seen as a mass-produced, homogenous beverage (Reid, McLaughlin, & Moore, 2014); cultural and economic shifts have opened space for the drink to evolve¹ into a “craft” product (Ocejo, 2017), and, in some cases, even a luxury item (Williams, Atwal & Bryson, 2019). As a cultural product, since early 2008 (Daniels, 2018), beer enthusiasts and specialists, once (and still sometimes) known as “beer sommeliers,” have been able to pursue certification as a *Cicerone*, wherein participants receive similar training in taste and presentation for beer as sommeliers receive for wine (MacNeil, 2015). Such developments in the production and consumption of beer, reflect wider – and changing – perspectives of “taste” (Korsmeyer, 1999) regarding the product.

Given its increasing prominence in public perceptions of taste, we examined whether and how big data sources might be leveraged to add narrative and description to geographical beer research. Questions driving such analyses could include: How do mentions of different beers vary geographically? Are there differences in how beer is discussed between various social media sources? Are some types, styles, or differently-sourced beers more visible in this kind of data? Do the different representations of beer seem to reflect varying “taste(s)” for the product? As little is known about the utility or validity of big data sources on this topic, we investigated the presence of seven exemplary beers – beers selected for their seasonal or regional characteristics (as documented in detail in the Methodology section) – in two online social media communities to produce a proof-of-concept methodological technique for asking questions of interest within available big data sources. For this study, we use two social media forums, BeerAdvocate and Twitter – BeerAdvocate is an online community website centered around an interest in beer, and Twitter is a general interest community based site – to explore the *abundance* and *type* of data available as well as its *validity* and *reliability* as a data source using the selected beers as proxies. In addition, this paper investigates what, if anything, the representation of (craft) beer, both in terms of quality and quantity, on social media reveals about beer’s mutable aesthetic “taste.”

STUDY BACKGROUND

We conducted a survey of the existing literature focused on beer and found that most beer-related geographic research was based on historical, cultural, and economic analyses; the methods for content analysis were primarily the same, involving text and visual analysis by manual data collection methods and data used for historical and economic accounts were largely some flavor of aggregate consumption or production secondary data.² Further, geographic research on the beer and wine industries – such as production or consumption trends for a region (Batzli, 2014; Elzinga

¹ Dighe (2016) reminds us, though, that prior to the major consolidation events of the 20th century, when beer brewing and distribution became globalized (Howard 2014), historically beer in the United States was produced in small batches for local distribution.

² Seventy nine (79) articles were reviewed from geography journals and beyond, with attention to the data sources utilized and the methodological tools or techniques applied.

et. al. 2018), neolocalism (Flack, 1997; Mathews & Patton, 2016; Schnell and Reese, 2003), sense of place/place making (Banks, 2007; Flack, 1997; Tiefenbacher, 2013), and alcohol by volume (ABV) trends overtime (Silva et al. 2017; Myles et al. 2020.) – utilized two key approaches, spatial trend analysis and comparative analysis.

Spatial trend analyses investigate brewery counts and/or consumption data across some geographical area to determine spatial trends, as illustrated by Batzli (2014), Colen and Swinnen (2016), Elzinga et. al. (2018), Hoalst-Pullen et al. (2014), Lamertz et. al. (2016), and McLaughlin et. al (2014). Data used in these studies are collected by survey (primary and secondary, via international and national NGOs, governments, or industry lobbying groups). Primary data collection is notorious for low response rates (McGuirk & O'Neill, 2016) and potentially low self-reporting for alcohol consumption (Sobell & Sobell, 1990). A limitation to secondary data is that it can be incomplete or difficult to compare across contexts (Lake et al. 2010; Silva et al. 2017).³

Studies using comparative analysis examine different materials such as brewery websites, beer labels, and beer names to investigate a variety of phenomena, including neolocalism and sense of place/placemaking, as illustrated, for example, by Schnell and Reese (2014) and Mathews & Patton (2016). Schnell and Reese (2014) visually examined beer labels on brewery websites to conduct a content analysis. Mathews & Patton (2016) also visually looked at labels and brewery websites for content analysis based on ethnicity and race. While these kinds of studies provide rich data, they can be hard to replicate.

Social media allows like-minded individuals to virtually gather and bond, potentially influencing both temporal and spatial patterns of brands discussed online (Laroche et al. 2012). Past geographical studies used volunteered or crowdsourced social media information to supplement secondary data, concluding that it was reasonably accurate (at least compared to other sources) and valuable, in that data collection and analysis can be conducted in near real-time (Haklay, 2010; Heikinheimo, 2017; Schnebele & Cervone, 2013). While social media data has already been used in a number of geographic studies, including studies of transportation movement (Andrienko et al. 2017), disease outbreak (Allen 2016), and natural disaster and crisis management (MacEachren et al. 2011), little work in this area has been done related to beer. Social media platforms hold promise as a potential data source for studies in beer and wine geography due to the large volume of public, easily accessible data they generate. This is especially true for geographic social media data, those data points generated by the user and tagged with geographic coordinates. Access to high-resolution data, like that provided on social media sites, could unlock additional research opportunities, by providing opportunities to explore: first-person accounts of beer or wine consumption when and where it occurs; personal consumer preference(s) for beers; as well as attributes of the beer itself, such as look, smell, taste, mouthfeel, viscosity, ABV, and international bitter units (IBUs) (Grigg, 2004). Lastly, it allows for the investigation of contemporary beer trends in the moment due to the ability to collect and store the data in near-real-time.

