DROUGHTSHAMING ON TWITTER DURING THE 2011-2016 CALIFORNIA DROUGHT

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ABSTRACT

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The latest drought in California (2011-2016) was the most severe in a millennium to befall that region. As historically low rainfall combined with record high temperatures, the state sustained long-lasting catastrophic damage to the subsoil and to precious aquifers. However, despite such a grave environmental, economic, and agricultural crisis, the human costs of the drought continue to be tallied. Part of the tragedy of the crisis could have been significantly mitigated if only California's mega-user water consumers and their entire class of residential consumers could have been compelled through official means to significantly cut their water usage to preserve the hundreds of millions of gallons that went to lawn care, or decorative and ornamental foliage.

Internet shaming has proven effective in correcting the illegal behavior of minor criminal defendants, and has been applied to the virtual and then real-world denigration of persons deemed socially deviant. However, this study examines whether the usual social media shaming platforms, specifically Twitter, were successfully applied to the behavior of California's negative drought deviants who hitherto could not be persuaded by fines, higher water rates, or other forms of coercion to reduce their outdoor water.

This study therefore collected a sample of historical droughtshaming tweets (N=158) via the Twitter API posted by Californians from January through August 2015. Applying distributive justice theory, privilege and entitlement theory, and the low-cost hypothesis, this dissertation tested three research questions concerning the likelihood of these tweets' distribution across wealthy versus disadvantaged communities, the likelihood that lower income Californians were shouldering the burden of the drought, and how the existence of droughtshaming in water districts may impact how much California water districts' communities cut their consumption.

Results revealed that businesses were droughtshamed more (51 times) than residences (48 times) and government sites (30 times). In the wealthiest communities, residences were shamed more, but in the affluent, middle class, working class, and lower income communities, businesses were shamed more. In fact, the wealthiest communities had more shamed locations of all three types than the other kinds of communities. Among the shamed locations were three water companies, a city hall, and 21 public parks including Golden Gate Park in San Francisco.

The working class and low-income communities received the fewest tweets but lots of residences were shamed among the wealthy communities, and then slightly fewer commercial and government sites. But in the other communities there were easily more businesses shamed than any other locations, and in poorer communities there are only a few residences shamed, with golf courses emerging as some of the business sites shamed. This implied a pattern of shaming high-status targets: wealthy residences in wealthy areas, businesses in less or non-wealthy areas, especially with golf courses — a pursuit of the privileged — in the lowest quintiles.

The findings for Hypotheses 1a and 1b strongly indicated a link between privilege and droughtshaming tweets with a disproportionate chance – greater than one in three (37%) – that a droughtshaming tweet would target a wealthy location, and that the true proportion of droughtshaming tweets that shame wealthy locations was 39 percent and 24 percent for affluent locations. Hypothesis 2 demonstrated that there was an inequality of drought burden in the respect that many of the state's lowest water consumers were likely to be situated in water districts with much wealthier or privileged Californians whose excessive water consumption drove up the district's overall consumption resulting in unduly high water cuts for lower water consumers. Hypothesis 3 demonstrated that despite the small dataset of tweets and the limitations of working with social media data that the existence of droughtshaming tweets in a water district was indeed a factor in Californians' reduction in consumption during the hottest and most severe portion of the drought — the summer of 2015.

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CHAPTER I

INTRODUCTION

The recent drought of 2011–2016 has been the most severe in a millennium in the state of California. The drought's onset was documented as beginning on December 27, 2011 (Kim and Lauder 2017). A much lauded study by Griffin and Anchukaitis (2014), and supported by Agha-Kouchak et al. (2014), using numerous data sources but primarily employing tree ring data indicated that the last drought as severe as this most recent drought occurred 1200 years ago—in approximately the year 814. According to the National Oceanographic and Atmospheric Association Drought Monitor (2015), California's latest drought has been recorded as the most severe, with the state entering the conditions of a level D4—exceptional drought—on January 28, 2014 (National Centers for Environmental Information at the National Oceanic and Atmospheric Administration 2015).

The year 2015 achieved still worse drought metrics than 2014, before 2016 saw the drought weaken and putter out as of April 7, 2017 (Kim and Lauder 2017). Consequently, California suffered "exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies" (National Centers for Environmental Information at the National Oceanic and Atmospheric Administration 2015).

The research findings of climate scientists, hydrologists, and other drought experts have similarly concluded the epic nature of the drought: 1) it was extreme in its rareness and severity; and, 2) climate change has exacerbated what would have otherwise been

just another of California's periodic, yet regular droughts. The Palmer Drought Severity Index (PDSI; Palmer 1965) was among the data supporting these conclusions. A standard drought severity measure specifically for droughts persisting beyond 12 months, the PDSI employs readily available temperature and precipitation data to estimate relative dryness on a scale ranging from -10 (dry) to +10 (wet) by using changes in evapotranspiration (i.e., water's evaporation from soil, plants, and foliage into the atmosphere). The PDSI also measures climate change's impact on specific aspects of drought. Averaged over the entire state of California, the PDSI actually indicated that the recent drought was even more severe than the standard estimations had revealed. The Kwon and Lall (2016) investigation employing the PDSI demonstrated that the recent drought was of "unprecedented severity," due in large part to uncharacteristically high temperatures, with the most recent similarly severe historical drought occurring nearly 21,000 years ago (p. 13).

The Standardized Precipitation Index (SPI; McKee, Doesken, and Kleist 1993) another common measure used to characterize drought or abnormal wetness, but for relatively shorter time periods, based on comparing how wet or dry an area is compared to its historical average, has been used to assess the drought. The SPI examines the availability of different water resources (e.g., soil moisture, snowpack, groundwater, river discharge and reservoir storage; Keyantash 2016). Cheng et al. (2016) investigating the drought and employing the SPI learned that the most recent drought of comparable severity occurred approximately in the year 1000 and outside of the area now known as California. Once again, the extremely elevated temperatures factored into the degree of severity.

While exceptionally heavy winter 2016–2017 snowfall in the Sierra Nevada has alleviated the drought's effects and historically high temperatures have dropped, the effects of the drought on the state and its people has been quite considerable. California's redwood forests and ecosystems, studied by international scientists and enjoyed by domestic and foreign tourists alike, are in jeopardy; drought-induced vascular damage to millions of these rare trees has and will continue to result in many thousands of dead redwoods, not to mention many thousands of other tree species statewide, as far into the future as the year 2050 (Anderegg et al. 2015). Many species of birds (e.g., Sonoran Desert birds) and other indigenous California animal species populations have been unable to nest or reproduce, and therefore are well below their expected values due to the flourishing of more drought-tolerant predators and microorganisms that now pose considerable threats to already endangered species and their fragile ecosystems (McCreedy and Van Riper 2014).

The dearth of surface water in the soil has compelled farmers in the state's key agricultural region, the Central Valley, to pump out massive stores of groundwater—the earth's water 'reserves' that exist beyond the depth of residential and commercial water wells (Boxall 2015). This activity has resulted in the drying up of wells, the reduction of water in streams and lakes, a deterioration of water quality, and increased pumping costs (Boxall 2015; United States Geological Survey 2016).

However, most disturbing are the widespread incidents of land subsidence and soil collapse in which the earth beneath building, roadways, structures, and peoples' feet is sinking by as much as one foot per year (Marcum 2014). The immediate and far future damage and costs of properties and structures affected by this phenomenon cannot be

anticipated at this early stage but are expected to run into the hundreds of millions of dollars (Boxall 2015). A further complication of this groundwater pumping practice is the very real escalating probability of still deadlier wildfires and the flash flooding and mudslides that accompany them. The U.S. Geological Survey (Campbell 2016) warns that the California's status as an already high-risk wildfire region will significantly worsen in the next few decades. Yet the harms extend still further.

As of August 2015, losses to the state's economy were estimated by the University of California-Davis to exceed $3 billion (Sanders 2015b) with approximately 11,000 mostly agricultural jobs lost, more than half a million acres of farmland have been fallowed, and thousands of residents have watched their wells and taps go dry as toilets for poorer urban and rural Californians became non-flushable without water (Kasler and Reese 2015).