This study is partially inspired by the work of Zook & Poorthius (2014), who have used Twitter data to map the mentions of keywords including “wine,” “beer,” as well as mentions of certain beers labeled as “light” and “cheap,” producing and analyzing a broad overview of the spatial footprint of the resulting dataset. Looking to investigate if nuanced observations about spatial and temporal properties of *specific beer labels* can be derived from crowd-sourced datasets, we extend their work by explicitly selecting breweries based on their *expected seasonality and regionality patterns*, as well as adding a non-seasonal, non-regional beer label (Budweiser) as a form of control.

³ Lake et al. (2010) describes how the classification of food establishments can leave out or misclassify establishment types (i.e. bars and pubs), leading to incomplete results. Silva et al. (2017) describes how two countries, Portugal and the Netherlands, calculate consumption differently, making comparison across borders difficult or unreliable.

Furthermore, we compare the spatial, temporal and thematic themes present in *two independent datasets* – BeerAdvocate and Twitter – to explore: whether the findings derived from different crowd-sourced datasets are comparable; whether such sources can complement the existing methods used by beer geographers; and to develop a better understanding about what kinds of research questions might be made possible by the effort invested in their analysis.

METHODOLOGY

Our methodological approach combines descriptive quantitative summaries, qualitative content analysis, and a synthesis and evaluation of the trends discovered in both quantitative and qualitative analyses, each described in detail below.

Data Collection

Here, we started by inspecting beer labels with the most reviews on BeerAdvocate (BA) (BeerAdvocate Most Popular Beers, n.d.). From this list, we selected seven beer labels to form a sample that encompasses different seasonal and regional properties. The *seasonality* of a beer is determined according to its patterns in release; specifically, a “seasonal beer” refers to one that is released only during certain times of the year as opposed to being available year round. Similarly, the *regionality* of a beer is related to its availability across geographic space; namely, a beer that is released in a smaller market (and is thus not available nationwide) would be considered more “regional” than a beer that is distributed across a greater area. Note that these are not mutually exclusive categories; a particular beer could be both seasonal and regional. Our list, which was designed to include examples across the *seasonality* and *regionality* spectrum, consisted of the following labels (in alphabetical order):

Bourbon County Brand Stout (referred to as BCBS henceforth),
Budweiser,
Celebration Fresh Hop IPA (Celebration),
Hopslam Ale (Hopslam),
Kentucky Breakfast Stout (KBS),
Two Hearted Ale, and
Zombie Dust.

With the exception of Budweiser (ranked 71st with 6,634 reviews), all of the beer labels ranked in the top 20 most reviewed, with the lowest review count in our list of 10,653 for the Celebration Fresh Hop IPA and the highest review count of 15,298 for the Two Hearted Ale.

We then built our first dataset (using BA) by scraping (with in-house tools) all of the BA reviews available for each of the beer labels on the resulting list, going as far back as 1998 for some of the labels. Our resulting BA dataset contains the timestamp and the content of each review, as well as the profile location of the user who left the review (BA provides the latter at the state level).

Finally, we built a second dataset (using Twitter) by filtering geographic tweets originating in the contiguous US during 2017-2018 that mention any of the beer brands on our beer label list, using in-house tools and geographic tweet database. We've approximated the notion of the beer mention by looking for an exact use of any of the following key phrases: "Bourbon County Brand Stout", "Bourbon County Stout ", "Budweiser", "Bud", "Celebration Fresh Hop IPA", "Sierra Nevada Celebration IPA", "Hopslam Ale", "Hopslam", "#hopslam", "Kentucky Breakfast Stout", "#KBS", "Two Hearted Ale", or "Zombie Dust". For beer labels with expected seasonal trends, we used a sample of one month of data, with the month chosen to match the peak availability of that beer. For beer labels with no expectation of seasonality, we used a sample of three months of data spread across the year and averaged out to make the counts comparable to the rest of the Twitter sample.

FINDINGS

Quantitative Results and Analysis

The BA dataset revealed clear seasonality (regular peaks in the number of reviews, as seen in Figure 1) for BCBS, Celebration, Hopslam and KBS, but no obvious seasonality for either Two Hearted Ale, Zombie Dust, or Budweiser, which was in agreement with our initial expectations. All beer reviews we inspected had a noticeable singular spike in volume around November 13, 2011. Although we do not have a definite explanation for this, we can say that the same spike can be seen in the history of Google queries for the term "beer advocate" (Google Trends 'beer advocate' search, n.d.) and might correspond to a surge in popularity of the BA community as a whole.

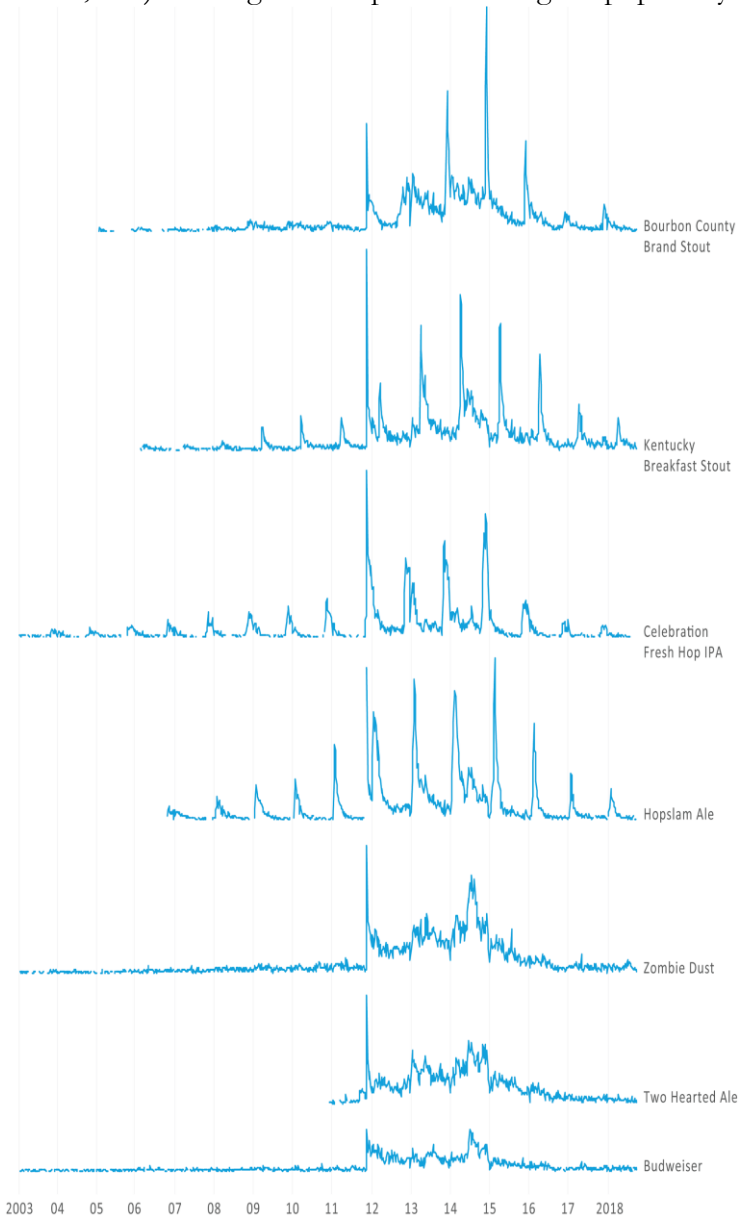


Figure 1. Timeline of BeerAdvocate reviews. The peak number of reviews is for Bourbon County Brand Stout at 319, other beer labels are shown at the same scale.

To compare the geographic footprint of various beer labels in both BA and Twitter datasets, we calculated estimates of both *cumulative* and *per-beer* review activity for each of the US states. The *cumulative review activity* refers to the total number of beer reviews (all beer labels from our list, combined) produced in each state, per capita. The *per-beer review activity* refers to the number

of reviews of a single specific beer label (e.g. BCBS) produced in each state, per capita. We used the per capita measurements as a rough standardization measure since the number of reviews appears to be linearly correlated to the population of each state, using 2010 census data (R^2 of 0.56).

Using these metrics, we produced a series of *slope charts*, shown in Figure 2, that capture the relative amount of interest in each of the beer labels in our list, for each state. For example, the slope chart in Figure 2, corresponding to Zombie Dust, shows two ascending lines that clearly stand out against the background with a clear opposite trend. The lines correspond to the states of Illinois and Indiana, implying a disproportionately high amount of reviews, per capita, of Zombie Dust. In contrast, other states that, on average, are fairly "prolific" in terms of number of reviews per capita (e.g. Massachusetts), produce a disproportionately low amount of reviews of the Zombie Dust.