This inability for Americans to do something as simple as use twentieth-century plumbing is concerning and the drought has, like other natural disasters in the United States, highlighted already well known inequalities in American society. For example, when hurricane Katrina struck New Orleans on August 29, 2005, deep differences in socioeconomic status were laid bare before the entire world. As middle class and wealthier New Orleans' residents evacuated inland in the hours leading to Katrina's landfall, many thousands of other residents—predominantly the city's poor African Americans, disabled, or elderly—were left literally "to fend for themselves" against Katrina's winds and waters (Simo 2008:309). Footage of fellow Americans sheltering on roofs with makeshift bedsheets pleading "PLEASE HELP US!" as the federal authorities

appeared almost purposely impotent conjured images of third-world monsoon disasters (Vaidyanathan 2015).

Such disasters indicate that the adverse effects and losses from natural, ecological, and environmental crises are not suffered equally across the various social classes and that many of the working and lower classes suffer an unfair and unjust degree of burden not shared by the wealthier classes in society (Anderson 1990). Despite the fact that many thousands of Californians could not muster water for hygiene, cooking, or washing clothes—all essential human practices—still other Californians saw no problem with using hundreds or even thousands of gallons per month on their luxurious landscaping and private home golf courses (Stellar et al. 2012). Surprisingly, there were no sanctions other than higher water bills or relatively affordable heavy use fines (e.g., $100) to compel individual Californians or organizations to restrict their water consumption: that was until Governor Brown's April 2015 executive order was put into effect (California Natural Resources Agency 2016).

Many outraged and frustrated residents resorted to Twitter in the absence of government sanctions (Hackman 2015). Exacting populist social media justice (Rizza, Pereira, and Curvelo 2011), ordinary citizens proceeded to vilify, or more specifically, to begin "#droughtshaming," the drought-deviant ''#waterwasters," or "#grassholes'' for what they judged was selfishly funneling the community's precious water into their own Olympic-sized swimming pools, lavish gardens, and ultra-green, plus-sized homestead acreage (Hollywood Reporter 2015). In addition, just as many Californians let their lawns go brown or yellow, they announced their conformity to these new drought norms, as well as their pride, on Twitter with "#brownisthenewgreen" and "#goldisthenewgreen"

(https://twitter.com/search?q= percent23goldisthenewgreen). While some critics alleged this was nothing more than 'Big Brother' come to California with everyone snitching on their neighbors out of spite or jealousy of their personal property, others claimed shaming people online actually works and that it has a place in modern life to promote pro-environmental behaviors (Jacquet 2015) and promote awareness in the wake of climate change-enhanced eco-crises (Vieweg et al. 2010).

THE RESEARCH PROBLEM

In light of the controversy, this dissertation will explore and examine ordinary Californians' use of social media, specifically Twitter, to Internet shame those individuals, organizations, and even government entities whom they perceive to be negative water deviants— that is, those who waste water through non-essential use of water (e.g., landscaping, car washing, paved surface washing, multiple swimming pools, etc.) or use excessive amounts of water disproportionate to actual individual personal needs. This dissertation seeks to answer the following questions: 1) Which communities were droughtshamed more— those with highly privileged residents in wealthy or affluent communities, the comfortable middle class, or the working and lower classes?, 2) Was there an inequality of drought burden during summer of 2015 when highly privileged and comfortable communities' residents were allowed to consume water for non-essential "luxury purposes" in excess of officially established personal water requirements while routinely low water-consuming highly disadvantaged and less prosperous communities' residents were expected to reduce their water consumption still further?, and 3) How significant was droughtshaming in getting Californians to reduce their water consumption

during the months of June through August of 2015, the very worst period of the worst drought to hit California in over a millennium?

The phenomenon of droughtshaming is the use of the Internet, or social media platforms such as Twitter or Facebook, to post video clips or photos of people and/or their property with the intent of capturing them violating mandatory or voluntary water restrictions, wasting water, or using water for non-essential purposes during the recent California drought of 2011–2016. Clips or photos posted on social media with just enough identifying information to locate the property but not sufficient information to identify the actual property owner have become a popular tool of drought norm enforcement because droughtshaming enables any ordinary citizen to show the world the water- wasting or inappropriate water-consuming behavior of virtually anyone from the very rich to the very poor.

For this dissertation, communities are measured and defined as zip codes rather than cities or towns. The Economic Innovation Group's (EIG) Distressed Communities Index (DCI) scores defines a community's level of privilege or disadvantage according to the following score ranges: 0–20.0 denotes wealthy, highly privileged communities; 20.01–40.0 somewhat less privileged upper middle class communities; 40.01–60.0 middle class communities; 60.01–80.0 less prosperous working class communities; and, 80.01–100.0 low income, or highly disadvantaged, communities. Inequality of drought burden for this dissertation is defined as circumstances in which high-water consuming communities' residents were allowed to consume water well in excess of the state's declared standard of 55 *residential gallons per capita daily* (R-GPCD), or the daily water consumption of one resident, during the period of the drought's greatest severity. By

contrast, many highly disadvantaged and less prosperous communities' residents were required to either reduce their already relatively low water consumption or were required to reduce their consumption by greater than 8 percent—a standard applied to water supplier districts with much higher water–consuming residents.

SIGNIFICANCE OF THE STUDY

This study can be impactful in three key areas: adding to the literature, utilizing methodological innovations, and providing benefits to policymakers. First, the study can significantly add to the droughtshaming and social media literature. To date, the droughtshaming literature has been meager, being absent any studies on social media as a means to shame individuals into pro-water conservation behavior. This dearth of content exists despite voluminous media accounts of droughtshaming. Furthermore, this study can inform the social media literature precisely because it examines Twitter's potential power as a digital tool of norms enforcement—a very different area of inquiry compared to the existing social media literature that focuses on Twitter as an economically or politically important tool of marketers, public relations professionals, and political operatives.

Second, the study employs a number of methodological innovations in sociology and social psychology research by geolocating tweets (calculated by the new U.S. Census Geocoder mapping tool; see Appendix E for map of geolocated Tweets) to better understand how geography and place may fit into social phenomena, and the application of Bayes' Theorem to answering research questions rather than frequentist models.

Sociologists have been slow to explore social media as a research tool or topic of inquiry while scholars of communication, media, data science, and Internet studies have

been exploring many social questions within the purview of sociology (Daniels and Feagin 2011; Di Maggio et al. 2001). Sociologists continue to lag behind such scholars in part because many fail to recognize the field's importance as means to take us into a "golden age of sociology"— wherein existing social theories can be tested in hitherto unimagined ways and hence new theories developed. Yet the greater obstacle to sociologists' foray into social media studies remains the technical tools, analytical methods, and coding skills often required to pursue such research (Di Maggio et al. 2001).

My study will help in promoting sociological social media research in the following two ways: 1) by demonstrating how straightforward social media research can be by integrating resources sociologists know well (e.g., social data sets like the U.S. Census and the Distressed Communities Index) with digital data sources (Tweets and the geolocation from the U.S. Census); and, 2) by using computational and data science tools to automate significant portions of the actual research process (e.g., data identification and collection, preparation, etc.) to achieve highly valid and reliable results while saving significant amounts of time.

Finally, this study's findings will have practical as well as policy implications. If droughtshaming on Twitter— a topic never before explored in scientific research—can be shown to motivate individuals to engage in pro-social pro-environmental behavior, then online shaming can perhaps be harnessed as a constructive tool of public and governmental policy. Substantial droughts have occurred not only in California but also in all regions of the US and they are becoming more frequent and more severe. Should my hypotheses be supported, other researchers could follow this work to help develop

effective online shaming-based initiatives to promote not merely water conservation but recycling behaviors and energy conservation as well—extending the practical impact beyond water and well beyond the borders of California.

STRUCTURE OF THE DISSERTATION

Chapter 2 reviews the literature in several main areas: community norms and harmful deviance; anti-environmental behavior and class-based entitlement; social control of norms; shaming in America and its effectiveness; social media shaming and its effects; and class-based entitlement behavior and shaming during the California drought.

Chapter 3 covers the theoretical framework and hypotheses under investigation. Chapter 4 provides details about the collection of original data and the inclusion of secondary data, the samples, variables and measurements, methods of analysis, and analytical strategies. Chapter 5 covers the study results. Chapter 6 summarizes the key findings, reviews their practical implications, and poses directions for future research.

CHAPTER II

LITERATURE REVIEW

This chapter reviews the literature on community norms and values, and why individuals and certain classes in society choose to engage in negative, harmful deviance against the community and its values. Also covered from the literature are reasons why certain people engage in harmful deviance against a public good in the community and why social sanctions meted out by the community serve as a means of social control. Next, the literature on pro-environmental norms and the harmful deviance against such norms during an environmental crisis is reviewed, examining successful sanctions versus unsuccessful sanctions. Finally, the California drought and the various types of harmful deviance and attempted informal and formal social control strategies are reviewed.