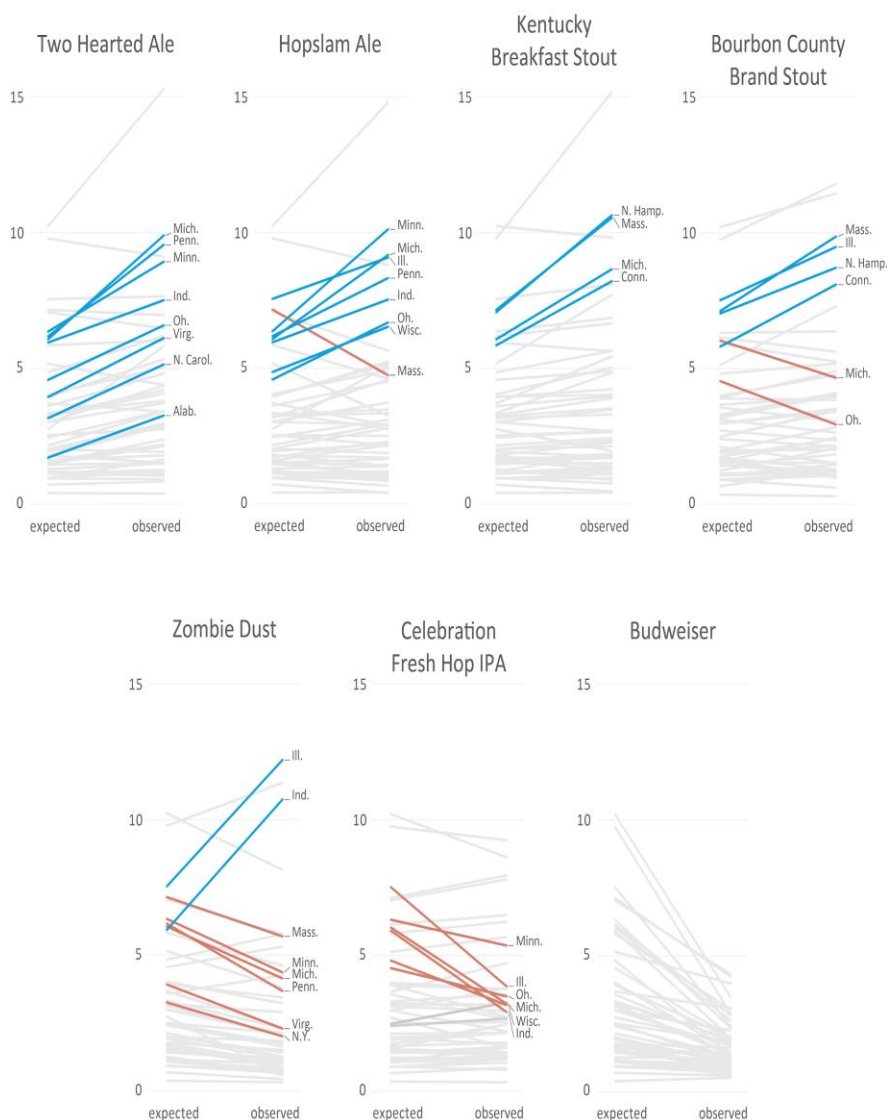


Figure 2. Slope charts showing the relative amount of interest in each of the beer labels across the US states. Each slope chart corresponds to one beer label, and each line in each slope chart corresponds to one state. The left and the right sides of each chart show the expected and the observed number of BeerAdvocate reviews, respectively, produced for the beer label in question. Ascending and descending lines correspond to states with disproportionately high and low numbers of reviews for the beer label in question. Differences of 10% or more from the expected

count are highlighted in color (unless substantiated by fewer than 100 reviews). The numbers on the vertical scale correspond to the number of reviews per 100,000 people.

Finally, we compared the geographic trends seen in BA dataset against those seen in the Twitter dataset, using the same methodology. Overall, Twitter appears to capture a different aspect of the popular interest in beer labels, producing trends that are not always in agreement with those seen in the BA dataset. For example, trends found in Twitter mentions for Zombie Dust, Two Hearted Ale and BCBS could be seen in the BA dataset as well. Hopslam, however, sometimes appears differently through different datasets—there seems to be a hotspot in Minnesota in both datasets, but BA indicated a cold spot in Michigan, Ohio, and Wisconsin, whereas Twitter indicates a hotspot. KBS comparison produced similar results—trends for Massachusetts were in agreement between the datasets, whereas trends for Michigan were in disagreement. Given the results of the qualitative analysis (reported further below) suggesting that Twitter mentions of beer labels are *qualitatively* different from reviews on BeerAdvocate, it is not unreasonable to hypothesize that the geographic trends (and the associated spatial processes) captured by the BA and Twitter datasets might be qualitatively different as well, with further research needed to precisely quantify these differences.

Overall, Twitter also provided sparse data: we calculated an average ratio of 9.9 BA reviews for each Twitter mention of either of the beer labels in our list. This ratio was not constant across the states either, suggesting further kinds of spatial heterogeneity: Arkansas, Indiana, Mississippi, Montana, and South Carolina appear over-represented on Twitter (producing over 100 percent more mentions than expected following the average ratio), whereas California appears under-represented (producing approximately 50 percent fewer mentions than expected). Given the success of Zook & Poorthuis (2014), these observations initially came as a surprise. As we captured between 95 and 99% of all geographic tweets for our study period and area, this is unlikely to be an issue of poor sampling. It appears plausible, however, that while Twitter provides a sufficient amount of data for a broad type of survey (e.g. mapping of the mentions of “beer” versus “wine” keywords, as done by Zook & Poorthuis), more nuanced queries (e.g. keyword matches for specific beer labels) are not sufficiently represented in Twitter, at least in comparison to the BA dataset.

The trends shown in the data bear out when considered alongside industry factors and consumer dynamics in relation to the selected beers. For example, *regionality* is visible in the data, as evidenced by the relative number of reviews seen in the states where a particular beer is produced (or in states nearby). Bourbon County Brand Stout, Hopslam, Kentucky Breakfast Stout, Two Hearted Ale, and Zombie Dust all display this characteristic. Bourbon County Brand Stout, for instance, is reviewed more in Illinois and less in Michigan while KBS is reviewed more in Michigan. We hypothesize that this trend reflects geographic variations, regional taste, and brand loyalty as well as product distribution since the two beers are the same style but are released during different seasons. If these other variables were not influential, we would expect the same trends for a similar beer style to hold true for both. Moreover, our analysis reveals that there are different kinds of regionality; for example, Zombie Dust displays the most “local” review zone (it is brewed in Indiana and reviewed most in Indiana and Illinois), while Two Hearted Ale and Hopslam are reviewed at greater rates in a wider zone. Celebration Fresh Hop IPA is the only beer label selected for analysis that presented itself differently across the datasets and in contrast to our expectations related to regionality.

In terms of *seasonality*, for annual, limited release beers, definite spikes in reviews are clear near the release months, and reviews of those brews dips during other seasons. Again, Celebration Fresh Hop IPA is the anomaly here; for this beer, while a seasonality trend was visible in the BA dataset as expected, the expected regionality trend was not (as noted above). In addition, the beer label was nearly nonexistent in the Twitter dataset, with only three mentions total appearing there. We speculate that this may be due to the overall decline in reviews during the beer release year by year or the difference in consumer reviews of (and taste for) seasonal barrel-conditioned annual

releases and other styles of annual releases. To understand this kind of anomaly in the findings, further research is required.

Qualitative Results and Analysis

Ratings on BeerAdvocate suggest a community of beer aficionados, or at least committed enthusiasts, critiquing beers on several attributes. Much like wine and beer tastings, a rating of one through five is used to evaluate the look, smell, taste, and feel of a beer as well as to offer an overall score. It is also a repository for information about the beer, including ABV, brewery, brewery address, annual availability dates, and non-independent owners. Most of the ratings contain no additional qualitative review notes beyond the static, quantifiable options, however several themes appeared within the qualitative reviews for those users that offered them.