COMMUNITY

Life on planet Earth is comprised of communities. These communities, in the civic sense of cities, towns, villages, etc., are social, economic, and political entities that sprang into being because they served, and continue to serve, a number of purposes. Communities bestow a sense of belonging and identity (e.g., "I'm a proud Texan") as well as a degree of security and provision of goods and services that individuals are typically unable to provide for themselves (e.g., water, electricity, safe and navigable transportation routes, civil security and laws, commerce and trade for acquiring food and goods, etc.; Chriss 2007; Terry, Hogg, and White 2000). In exchange for these benefits, and infinitely many more, individuals choose to be part of a community— a whole—by engaging in what is known as the social contract: "The community that is formed by this

social contract is not simply the sum total of the lives and wills of its members: it is a distinct and unified entity with a life and a will of its own" (Rousseau 1920:15).

To be a member of a community, the individual is expected and required to surrender some of their personal freedoms in exchange for the benefits afforded members; by relinquishing a degree of personal liberty to act according to one's own will (which may often include immoral and dangerous actions), the individual gains a civil liberty enlightened by reason yet constrained by a moral general will (Rousseau 1920).

For most individuals it is more desirable to give up the freedom to do literally whatever they wish in exchange for the freedom to not have to fabricate their own mode of transportation, or to manufacture their own fuel, or to hunt, kill, skin, and clean their own meat, or to protect themselves from armed people from other areas, etc. Yet beyond this convenience and comfort gained, there are other duties and responsibilities of community membership.

According to consensus theory (Davis 1937; Parsons 1951), a community in the civic sense, exists to provide benefit to its members just as its members provide benefits to the community at large. So long as the community survives and thrives, individual members can benefit from it and continue to contribute to it. The community's survival, and hence its individual members' survival, is mutual, or rather, interdependent.

COMMUNITY NORMS AND VALUES

Critical to the survival of a community is the sharing of a basic value system to which its members adhere. A value system is a set of values, or principles, held to be morally and ethically important and serve as the basis of norms, which themselves guide expected behavior (Heckert and Heckert 2004). Hence, the community consists of

individual members cooperating as they seek to achieve common shared values and objectives: survival, sustaining the community, and the preservation of beliefs critical to the community's survival, and thus their own survival (Tittle and Paternoster 2000). America as a nation, comprised of many smaller communities, has common shared values that permeate its culture and institutions down through the states, cities, and towns (Erikson 1966).

Williams (1965) codified the most comprehensive collection of quintessential dominant American values: achievement and success, individualism, activity, and work, efficiency and practicality, science and technology, progress, material comfort, humanitarianism, freedom, democracy, equality, and racism and group superiority (pp. 409–468).These values generally reflect a middle class moral and economic view of the world as conceived by the Puritans settlers of the North American continent who established their white, Anglo-Saxon Protestant values (Erikson 1966; Weaver 2001). These values serve to inform key middle class norms that dominate American culture: group loyalty, privacy, prudence, conventionality, responsibility, participation, moderation, honesty, peacefulness, and courtesy (Heckert and Heckert 2004; Tittle and Paternoster 2000).

Per consensus theory, these values largely persisted intact into the present day because individuals who have shared these values, and conformed to the norms tied to these same values, have been rewarded by the community (Tittle and Paternoster 2000; Weaver 2001). Rewards include social acceptance, educational and career advancement, upward economic mobility, respect, and tangible, practical benefits (Becker 1964). Rewarding conformity aims to ensure the survival of the community as well as the

individuals within the community (Becker 1964; Chriss 2007). However, those who deviate from community norms can expect disapproval. The more serious the breach of norms, the more serious the sanction, or consequence, with very serious violations punished by the state's formal sanctions (e.g., fine, community service, imprisonment, execution) (Becker 1964). Less serious deviant acts that do not threaten community survival may only be frowned upon, discouraged, and suffer mild admonishment (Tittle and Paternoster 2000).

DEVIANCE AGAINST THE PUBLIC GOOD AND SOCIAL SANCTIONS

Deviance, for purposes of this paper, focuses on non-criminal negative deviance, or acts that non-conform or underconform in potentially harmful ways from community norms while not violating any government entity's laws (Heckert and Heckert 2004). This is in distinction to positive deviance that consists of behaviors that either over- conform to a community's norms or deviate in a positive way, such as Albert Einstein's unorthodox methods, or Sigmund Freud's psychodynamic, analytical professional practice that lead to advancements in understanding the human mind (Tittle and Paternoster 2000).

Ultimately, context—the time period, place, individual actor, and circumstances—determines the nature of deviance and its severity (Becker 1964). For example, in the days of the Massachusetts' Bay Colony, working on a Sunday, the Sabbath, was judged reprehensible behavior (Erikson 1966). Today in the same part of Massachusetts, many people work on Sundays—both paid work for an employer and unpaid work, perhaps around one's domicile. Beyond context, community members ultimately decide what behavior is judged deviant and who is labeled a deviant, "The

degree to which an act will be treated as deviant depends also on who commits the act and who feels he [or she] has been harmed by it. Rules tend to be applied to some more than others" (Becker 1964:42–43). However, adherence to those same rules is performed by some more than others. There is a strong relationship between the desire for social approval and acceptance and conformity to those social norms. However, the more affluent and wealthy, given their plentiful resources, social capital and networks, possess a greater sense of entitlement and are less dependent on others in the community for their needs—particularly needs for social approval and acceptance (Piff et al. 2012). Consequently, they have less of a desire and a need to conform to community norms (Fukushima, Sharp, and Kobayashi 2009; Thio 2001). Yet when people are dependent upon one another to fulfill needs they must be more tied into their community and to what is happening in it, rather than simply remaining detached (Kraus, Côté, and Keltner 2010). Kraus et al. (2010) further found that upper class individuals' financial independence enabled them to essentially disregard what is 'going on' with others and be unconcerned with social and environmental contexts; instead, they believe in their own superiority, own importance, and entitlement.

"TRAGEDY OF THE COMMONS" AND WATER CONSERVATION

Such perspectives are wrought with the potential for harmful consequences for the community. The issues with water conservation during the drought and individuals' non-compliance are a contemporary example of the "tragedy of the commons." According to Hardin (1968), despite the fact that we have communities and societies that enacted laws to largely minimize dangerous and harmful behaviors, there remains the freedom of each individual to do as they will. Specifically, each community has resources, and the

problem with preserving a public, or community, resource—in this instance, water—is that everyone is free to overuse it (Hardin 1968; Milinski, Semmann, and Krambeck 2002).

In California, the wealthy residents of Rancho Santa Fe and similar communities who have expressed their assertions that they have a "right" not to have to forgo green lawns and colorful flowers on their comparatively vast properties, and that they should not have to play golf on brown greens at the country club (Bardach 2014; Daniels 2015). In April 2015, after Governor Jerry Brown mandated a 25 percent water reduction in water consumption for the entire state, Rancho Santa Fe residents defiantly used more water than their monthly average (Gardner 2014). In the months leading up to the mandate, this community's residents used five times the amount of water as the average coastal Californian in September—584 gallons each (California State Water Resources Control Board 2015). As of November 1, 2014, water use in the wealthiest three California communities (including Rancho Santa Fe) was down only 1.5 percent from September 2013, while the rest of the state was down 10.3 percent (California State Water Resources Control Board 2015).

A 10-year study of residential water use in California, Mini, Hogue, and Pincetl (2014) found that not only did wealthier areas use more water, but they also cut back less during droughts, because higher incomes insulated their residents from fines and rising water bills. By contrast, working class and lower income areas' residents used one-tenth of the water of the residents in the wealthy areas, not simply because of the size of their domiciles and lawns, but because these residents had typically already cut back to the fullest extent possible. Mini et al. (2014) also found that a $1,000 increase in median

household income amounts to a 2 percent increase in single-family residential water use. This is the tragedy of the commons: individuals asserting their freedom and right to do as they please on their private property (Hardin 1968). “Conservation is for the little people” (Gray 2015).

DEVIATING AGAINST THE PUBLIC GOOD OF WATER CONSERVATION

A Pew Research Center Survey conducted in December 2016 showed that the majority of Americans favored stricter environmental laws and regulations (Bialik 2016). While Americans like to be viewed by others as being pro-social and contributing to the public good, there is often a deep divide between individual intentions and attitudes and actual behaviors. The majority of Americans support water policy campaigns for voluntary water conservation, yet they do not trust others besides themselves to voluntary conserve water; being egoistic themselves, they believe mandatory measures are for untrustworthy others (Stoutenborough and Vedlitz 2016).

In reviewing water policy proposals, the one measure consistently opposed more than any other was mandatory water conservation, even though one in three Americans agreed that droughts are becoming more common while one in four agreed such droughts are becoming more severe (Fischetti 2015). Clearly this concern with the behavior of others being appropriate with respect to issues of water consumption is an important area to explore, particularly, given the findings that although Americans typically will not restrict their consumption patterns willingly, they will bend to social norms and the power of social sanctions—be they formal or informal (Jacquet et al. 2013; Rand and Nowak 2013; Willis et al. 2011).

The role of social sanctions in compelling conformity for the sake of maintaining a public good, such as preserving water resources, is well studied. Sanctions are the community's response—or social control—to the deviant behavior of the individual or group (Chriss 2007; Hirschi 1969; Hirschi and Gottfredson 1994). Sanctions can be positive, as in a reward given for positive deviance or conformity to norms, or negative (Hirschi and Gottfredson 1994). When individuals deviate from norms in ways that create potential for harm then *negative sanctions,* aka punishment, may be exacted. Individuals who break community norms codified as *laws* may be subject to the official punishment of the state, while those who violate community norms not backed by civil or criminal laws may find themselves subject to the sanctions of their community members (Hirschi and Gottfredson 1994). Regardless of the lack of government guarantors, these community-backed social sanctions known as informal sanctions are often far more binding and powerful than any punishment that the state can administer (Ross 1896). When the state cannot or will not intervene to curb the harmful deviance of individuals, whatever the reasons for inaction, the community will often step in itself, in the form of individual actors, particularly in a crisis situation (Rost, Stahel, and Frey 2016; Shemtob 2013).

CRISIS RESPONSES TO HARMFUL DEVIANCE

During a crisis, as in the case of the California drought, when an enforcement vacuum exists, individuals will act to redress the perceived injustice and sustain the public good by imposing their own informal sanctions. In the past, negative deviance that was criminal warranted the vigilantism of the Old West. Horse thieves and murderers would find themselves facing the end of a rope when the locale or territory had no

attendant law enforcement official (Gonzales-Day 2006). When the forms of negative deviance meant that no laws had been broken and hence the law could not act, the people would serve the interests of the public good and deal with the offender in an act of democratized punishment (Hoffer 1998; Shemtob 2013). In the seventeenth and eighteenth centuries, many men suspected of negative deviance experienced the wrath of the community's informal social sanctions in the form of tarring and feathering or being "run out of town on a rail" (Hoffer 1998).

A custom practiced around the world but Anglicized in America, as *shivaree* was a method of informal social control often employed by a small to medium group of local individuals, out in small American frontier towns or villages from the seventeenth through nineteenth centuries. Lacking established institutions for enforcing moral and social order, such as churches and law enforcement, the group would arrive usually after nightfall, at the residence of the non-conforming but usually not criminally-deviant target (Pencak 2009). Shouts, howls, banging metal against metal, shooting guns into the air, banging drums, playing bagpipes or other loud and projecting musical instruments bombarded the target, often startling them awake in the middle of the night. Such rackets were accompanied by calls for the target to remedy their transgression against the community by obeying the firm "requests" of the group. Once the requests were met, the shivaree ended. If not, it would continue night after night until the target relented.

The embarrassment of such a display and the fact that the entire community now knew the target's transgression often helped enforce frontier norms. Targets of the shivaree were often one of the following: 1) girls suspected of premarital sex who would then be forced to marry or else flee the town; 2) men who romantically pursued other

men's wives; 3) people suspected of crimes lacking substantiating proof; and, 4) those accused of being inhospitable to community members and visitors, or poaching, stealing or deactivating other trappers' traps (Pencak 2009). While the practice was often very unpleasant to the target, especially if the group members were under the influence of alcohol and turned to destructive behavior, it remained an effective, albeit unsettling tool of norms enforcement in the absence of formal social controls (Pencak 2009).

The propensity of the common people to enforce pro-social and pro-conservation behavior, but during an historic drought, exists in modern America as well. The targeted behavior is quite varied, and it is important to remember that Californians failing to conserve water during the drought is an example of non-criminal negative deviance.

Therefore, such behaviors warrant informal sanctions. Someone who runs their lawn sprinklers for hours at a time, or lets their sprinklers flood the driveway, sidewalks, or street, or improperly maintains their sprinkler equipment is negatively deviating from the responsibility norm. An individual who plants a dozen water-chugging lemon trees during the same drought while residents two miles away suffer from dry wells and no water (Lin and Martinez 2016) is deviating from prudence by being indiscrete (Bardach 2014). An individual who considerably adds to their residential water consumption during a drought by building an Olympic-sized swimming pool on their property or trucks in water from outside their community (Weathers 2014) in order to avoid water restrictions and conservation measures is violating the moderation norm by being hedonistic. In addition, someone who steals water from a fire hydrant to water his or her ranch property, like the television star Tom Selleck (Bardach 2014), is deviating from the honesty norm by being deceitful.

While these acts would typically be viewed as perhaps selfish and self-indulgent by many community members, under normal circumstances, when set during the recent historically devastating drought in California, these acts have been judged as negative deviance, serious negative deviance. The non-essential use of water during a drought for luxuries such as swimming pools, golf courses, and landscaping is serious and harmful at a time when the United States Geological Survey (2016) revealed that the earth under people's feet is literally collapsing due to lack of moisture in the layers of earth beneath the topsoil. Much of this is due to the fact that certain landowners with massive property holdings are draining the state's precious underwater aquifers, and the government is hiding the names of these individuals, all but ensuring that enforcement of the legislation passed years ago to protect the aquifers is effectively neutralized (Donohue 2015).

COMMUNITY SANCTIONS AGAINST NEGATIVE WATER DEVIANCE

Despite the contextual seriousness of this deviance, there were no formal sanctions to abate or prevent this behavior because there were no laws restricting water consumption during a drought; people could use as much water as they could afford (Williams and Mieszowski 2015). When no other efforts—mandatory or voluntary conservation, fines, shutting of water meters, etc.—succeeded at curbing the staggeringly high water consumption rates of the state's wealthiest residents, water districts instituted tiered water rates in April 2015, that had been approved under Proposition 218 by voters in 1996 (Rogers 2016). Aimed at the worst water deviants whose watering of comparatively vast properties were responsible for 54 percent of the state's overconsumption of water but also cost millions of dollars in recouped infrastructure and service delivery costs to these mega-users, the law effectively meant that for residents

who consumed more than 7480 gallons of water in a month, each gallon of the overage would increase by 39 percent (Yarbrough 2015).

Experts were optimistic about the new law's power to curb consumption by the worst violators but those very same people targeted by the new law were able to prevent any such sanctions against themselves. Nine of the state's wealthiest residents, including early Microsoft investor David Marquardt, two senior officers of financial services/investment banking firms, and six other very wealthy Californians grouped together to sue claiming the tiered costs were un-constitutional (California's constitution) because they were too high (Rogers 2016; Yarbrough 2015). This was despite the fact that they claimed in court that they could easily pay the higher rates given that they all live in the same community where the mean home price is more than $4 million.

Thus the one formal sanction taken to protect the community from the very negative deviants, very wealthy and apparently quite powerful, that were responsible for the preponderance of harmful water consumption was stopped when the law was struck down (Rogers 2016; Yarbrough 2015). Another community member appraised the situation: by striking down the "tiered water rates, people who use less will have to pay a greater share of the overall bill, essentially subsidizing the biggest users with the largest green lawns," and "People here have had no problem conserving. It was a civic duty. Good citizens cooperate. These are very rich, very self-entitled people who just don't have any sense of community" (Yarbrough 2015: 1).

Beyond using wealth and the power of the courts to avoid consequences of their harmful deviance (Piff 2014), the biggest water deviants flouted restrictions by simply trucking in water under the cover of night (Bardach 2014; Daniels 2015; Walker 2014) or

going so far as to literally steal water from hydrants in neighboring poor municipalities lacking sufficient water for toilet flushing (Gardner 2014). The wealthier classes, as a demographic, possess a fundamentally greater sense of psychological entitlement and sense of superiority that makes them largely less sensitive to the needs and suffering of others; they instead exhibit greater self-serving tendencies and unethical behavior (Bardach 2014; Stellar et al. 2012). Such an orientation and worldview empower such individuals by reinforcing their belief that they have the right to anything they want, and they should not be held accountable to any consequences (Stellar et al. 2012).