BeerAdvocate users who offered qualitative reviews described the way the beer looked while being poured, the “head” (the carbonated foam at the top of the beer), aroma, mouth feel, and body of the beer, as well as the reasons for why they decided to try a particular beer. These details, taken collectively, are quite akin to the kind of commentary provided by avid wine drinkers in their tasting notes. Similarly, in some instances, reviewers of seasonal or otherwise limited release beers offered critiques of each year’s release, much like a wine connoisseur might compare current vintages to past releases, noting their preferences for the various production years of the same beer over time. Overall and in contrast to the kinds of reviews found on Twitter, the reviews provided by users of BeerAdvocate were highly descriptive; Table 1 offers some examples of the kinds of detailed, qualitative assessments provided by BeerAdvocate users.

BeerAdvocate User Comments *(with dates posted)*

“Really wanted to give the famous KBS another try since I was disappointed the first time around - maybe I had a bad batch? Also saw the opportunity to try it on tap, and boy am I glad I did. Completely different experience! Great dark brown, almost black color with immediate great frothy tan head that slowly faded, along with some nice sheets of lingering lacing. Smells of dark coffee, chocolate and a little vanilla. Tastes of dark roast coffee, dark slightly bitter chocolate, molasses, vanilla, malt and a little caramel. Great bourbon oak undertones with some hints of sweetness. Smooth, slightly creamy mouthfeel and just the right amount of carbonation. High ABV is well-hidden in this beer’s incredible flavor. Not too heavy or overpowering at all. I think this beer’s reputation is well-deserved and I’m convinced my original bottle of beer was just not right.” *(posted April 7, 2018)*

“This is by far my favorite beer. I wish it wasn't a seasonal, but maybe that is one of the reasons I appreciate it so much. Every year around Thanksgiving I start looking for this to show up at the liquor section at Hyvee. I was also fortunate to drink it on tap this year at one of my favorite alehouses. Wow...nothing better. Rich in dark amber color, Perfect blend of 3 different hops, and an amazing balance of bitter pine, citrus, and caramel toasted malt will satisfy any fan of a true American IPA. the only downside is that when it is gone...it is gone for about 10 months...that makes me sad!” *(posted April 16, 2018)*

“I have been fortunate enough to find Hopslam on tap for the past few years. Always tastes a little better to me from a tap. Tastes more like the Imperial IPA that it is, than when poured out of a can. But, I would never pass it up in any form when I'm lucky enough to find it. As Imperial IPAs go, this one is probably the most Hop forward I've ever tasted. But it doesn't have too much of that grapefruit hop taste, that's so popular right now, but that I don't like. But it varies from year to year, as its a true craft beer that depends on a lot of variables, like timing when to add the next dose of hops. That said,

this year's Hop[s]lam was the best I've ever tasted! 5 snifters from a tap, and two 6 packs...
But not all in one night.” (*posted February 23, 2017*)

Table 1. Examples of qualitative beer reviews posted by users on BeerAdvocate.

The Twitter data mainly yielded tweets that, rather than providing quantitative scores or qualitative comments on their own, linked to reviews posted on other social media forums, like Untappd⁴, Instagram, or other social media applications. We hand coded and reviewed over 300 tweets. Ninety three percent of the tweets reviewed were reposts from other sites; Untappd (81%) and Instagram (12%) were the two most prominently linked applications. Of those analyzed, less than 10 tweets were comprised of content posted directly to Twitter. Tweets linked to Instagram always included a photo. On Untappd, which was by far the most frequently used outside site, about a third of the ratings (31%) included photos of the beers in question, while the others did not. If a photo was included, it almost always (95%) featured the beer in the bottle and/or glass after being poured but before being consumed.

Untappd reviews are mainly “am drinking” posts without much content about the actual beer characteristics or perceived quality. The drinking establishment or place of purchase was often tagged and displayed to other users in the community. Untappd contains explicit incentives for active users (e.g., badges, rewards, and increased community visibility) as well implicit motivation (e.g., the potential for gaining industry endorsements, establishing social status within the beer aficionado community, or engaging in conspicuous consumption). Whether posted to Untappd or Instagram, posted photos were usually taken when drinking (and eating) out and almost always included the beer and/or its container. In comparison to BeerAdvocate, the user posts on Twitter included noticeably less critique of the beer or its profile.

“Happy national beer day! - Drinking a Two Hearted Ale by @BellsBrewery @ Lucky's 13 Pub #photo”

“Drinking a Zombie Dust by @3floyds @ Rays Tasting Room #photo”

⁴ Untappd (www.untappd.com) is a free social phone application that allows users to create friend groups, rate beers, check-in to establishments, get up-to-date beer menus, recommendations, and earn “achievements” for participation.