Wealthy Californians such as those living in the Rancho Santa Fe community even exhibited outrage when they were called upon to share the burden of water conservation for the benefit of everyone. Gay Butler stated, "It angers me because people aren't looking at the overall picture. What are we supposed to do, just have dirt around our house on four acres? (Kuznia 2015:2). Furthermore, "wealthy people shouldn't be forced to suffer the indignity of having brown lawns or playing golf on brown golf courses..." and Butler detests the trend of droughtshaming (Kuznia 2015:2). More disturbing is the fact that a board member for the Metropolitan Water District of Southern California, Brett Barbre asserted that the call for water conservation was a "'war on suburbia' and likened his rights to waste water to the right to bear arms...'They'll have to pry it [water] from my cold, dead hands'" (Kuznia 2015:2).

The fact that such wealthy Californians prioritized their leisure comforts and property aesthetics while 1,800 families, residing in the working- and lower class corners of the same county, had to rely on charity-provided but empty water tanks indicates the degree of selfish entitlement (Kuznia 2015; Lin and Martinez 2016). Residents in these

areas and many others were forced to make weekly trips to nearby water stations to fill 55-gallon barrels, so they could shower, flush toilets, and wash dishes.

Repeated calls for punitive measures largely went unheeded. Appeals for more democratic and widespread penalties such as water districts charging overuse fees, or installing residential meters with threats to discontinue service if conservation metrics were not met, only seemed to deter residents whose consumption was primarily constrained by income (Baerenklau, Schwabe, and Dinar 2013; Borg, Edwards, and Kimpel 2013; Kuklowsky 2013). Nonetheless, individuals could not be allowed to consume water unchecked without catastrophic consequences. With attitudes such as 'I can use as much water as I please' (Bardach 2014) and the lack of binding formal sanctions, a solution was desperately needed. Ordinary Californians developed their own.

Gradually over the course of the worsening drought, many celebrities and wealthy Californians found themselves labeled as deviants in news stories, social media campaigns, and Internet shaming (Hackman 2015). While average Californians were also targeted in social media by fellow community members, residents were frustrated with the authorities' apparent inability or unwillingness to stop wealthy residents from consuming comparatively vast sums of water, seemingly indifferent to the drought's catastrophic effects (Donohue 2015; Rogers 2016; Yarbrough 2015). With many of these Californians bringing in their own water, they believed they could ignore water conservations measures and regulations intended to ensure that all residents have access to adequate water supplies for cooking, bathing, and essential hygienic and public health functions (Daniels 2015). These residents as a group have been "lacking a sense that we are all in this together" and with their ability to import water and thus "buy their way out"

of the current crisis, many have expressed the view that their income and status entitled them to use as much water as they could afford to buy (Kudler 2014; Lovett 2014). One Rancho Santa Fe resident and talk radio host conveniently overlooked the fact that water is a community resource administered and distributed by the state's water districts (Association of California Water Agencies 2017), when he asserted, "we're not all equal when it comes to water" and that as the wealthy, who pay higher taxes, they "should not be forced to live on property with brown lawns, golf on brown courses or apologize for wanting their gardens to be beautiful" (Kudler 2015).

PRIVILEGED CALIFORNIANS AND NEGATIVE WATER DEVIANCE

Such entitlement attitudes are found to be common among the more financially privileged segments of the population. De Oliver's (1999) conservation behaviors study of Texas residents, situated by U.S. census tracts, found that there is a very strong relationship between actual water conservation outcomes and the highly correlated factors of income, education, and in particular, political affiliation. Residents living in majority white, highly educated, higher income, Republican-dominated census tracts were those whose actual conservation outcomes were the lowest, and substantially the lowest, of all income and educational levels, political identifications, and races, with respect to census tracts' characteristics (De Oliver 1999; Jacquet et al. 2013).

He also found that there is a "greater propensity for poorer conservation response from a politically conservative demographic, with such population groups among those least likely to conserve energy or water" (De Oliver 1999:390). They are also more likely to become even more deeply entrenched in their disbelief of climate change and in the severity of the historic drought the more that they are confronted by or exposed to

messages about the drought's severity (Jacquet, Dietrich, and Jost 2014). Conservative political ideology informs their way of life, defends their self-concept, and bolsters their own group's interests, they act or fail to act in order to maintain the status quo rather than conserve resources (Jost, Banaji, and Nosek 2004; Lindenberg and Steg 2007).

Thus, the more the government, agencies, non-profits, or environmental experts try to provide the facts concerning the absolute need for universal conservation in order to sustain water supplies, the more resistant political conservatives are to responding to such fear messages and threats (Jacquet et al. 2014). By contrast, those most likely to conserve water were those of lower and middle incomes and those of liberal political identification, regardless of income and educational attainment (De Oliver 1999; Jackson 2006).

An example of this type of behavior was found in Montecito. There, in an area where United States Census data indicate Republican Party ideological dominance, the top three water users consumed nearly 30 million gallons of water among them in 2012–2013—enough water to supply one of the many California small towns who suffered from dry wells (Bardach 2014). Yet no actions were taken by the any local, county, or state government, and no fines were imposed. In truth, government agencies in the state, rather than punishing or sanctioning such persons, were actually withholding the names of individual wealthy Californians who persisted in using enough water to re-supply many small towns' dry residential wells (Donohue 2015).

One wealthy water deviant, dubbed the "Wet Prince of Bel-Air" by the press, used nearly 12 million gallons of water in 2015 alone, during the worst year of the worst drought in over 1,200 years (ABC News 2016; Donohue 2015). The

government's protection of this individual's identity caused such fury among Californians, many of whom were struggling to find still further ways to cut their consumption in the midst of the April gubernatorial 25 percent reduction mandate, and the press that the media and several non-profit investigative reporting agencies used high-tech satellite imagery and public records to narrow the identity of the "Prince" (Corey and Williams 2016).

Further media coverage resulted in the outing of the "mega-users"; a list of California water agencies' top 100 customers based on consumption values. At the time the list was posted online in July 2015, the average middle class home was consuming 42705 gallons per year, the average upper class home 213,160 gallons per year, and the average low income home just 18000 gallons per year (Kudler 2014). The top consumer on the list, the "Wet Prince of Bel Air" was the biggest user in the state at 11.8 million gallons per year—more than 55 times more water than the average wealthy resident, and more than 276 times the average middle class California resident.

There were 99 other mega-users consuming an average of 4.25 million gallons per year in the Los Angeles water agency, and 100 times the water use of the average middle class California resident; 100 mega-users consuming an average of 1.5 million gallons per year in the East Bay (Bay Area) water agency, and 40 times the water use of the average middle class resident; another 143 mega-users between San Diego and Eastern Riverside County both averaging 1.20 million gallons of water at 29 times the average middle class resident; and another 22 users between Orange County, Alameda County, and Long Beach (Williams and Mieszowski 2015).

Nonetheless, both state and local governments announced that they were essentially powerless to officially and formally sanction, or punish, Californians who engaged in acts of negative water deviance, including the continuous consumption of vast sums of water like those described above. “There’s no ordinance on the books…to go after an individual customer strictly for their use” according to Martin Adams, senior assistant general manager for the Department of Water and Power-Los Angeles, because “As long as residents follow other usage rules (such as watering only on certain days and preventing run off into the street), they can use as much water as they can pay for” (Williams and Mieszowski 2015).

Many mega-users countered public and media claims of selfishness, entitlement, and a disregard for the community with the excuse that they did not know how much water they use nor do they know how much their water bills actually were, but that they were doing all they could to cut back consumption (Daniels 2015; Gardner 2014; Williams and Mieszowski 2015). Such responses demonstrate how wealth can be both an insulator and an isolator from the effects that climate change and environmental crises have on a community and its less fortunate residents (Baerenklau et al. 2013; De Oliver 1999; Evans et al. 2015; Kuklowsky 2013).

From online media as well as traditional media, the reports of the wealthier and affluent Californians being vilified for their water consumption behavior increased (see Corey 2016; Nagourney and Healy 2015; Price 2016; Sanders 2015a). The information age’s equivalent of the town square pillory or stockade—Internet or social media shaming—was beginning to be utilized by growing numbers of Californians dissatisfied

with the inadequate response to the crisis. As their American ancestors before them, they were enacting their own punishment against irresponsible consumers. However, this behavior should not have surprised anyone. Laboratory experiments worldwide performed across a variety of social settings have consistently demonstrated that individuals tend to behave pro-socially and to punish those who fail to so behave, even when they must bear a personal cost and even when it is highly unlikely they will ever interact with the deviant in the future (Gintis 2000; Price 2016).

Still, social media shaming, specifically in the form of droughtshaming, can be explained in part by the fact that such behavior is quick and easy to perform. Given the ease and convenience with which an individual can take a photo or shoot a video on a cell phone, then type 140 or fewer characters, and click "post," (process takes an estimated 30–45 seconds (Hyatt 2009) and the existence of the free Twitter platform, there are very low costs for engaging in this behavior. Droughtshamers, just like their work colleagues and neighbors, can engage in their social media activity on their way to and from work, or easily squeeze it into or around their recreation, shopping, and errands (Krogstad 2015).

Furthermore, social media itself provides a layer of insulation for droughtshamers through social and proximal distance and a degree of anonymity not available to individuals who would attempt to droughtshame face-to-face in real time (Rost et al. 2016). This is a means of protection from interpersonal physical aggression, calls to the authorities (e.g., police) while giving even the socially awkward and shy a platform to share in the digital enforcement of norms (Rost et al. 2016). This behavior was borne out in the social media and Internet shaming of negative water deviants as individuals photographed and video recorded such targets without seeming regard for some

individuals and groups who argued that droughtshaming was nothing more than a "Big Brother" strategy from the "bottom up" (Jacquet 2015). This lack of fear concerning the personal repercussions for droughtshaming may be bolstered by the findings of social media analytics platform Beevolve that 88.2 percent of all Twitter users choose *not* to shield their identity by specifying that all the tweets associated with their account only be viewable by approved followers. Instead, they allow anyone to see their tweets and thereby maintain a "public presence" (Beevolve 2012:1).

Droughtshaming as a social sanction by members of the population should have been anticipated. With cell phone camera and security or surveillance cameras now ubiquitous, it may be harder than ever to engage in deviance without someone capturing photographic, video, or auditory evidence of it. According to the Pew Research Center on Internet and Technology's decade-long study of Americans' Internet engagement and behavior (Greenwood, Perrin, and Duggan 2016), 86 percent of Americans use the Internet, with more than half of all online adults (56 percent) using more than one of the five main social media platforms (Facebook, Twitter, Instagram, Pinterest, and LinkedIn). The fastest increase in Internet and social media users has been in adults over the age of 65 years.

In the digital age, with smart phone owners comprising approximately 75 percent of all cell phone users (Greenwood et al. 2016) social media has quickly replaced face-to-face interactions, television, and print media as the main venue for shaming those who have committed misdemeanors, been arrested for DWIs/DUIs, as well as for alerting communities to the existence of convicted sexual offenders in their neighborhoods (Hess and Waller 2013; Klonick 2016). Shaming online has expanded from highlighting

criminal deviants to "punishing" non-criminal deviance of members of society deemed unworthy of respect and incapable of "knowing their place," such as women and teen girls targeted in the "slut-shaming phenomenon" (Ringrold and Renose 2012; Shah 2015).

Even governments worldwide have been shamed for their unjust and savage behavior against civil disobedience, such as the "Arab Spring" and in the case of corporations who pollute air or water in the furtherance of profits (Krain 2012). The intended purpose of all these shamings was to persuade those engaging in what was perceived to be harmful non-conformist behavior to actually conform their actions to the existing preferred social norms (Klonick 2016). Beyond mere norm enforcement, social media shaming has turned to shaming in the interests of social causes.

The now world-famous cases of the shamed Justine Sacco[1] (Jacquet 2015; Ronson 2015a, 2015c), the Ferguson police and the "'Chaotic and dangerous' Cleveland police" who fatally shot or assaulted pacified or unarmed citizens (Lewis 2014), and the "Ice Bucket Challenge" enactors who essentially did nothing to aid the cause of Lou Gehrig's Disease (Moore 2014) all erupted from ordinary citizens who were exasperated with the persistence of injustice, and the power structure's apparent inaction or indifference concerning these issues. Further, the case of social media shamer Adria Richards[2]

[1] Sacco was shamed in social media after a risqué Tweet she sent prior to boarding a London to Johannesburg flight, South Africa (her hometown) was mistakenly interpreted as an insensitive, racist slur against HIV/AIDS sufferers during the zenith of the African AIDS crisis. The Tweet, "Going to Africa. Hope I don't get AIDS. Just kidding. I'm white!" resulted in a shaming onslaught that went viral during the hours of her flight, when she was unaware and unable to address it. She landed in South Africa completely blindsided by the response. Sacco, aged 30, consequently lost her job as a senior director of corporate communications.

[2] Adria Richards, a female developer live Tweeting a tech conference, overheard two male developers making what she interpreted to be a sexist joke between themselves. She tweeted their photograph with the following text: "Not cool. Jokes about forking repo's in a sexual way and 'big' dongles. Right behind me." The conference's organizer immediately spoke to the men, they apologized, Richards followed up the

(Ronson 2015a) who fearlessly called out the pervasive sexism and sexual harassment that women experience in the Silicon Valley tech industry was punished by the very male-dominated tech culture that she was trying to bring to light (Fitts 2017). Richards herself became the target of "misogynistic, demeaning" shaming for not "staying in her place" and for not "keeping line with cultural expectations for" women (Zandt 2013). Four years later, she has not found another developer job and identifies herself as a consultant (Fitts 2017).

Accumulating occurrences of social media shaming continue to warn that others in society are watching, listening, and eventually acting on perceived injustices they encounter both in real and cyber space. The year 2015 suddenly became the "year of public shaming" online and it became a viral phenomenon with serious implications (Hutchins 2015). In 2015, even the authorities encouraged the California public to droughtshame, with the state founding a website, saveourwater.com enabling anyone to upload photos or videos of negative water deviants to the site (Cooledge 2015; Sanders 2015b). Some cities started their own sites.

In all these examples, social media shaming resulted in real world consequences for the shamed, albeit arguably to a lesser extent for the shamers. In addition to the personal and corporate reputations destroyed by shaming, in Ferguson, Missouri, and Cleveland, plus another two dozen other law enforcement agencies, Justice Department officials have intervened to investigate injustices, poor procedures and performance, and to impose higher standards and demand accountability (Queally 2015). Both the Ferguson

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incident in her blog, and one of the men lost his job. Richards was vilified in social media, and hackers targeted her employer's site and servers in a denial of service attack, resulting in loss of service to customers as employers worked throughout the night to remedy the situation. The next morning her employer announced on social media that they had terminated Richards. The fired developer has since been hired by another company.

and Cleveland police chiefs have been replaced and racial sensitivity and community relationship management training has been instituted for all officers (Lewis 2014). Many other reforms and a decade of monitoring and supervision by the Justice Department were put into place to ensure reforms take root as well as flourish in the police culture (Levenson 2017).

The claim can therefore be made that social media shaming does indeed "get results," albeit not always pleasant results. Many of the social media shamed find that after two years, or much longer, they and their reputations have still not recovered socially or economically. In the words of the shamed Lindsey Stone[3], "Overnight, everything I loved was gone" (Ronson 2015b; Zimmerman 2012). The costs of being shamed online can be long-term and pervasive, often resulting in social isolation, psychological and emotional problems, job loss, spouse or partner loss, and permanent reputation damage when the shaming is repeated, widespread and particularly vicious (Chao, Cheng, and Chiou 2011; Duggan 2017; Schmidt et al. 2010; Tangney et al. 2007).

Calls to limit social media "shame justice" with its potential for "permanent branding of individuals by tainting their online persona" of Americans behaving badly (Parsons 2012:4) have been met with counter-claims of the desperate need for legislation to protect individuals from virtual threats crossing the air gap from the digital to the actual (Laidlaw 2017). Quite disturbing are the many cases in which the mere belief that someone had committed a serious breach of norms was enough to elicit harassment,

[3] Lindsey Stone, a 30-year-old employee of the charity, LIFE, that serves the adult learning disabled, fell victim to a viral shaming campaign when during a work-related trip to Arlington National Cemetery, she posed for a photo showing her seemingly shouting and holding up her left middle finger to a sign stating, "Silence and respect." Stone had a hobby of taking unorthodox photographs that poked fun or tried to appear ironic and posted such photos regularly on her Facebook page. Consequently, she and the co-worker who took the photo were fired, even after their public online apology and explanation. Still, tens of thousands called for her dismissal with more than 3000 signing an online petition.

blackmail, and threats of rape or murder (Goldman 2015). The fact remains that society, and the Internet as its antenna and amplifier, is unfortunately full of people who lack the decency, decorum, and maturity to refrain from such reprehensible speech and conduct. Speech and social discourse are constitutionally protected, hence, society may have to continue to tolerate such unsavory behavior—both online and off.