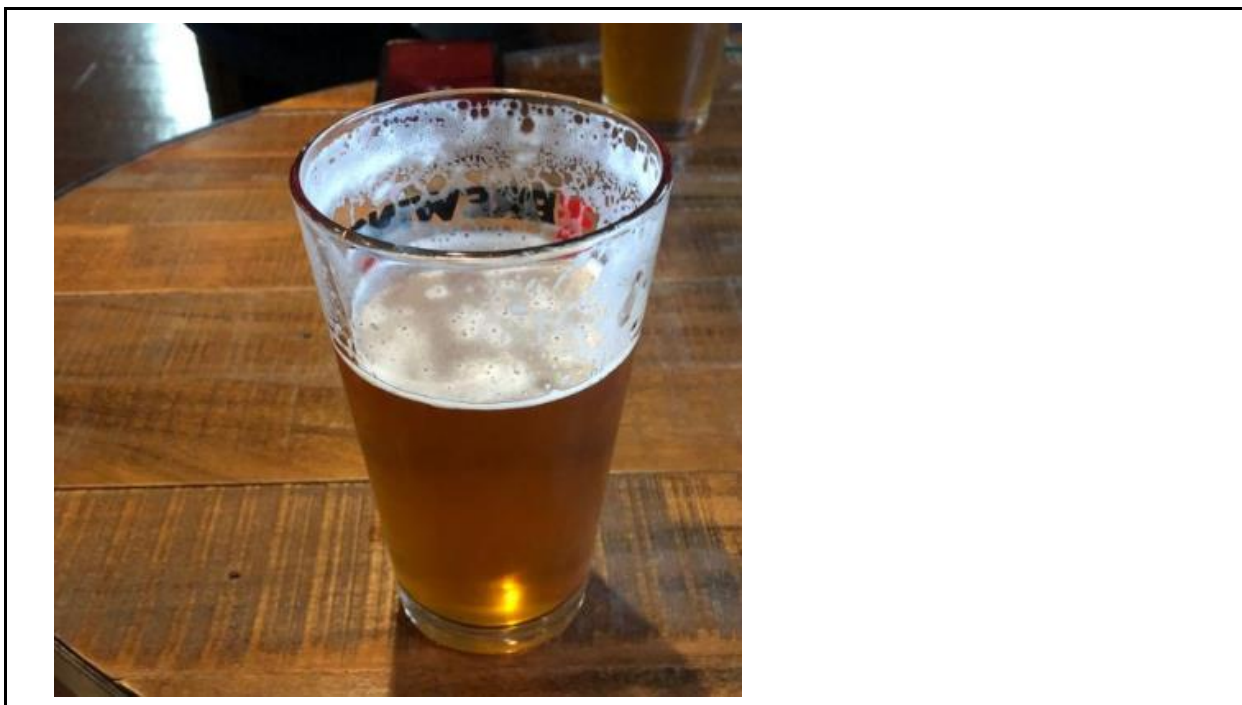


Figure 3. Example Tweet from our sample. This is a tweet generated by a user's post on Untappd. (Tweet from April 14, 2018, collected on December 11, 2018.)

LIMITATIONS

Despite its apparent potential, there are plenty of known limitations for using social media data, including issues such as poor data quality, low study validity, non-representative sampling, and presence of super users (extremely frequent users of a given platform) (Haklay, 2010; Lazer et al. 2014; Tsou, 2015). Although we were able to demonstrate the utility of using such data for more nuanced geographic inquiries than previous methods have allowed, we did not, due to the limited scope of the paper, explore the impact of non-representative sampling and super users on the resulting findings. Our study also made use of *exact keyword matching* as the methodology for Twitter data selection. Although straightforward, popular, and not without certain implicit validity, this technique is limited and is likely to have restricted the volume of data available for the analysis. A plethora of advanced data retrieval techniques could be used to substitute our approach, although the determination of the optimal technique for extracting beer-related posts – short of manually reading the millions of the tweets generated daily – would likely require an entire study of its own.

DISCUSSION AND CONCLUSION

In this study, we attempted to explore whether “big data” from social media could be harnessed to deepen and expand geographic research on beer. Our findings indicate that social media datasets can be used to explore certain broad aspects of the spatial and temporal phenomena associated with beer culture, including the regionality and seasonality of beer consumption, in an efficient and cost-effective way. However, certain discrepancies (both spatial and temporal) observed between the different datasets should serve as a caution against overgeneralizing from the observations made using any single dataset. Thus, we conclude that “big data” can complement the existing methods used by beer geographers, but a mixed-methods approach with expert knowledge cross-referenced to data-derived insights is recommended.

We also explored whether different forms of social media collect and portray differing perspectives on and experiences with beer, and our observations suggest that BA and Twitter might be qualitatively different in terms of their content. BA reviews are much more likely to

feature detailed descriptions and evaluations of a beer, while Twitter posts are (necessarily) shorter and less nuanced. These differences in content mean that an assessment of consumer taste is more feasible in the content provided by BA than that provided by Twitter.

In addition, we investigated whether some types, styles, or differently-sourced beers would be more visible in the data – and these kinds of differentiations were evident. Overall, BeerAdvocate users appear more committed to sharing their perspectives on the various qualities of different labels, positioning certain beers as worthy of consideration and acclaim while denying the same to others. Twitter, on the other hand, appears to mostly serve as a vehicle for conspicuous consumption, with its users re-broadcasting information already made available on other platforms such as Untappd. For scholars interested in studying the representation of (craft) beer, this might prove to be an important methodological consideration, as user motivation for sharing their personal opinions of and experiences with beer appears to vary between platforms, with noticeable impact on the resulting content.

In sum, the mentions of different beers do vary geographically, which is visible on both the BA and Twitter platforms. However, there are differences in how beer is discussed between these social media sources. Some types, styles, and/or differently-sourced beers are more visible in the data, and the different representations of the beer do seemingly reflect varying taste(s) for the product(s). In short, this “virtual pub crawl” has revealed that the representation of (craft) beer, both in terms of quality and quantity, on social media does help to reveal beer’s mutable aesthetic “taste” as expressed by users of these online forums.

REFERENCES

- Allen, C. Tsou, M. H., Aslam, A., Nagel A., & Gawron J. M. (2016). Applying GIS and machine learning methods to Twitter data for multiscale surveillance of Influenza. *PLoS ONE* 11(7): e0157734. doi:10.1371/journal.pone.0157734
- Andrienko, N., Andrienko, G., Fuchs, G., & Jankowski, P. (2015). Scalable and privacy-respectful interactive discovery of place semantics from human mobility traces. *Information Visualization*, 15. <https://doi.org/10.1177/1473871615581216>
- BeerAdvocate Most Popular Beers. Retrieved from <https://www.beeradvocate.com/beer/popular/> (Last accessed on October 1, 2018).
- Banks, G., Kelly, S., Lewis, N., & Sharpe, S. (2007). Place ‘from one glance’: The use of place in the marketing of New Zealand and Australian wines. *Australian Geographer*, 38(1), 15–35. <https://doi.org/10.1080/00049180601175840>
- Batzli, S. A. (2014). Mapping United States breweries 1612 to 2001. In M. Patterson, & N. Hoalst-Pullen (Eds.), *Geography of beer* (pp. 31–44). New York: Springer.
- Colen, L., & Swinnen, J. F. M. (2010). Beer drinking nations-The determinants of global beer consumption. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1752829>
- Court of Master Sommeliers, A. (2019). About: the court of master Sommeliers. Retrieved from <https://www.mastersommeliers.org/about> (Last accessed on October 6, 2019).
- Daniels, R. (2018). *Cicerone® certification program milestone: 10 Years of beer certifications*. Chicago, IL: Craft Beer Institute (Cicerone Certification Program).
- Dighe, R. S. (2016). A taste for temperance: How American beer got to be so bland. *Business History*, 58(5), 752-784.
- Elzinga, K. G., Tremblay, C. H., & Tremblay, V. J. (2015). Craft beer in the United States: history, numbers, and geography. *Journal of Wine Economics*, 10(3), 242–274.
- Epstein, D. (2017). How 3 Floyds Brewing Co. became the Mecca for heavy-metal craft beer. *Revolver*. Retrieved from <https://www.revolvermag.com/culture/how-3-floyds-brewing-co-became-mecca-heavy-metal-craft-beer> (Last accessed on December 18, 2019).
- Flack, W. (1997). American microbreweries and neolocalism: “Ale-ing” for a sense of place.

- Journal of Cultural Geography*, 16(2), 37–53. <https://doi.org/10.1080/08873639709478336>
- Garavaglia, C., & Swinnen, J. (2018). Economic perspectives on craft beer: A revolution in the global beer industry. Cham, Springer International Publishing, Palgrave Macmillan.
- Garavaglia, C., & Swinnen, J. (2017). The craft beer revolution: An international perspective. *Choices: The Magazine of Food, Farm & Resource Issues*, 32(3), 1.
- Google Trends. (2019). Beer advocate search. Retrieved from <https://trends.google.com/trends/explore?date=all&geo=US&q=beer%20advocate>
- Grigg, D. (2004). Wine, spirits and beer: World patterns of consumption. *Geography*, 89, 99–110.
- Haklay, M. (2010). How good is OpenStreetMap information? A comparative study of OpenStreetMap and Ordnance Survey datasets for London and the rest of England. *Environment and Planning B: Planning and Design*, 37, 682–703. <https://doi.org/10.1068/b35097>
- Heikinheimo, V., Di Minin, E., Tenkanen, H., Hausmann, A., Erkkonen, J., & Toivonen, T. (2017). User-generated geographic information for visitor monitoring in a national park: A comparison of social media data and visitor survey. *ISPRS International Journal of Geo-Information*, 6, 85. <https://doi.org/10.3390/ijgi6030085>
- Howard, P. H. (2014). Too big to ale? Globalization and consolidation in the beer industry. In M. Patterson, & N. Hoalst-Pullen (Eds.), *Geography of Beer* (pp. 155–165). New York: Springer.
- Korsmeyer, C. (1999). *Making sense of taste: Food and philosophy*. Ithaca, NY: Cornell University Press.
- Lake, A. A., Burgoine, T., Greenhalgh, F., Stamp, E., & Tyrrell, R. (2010). The foodscape : classification and field validation of secondary data sources. *Health place*, 16(4), 666–673.
- Lamertz, K., Foster, W. M., Coraiola, D. M., & Kroezen, J. (2016). New identities from remnants of the past: An examination of the history of beer brewing in Ontario and the recent emergence of craft breweries. *Business History*, 58(5), 796–828. <https://doi.org/10.1080/00076791.2015.1065819>
- Laroche, M., Habibi, M. R., Richard, M. O., & Sankaranarayanan, R. (2012). The effects of social media based brand communities on brand community markers, value creation practices, brand trust and brand loyalty. *Computers in Human Behavior*, 28(5), 1755–1767. <https://doi.org/10.1016/j.chb.2012.04.016>
- Lazer, D., Kennedy, R., King, G., & Vespignani, A. (2014). The parable of Google flu: Traps in big data analysis. *Science*, 343(6176), 1203. <https://doi.org/10.1126/science.1248506>
- MacEachren, A. M., Jaiswal, A., Robinson, A. C., Pezanowski S., Savelyev A., Mitra, P., & Blanford, J. (2011). SensePlace2: GeoTwitter analytics support for situational awareness. *2011 IEEE Conference on Visual Analytics Science and Technology (VAST)*, 181–190. <https://doi.org/10.1109/VAST.2011.6102456>
- MacNeil, K. (2015). *The Wine Bible*. New York: Workman Publishing Company.
- Mathews, A. J., & Matthew T. P. (2016). Exploring place marketing by American microbreweries: Neolocal expressions of ethnicity and race. *Journal of Cultural Geography*, 33(3), 275–309.
- McGuirk, P. M., & O'Neill, P. (2016). Using questionnaires in qualitative human geography. In I. Hay (Eds.), *Qualitative Research Methods in Human Geography*, 246–273.
- McLaughlin, R. B., et. al. (2014). The Ubiquity of good taste: A spatial analysis of the craft brewing industry in the United States. In M. Patterson, & N. Hoalst-Pullen (Eds.), *Geography of Beer* (pp. 131–154). New York: Springer.
- Myles, C. C., & Breen J. (2018). (Micro)movements and microbrew: On craft beer, tourism trails, and material transformation(s) in three urban industrial sites. In C. Kline, S. L. Slocum, & C. Cavaliere (Eds.), *Craft Beverages and Tourism, Volume 2: Environmental, Societal, and Marketing Implications*. Cham, Switzerland: Palgrave.