Still, the apparently misunderstood or misinterpreted behaviors that resulted in such social media firestorms were very different matters than the California droughtshaming phenomenon. The excessive consumption of water during a historic drought affected the entire community. Communities with low water supplies suffered water thefts from wealthy ranch owners such as Tom Selleck, whose actions only resulted in small fines, if any punishment at all (Bardach 2014).

CONSUMPTION DISPARITIES AND CALIFORNIANS' RESPONSE

Apple Valley homeowners, where the median household income was under $50,000 per year, and residents' average water bills were under $70/month were hit with sharp fines for not conserving enough (Lovett 2014). Meanwhile, the state's 373 residential water mega-users (the state's very wealthy and powerful) whose lowest consumer used 781,000 gallons during the worst year of the drought (the average Californian used 72 percent less than that), 343 mega-users consumed more than 1.1 million gallons that same year, with 100 of those using an average 4.2 million gallons (Corey and Williams 2016). A single mega-user was fined for excessive water use: Ms. Alberts (Lovett 2014).

The continued lack of water distribution justice drew class resentment from working and lower income Californians; in lower income areas like Compton, "lawns are

brown and backyard pools are few or empty" but in affluent communities like Cowan Heights, "water is a luxury worth paying for as homeowners shower their lush lawns and top off pools and koi ponds" (Nagourney and Healy 2015:4). Jeffrey Kightlinger, the general manager of the Metropolitan Water District of Southern California, that serves 19 million water customers noted: "We are finding it [higher water prices] works with 90 percent of the public. You still have certain wealthy communities that won't bother. And the price penalty doesn't impact them. It sends a bad message" (Nagourney and Healy 2015).

California residents began forming vigilante groups and turned to droughtshaming on YouTube, Twitter, and newly developed apps angrily asserting, "It's 'ethically problematic' that one household is using nearly 12 million gallons of water [Wet Prince of Bel Air], while thousands of low-income California residents are living without tap water (Williams and Mieszowski 2015:6). Other concerned citizens like Steve Lopez formed a "'drought posse' to hunt down the 'water-hogging champ of California' using satellite maps, neighborhood gutter flows and even a camera-equipped drone'" (Walker 2015:2). These citizens acted to fill a community norm enforcement role that the justice system could not (Ellickson 1994).

Nonetheless, claims that droughtshaming is nothing more than cyberbullying-fueled class warfare, do not hold up. Cyberbullying perpetrators typically target individual members of vulnerable and stigmatized groups, and society generally disavows such attacks, while Internet justice activists, such as droughtshamers, target individuals among the relatively more privileged and powerful and the community generally continue to see their acts as justified (Fish 2017).

Clearly, citizens had decided to seek their own sanctions: “Citizens have taken matters into their own hands in order to shame mega-users” (Williams and Mieszowski 2015:6). Notwithstanding, the response of individuals in the community to informally sanction deviant behavior can be especially strong when those sanctioning feel personally that the deviance has direct or indirect adverse consequences for themselves. In surveys and experimental designs (Brauer and Chekroun 2005; Chekroun 2008; Chekroun and Nugier 2011), when individuals suffer personally from the deviance perpetrated by others, they are more deeply and personally integrated into the situation and are therefore more intensely motivated to sanction the deviant. Underlying this motive is a psychological need to protect one’s social identity and image as part of a given group or community. For example, when Californians blog to complain about their fellow residents washing their cars in an historic drought or name a neighbor who let a sprinkler run for hours at a time, they are increasingly motivated to sanction such deviance in a drought because it threatens their own social identity and their image.

In the case of the drought, much of this is due to California’s history as a leader in pro-environmental and progressive pro-conservation legislation (London et al. 2013; Merchant 1998; Sze et al. 2009). Californians are, as a state, proud of their trailblazing in the interests of progress (Merchant 1998). Hence, Californians who engage in deviant behavior during a historic drought threaten not only potable water supplies but also the identities of Californians as Californians. Such deviant behavior thus motivates fellow community members to act to punish and curb that shameful behavior (Chekroun and Nugier 2011; Evans et al. 2015; Rivera et al. 2016).

SHAMING AS A WEAPON AGAINST THE DROUGHT

Once viewed as a harmful force, shame, the *verb*, rather than shame the *feeling*, has been found to have a number of positive social effects (Cibich, Woodyatt, and Wenzel 2016; Leach and Cidam 2015). In public goods experiments investigating the overuse of common resources, shaming resulted not only in the punishment of the non- or under-contributor, but the mere existence of shaming as a social sanction for non- or under-contributors motivated all participants to cooperate and significantly reduce their use of the common resource (Jacquet et al. 2011). The threat of shaming with its accompanying damage to one's reputation motivated strong cooperation among the participants. Panagopoulos' (2010) three experiments of shaming's effects as social pressure found that shame actually motivated citizens' cooperation with the social norms required to preserve a public good. Pride as a motivator for behaving pro-socially, that is for conforming for the sake of the community's norms and values, only motivated those individuals who already possessed a high propensity towards behaving pro-socially, in preservation of public goods, whereas the fear of being shamed motivated both high and low propensity individuals (Panagopoulos 2010). This is consistent with Bear, Manning, and Izard (2003), Gerber, Green, and Larimer (2008), and Smith et al. (2002) all demonstrating that shame avoidance stimulates pro-social behavior considerably.

But individuals are not merely very afraid of being shamed in front of their friends, family, and neighbors. Shaming in modern America, particularly when it comes to motivating pro-social behavior in the interests of the common good, is effective because people fear the ubiquitous power of digital social networks like Twitter (Rost et al. 2016). Mistakenly, many disregard the role and power of shaming in contemporary

society because Americans are no longer a nation of very tight, homogeneous communities comprised of people of the same race, religion, ethnicity, and values as in decades past (Fish 2017). Through the mid-twentieth century, the reality that "everyone knew everyone else" meant that shame and the potential to be shamed publicly served to largely maintain normative conformity, hence, diversity and twenty-first century civic dynamics has supposedly done away with shame's power (Kahan 1997). However, this is not the case.

The almost infinite reach of the Internet, and social media in particular, ensures that few secrets concerning public behavior, particularly of the rich and powerful, can be kept for long. The vast, real-time, 24-hour dissemination of information across every aspect and level of American society warns that if those close to an individual do not learn of their "sins" on social media, someone in that social network probably will, and of course, so will loved ones, eventually (Fish 2017; Kahan 1997). The prospect of disgrace, potentially gone viral, "continues to furnish a strong incentive" (Fish 2017:442).

While America no longer makes use of the public square to label and shame, shaming in American society is experiencing a resurgence due to its seeming attractiveness (Fessler 2004; Goldman 2015). The advent of social media has vastly increased the speed and ease with which an individual can be shamed in the interests of the public good and has provided the politically disenfranchised with a means of targeting seemingly untouchable elites (Fish 2017; Rost et al. 2016). Droughtshaming has apparently targeted the very group of individuals on whom financial sanctions and the lack of formal sanctions have had no effect: those individuals of large private property, high income, and high status (Gray 2015; Hackman 2015).

The wealthy and powerful, celebrities and companies are deeply concerned with their public reputations far beyond the degree to which ordinary individuals are (Van Vugt and Hardy 2009). Public goods games and experiments indicate that the desire and need to maintain favorable estimations of one's reputation is a very strong motivator of pro-social behavior aimed at sustaining the public good (Milinski et al. 2002). Essentially, Van Vugt and Hardy (2009) found that the decision to engage in pro-social environmental behavior for the sake of a public good, in this instance water conservation, is made more to preserve and protect a favorable reputation—both online and off—rather than for the sake of the utility of helping. It is a self-presentation strategy of conspicuous cooperation, with altruism not even part of the calculation (Van Vugt and Hardy 2009). If they may incur damage to their reputation by failing to conserve water because they have been outed publicly for not doing so, then it is in their reputation's best interests to act quickly to correct their non-conformance. This very behavior has been observed by high-profile Californians Barbra Streisand, Oprah Winfrey, and a few of the mega-users; all individuals shamed in social media for their failure to conserve water during the drought and for very publicly consuming water at levels exponentially beyond what even California's average wealthy homeowners consumed (Bardach 2014; Borg et al. 2013).