- Myles, C. C., Goff, P. D., Wiley, D., & Savelyev, A. (2020). Low gravity on the rise: A sociocultural examination of low alcohol beer in the United States. In N. Hoalst-Pullen & M. Patterson (Eds.), *The geography of beer: Economics, policies and culture*. New York: Springer.
- Noel, J. (2019). Goose Island prepares for nationwide rollout - Chicago Tribune. Retrieved from <https://www.chicagotribune.com/business/ct-xpm-2012-08-25-ct-biz-0825-goose-island-20120825-story.html> (Last accessed on May 20, 2019).
- Ocejo, R. E. (2017). *Masters of craft: Old jobs in the new urban economy*. Princeton, NJ: Princeton University Press.
- Patterson, M., & Hoalst-Pullen N. (Eds). (2014). *The geography of beer: Regions, environment, and societies*. New York: Springer.
- Reid, N., & Gatrell, J. D. (2017). Craft breweries and economic development: Local geographies of beer. *Polymath: An Interdisciplinary Arts and Sciences Journal*, 7, 90–110.
- Reid, N., McLaughlin R. B., & Moore M. S. (2014). From yellow fizz to big biz: American craft beer comes of age. *American Geographical Society's Focus on Geography* 57(3), 114 -125.
- Release, P. (2019). Founders Brewing Co. announces KBS release date. Retrieved from <https://www.brewbound.com/news/founders-brewing-co-announces-kbs-release-date> (Last accessed on December 18, 2019).
- Schnebele, E., & Cervone, G. (2013). Improving remote sensing flood assessment using volunteered geographical data. *Natural Hazards and Earth System Sciences*, 13(3), 669–677. <https://doi.org/10.5194/nhess-13-669-2013>
- Schnell, S. M., & Reese, J. F. (2003). Microbreweries as tools of local identity. *Journal of Cultural Geography*, 21(1), 45–69.
- Schnell, S. M., & Reese, J. F., (2014). Microbreweries, place, and identity in the United States. In: M. Patterson, & N. Hoalst-Pullen (Eds), *The geography of beer: Regions, environment, and societies* (pp. 189–199). New York: Springer.
- Silva, A. P., Jager, G., Van Zyl, H., Voss, H. P., Pintado, M., Hogg, T., & De Graaf, C. (2017). Cheers, proost, saúde: Cultural, contextual and psychological factors of wine and beer consumption in Portugal and in the Netherlands. *Critical Reviews in Food Science and Nutrition*, 57(7), 1340–1349. <https://doi.org/10.1080/10408398.2014.969396>
- Slocum, S. L., Kline, C., & Cavaliere C. T. (2018). *Craft beverages and tourism, Volume 2: Environmental, societal, and marketing implications*. Cham, Switzerland: Palgrave Macmillan.
- Sobell, L. C., & Sobell, M. B. (1990). Self-report issues in alcohol abuse: State of the art and future directions. *Behavioral Assessment*, 12(1), 77–90.
- Tin Whiskers Brewing Company. (2017). The History of the DIPA. Retrieved from <https://twbrewing.com/blog/history-dipa> (Last accessed December 18, 2019).
- Tiefenbacher, J. P. (2013). Themes of U.S. wine advertising and the use of geography and place to market wine. *EchoGéo*.
- Tsou, M. H. (2015). Research challenges and opportunities in mapping social media and big data. *Cartography and Geographic Information Science*, 42(sup1), 70–74. <https://doi.org/10.1080/15230406.2015.1059251>
- Williams, A. (2017). Exploring the impact of legislation on the development of craft beer. *Beverages* 3(2), 18.
- Williams, A., Atwal G., & Bryson, D. (2019). Luxury craftsmanship – the emergent luxury beer market. *British Food Journal*, 2, 359.
- Zook, M., & Poorthuis A., (2014). Offline brews and online views: Exploring the geography of beer tweets. In M. Patterson, & N. Hoalst-Pullen (Eds.), *The geography of beer: Regions, environment, and societies* (pp. 201–210). New York: Springer.

BIOGRAPHY

Alexander Savelyev is an Assistant Professor at the Department of Geography at Texas State University. He received his PhD in Geography from The Pennsylvania State University in 2015, with his research focus on cartography and geovisual analytics. He was elected and served as the Chair of the AAG Cartography Specialty Group in 2017-2018.

Delorean Wiley is a Ph.D. student in the Department of Geography at Texas State University, San Marcos. She received her Master of Science in Sustainability Studies from Texas State University, San Marcos in 2019. Wiley owns a bakery in Schertz, Texas that upcycles brewers spent grain into baked goods, such as cinnamon rolls and pretzels. The business launched in 2018 as part of a transformative praxis study. Wiley has worked with small craft food and beverage producers in private and public sector roles for 10 years. She received her Bachelor of Science in Agribusiness with a minor in Horticulture from Texas A&M University, College Station. Currently, Wiley is studying gender inclusivity issues in the United State beer industry.

Colleen C. Myles is an Associate Professor in the Department of Geography at Texas State University in San Marcos, TX. She has a PhD in Geography and an MS in Community Development from the University of California, Davis. She is a rural geographer and political ecologist with specialties in land and environmental management; (ex)urbanization; (rural) sustainability and tourism; wine, beer, and cider geographies (aka “fermented landscapes”); and agriculture (urban, peri-urban, and sustainable).

Paepin D. Goff is an Associate Professor in the Department of Earth and Environmental Sciences at Austin Community College. She received her PhD in Geography from Texas State University in 2019, with a research focus on geomorphology and the cryosphere.