When someone is shamed, by definition, it is public so that others in the community know of the transgression against them, and acknowledge the broken social bonds, and the shamed understands they have endangered their social status and reputation (Ausubel 1955). Shaming is a negative moral judgment that regulates social behavior, it exposes the individual to the community's disapproval and sends the message that this particular individual has not 'measured up' like the rest of us (Thio 2001).

Brehm and Brehm (1981) and Kluger and De Nisi (1996) found that shame as a negative feedback actually consistently improves individuals' behavior. Marcus, Neuman, and MacKuen (2000) demonstrated that changes in politically-linked behavior, such as failing to conserve during a drought, can be stimulated by the anxious negativity that shaming provides.

Other states are generated within individuals who have been subjected to public shaming. In a study of Southern California residents in Los Angeles and its suburbs that combined ethnographic field work, focus groups, and a survey, Fessler (2004) found that being shamed in public was responsible for eliciting a "Focus on concern with others' actual or imagined negative evaluations," as well as feelings of guilt, embarrassment, regret, and "feeling small" (p. 218).

He found that shame was very much rank-related and that it motivated cooperation and conformity. These findings are important because the sample in this study was comprised solely of educated, middle, and upper middle class participants: individuals from some of the very groups revealed by media accounts to be the targets of droughtshaming, and to be less likely to engage in water conservation behaviors (Corey 2016). These are the very groups of individuals especially concerned with maintaining a positive social media profile and the existence of social media means that the "'entire community'" to which you belong, in a norms enforcement sense, is everyone you know and will never know (Goldman 2014; Van Vugt and Hardy 2009). Therefore, a negative water deviant's entire community via online social media platforms actually contains the very cultural conditions that existed during the American colonial period in which

"public shaming thrived" (Goldman 2014:3). Truly, everyone may be watching the water waster.

Not surprisingly, individuals tend to behave more pro-socially when they believe they are being seen by others or believe there is potential for others to witness their behavior (Bateson, Nettles, and Roberts 2006; Jacquet et al. 2011). Americans now live in a world where smartphone cameras and social media activities are everywhere. Everyone is under scrutiny from friends and foes alike, and so individuals are inclined to control their behavior more when they know this is the case (Bateson et al. 2006; Rand and Nowak 2013). Hogg (2010) attributes this to the fact that individuals need social acceptance and approval, and desire to avoid social disapproval and social sanctions that typically accompany perceived negative social deviance.

Further, because privacy reduces conformity, if the individual presumes that their behavior is under the scrutiny by those around them, and hence they lack a degree of privacy, then they are more likely to conform to norms (Deutsch and Gerard 1955; Hogg 2010). In addition, while these norms serve to, in great measure, guide public behavior in situations with social others, these norms may be needed when humans perceivably fail in their other social obligations. In modern America, no one wants a negative Tweet concerning their selfish or anti-social behavior, attitudes, or beliefs to end up the subject of a nationwide or worldwide viral firestorm, but even minimal exposure to social media and the Internet have demonstrated how such a thing can easily happen.

From this review of the literature, there is a great deal of research on the entitlement behavior and ideologically-motivated conspicuous consumption of wealthier and more prosperous segments of the community. There is also extensive research on this

specific population's excessive concern for reputation preservation and the desire to avoid public embarrassment.

However, there is very little scholarship addressing the phenomenon of droughtshaming itself via Twitter, other than that which explores social media shaming in general and its powerful and sometimes adverse and long-term effects on reputation and status. There is extensive literature on the role of social control in ensuring community members engage in preferred behaviors, particularly in the realm of pro-environmental behavior and activities such as recycling and water conservation. What remains unknown is the possible effectiveness of social media shaming during the recent crisis in California when many wealthy residents were observed engaging in excessive and very conspicuous consumption behaviors. Questions persist as to whether the droughtshaming that caused a media firestorm in 2015 had any effect whatsoever on the ways in which less environmentally-conscientious Californians decided to manage their domestic water consumption.

CHAPTER III

THEORETICAL FRAMEWORK AND HYPOTHESES

This chapter presents the theories and concepts that were integrated to create a new theoretical framework to account for the underlying the study research questions and hypotheses: distributive justice theory, privilege and entitlement theory, and the low-cost hypothesis.

PERTINENT THEORIES FROM LITERATURE

Distributive Justice Theory

According to Jasso (1980, 2002), *distributive justice* describes the just, fair, and equitable distribution of resources, goods, or opportunities in a society. Individuals routinely make their own evaluations regarding the fairness of distributed resources. Individuals, or *perceivers*, each possess a set of personal beliefs, motivations, and characteristics that influence their judgment as to whether or not a state of unjust distribution exists, as they perceive it. This set of influences is known collectively as perceiver factors.

Aside from these perceptions of what is a fair or unfair distribution, *situational factors*, the current social or economic circumstances, exist that interact or combine with perceiver factors to produce the individual's overall evaluation concerning whether a distribution is fair or an unfair. If an individual perceives that the distribution is just and fair to them then emotional satisfaction and contentment typically results. If the perception is of an unjust distribution then emotional reactions such as anger, frustration, and distress result (Hegtvedt 2006). These negative emotional reactions occur because

individuals perceive themselves to be under-rewarded while they perceive that others may be over-rewarded (Adams 1965). When negative emotions result, individuals are motivated to take action to redress the state of injustice and to relieve the distress and the tensions of injustice. According to Adams (1965), individuals will naturally pursue the least costly means—both real and psychological—by which to correct this injustice.

This theory has three propositions. First, individuals continually evaluate their circumstances and world to determine if a state of justice or injustice exists. Second, if they determine from their evaluation that a state of justice exists around them or with regard to some specific domain then they will experience ease, happiness, and contentment. If they determine a state of injustice exists for themselves, or even for others, they will experience tension, distress, and uncomfortable emotions. Third, to eradicate these tensions and uncomfortable emotions, they will take action via the least costly means—psychologically and otherwise—to attempt to rectify the state of injustice.

Privilege and Entitlement Theory

Privilege and entitlement theory was developed by Pease (2009) based on some of the work of Nozik (1974). It examines the intertwined nature of select groups that enjoy social advantages and power, and how they use their position at the top of the social, political, and economic hierarchies to maintain their status and to marginalize other groups, or in the very least to social exclude them and ignore their needs.

Privilege is a collection of systematically endowed advantages that persons expect because of membership in one or more dominant groups possessing power over institutions and resources, power far exceeding that of the average person (Bailey 1998). The privileged in American society enjoy all those things to which Americans strive, in

abundance: authority and power in all levels of politics; the best homes; the finest quality healthcare and food; financial wealth and property; and high social status (Sidanius and Pratto 2001).

Entitlement (Rosenblum and Travis 2006) is the sense that one has the innate right to respect, reward, protection, and the things one desires. When a privileged person does not get that which they think they are entitled, they frequently respond with shock and anger, as this is a state to which they are unaccustomed (Lyn 1992; Pease 2009). Those who endorse entitlement tend to be members of the upper class who are the direct beneficiaries and administrators of the capitalistic economy and hence are wealthier (Nozik 1974).

Privilege and entitlement exist in a perpetual cycle in which the privileged, who already have superior power, opportunities, and resources, feel entitled to whatever and whomever they choose, and upon receiving the objects of their desire, their state of privilege is reinforced. Further, such individuals ardently believe they have earned or deserved their privilege, and therefore that they have a right to feel and be entitled. Even when privilege is endowed through inherited socioeconomic status, and by no efforts of the privileged individual, such individuals still assert that they have earned their privilege (Pease 2009).

Privilege and entitlement theory have a number of propositions. First, because the privileged are regarded as normal and their behavior normative, due to their dominant status, the behaviors and lifestyle of non-dominant groups are therefore aberrant and deviant. The privileged use their power at the top of the various social hierarchies to socialize all classes into the ideas that the privileged are normal while criminalizing the

behaviors of those on the lower rungs of society. A review of the works of Donald Black (*The Behavior of Law*, *The Structure of Right and Wrong*, etc.) and Jeffrey Reiman (*The Rich Get Richer and the Poor Go to Prison*) examine in great detail how the deviance and crimes of the wealthy and powerful routinely go unpunished or under-punished while the relatively far minor crimes, in severity and scope, of the less advantaged have led to the American prison industrial complex, from which the privileged have directly benefited financially.

Second, because the privileged believe that their privilege and entitlements are naturalized and deserved (a product of a person being born more intelligent, more talented, or to a superior family/bloodline), they also believe that disadvantage and the lack of entitlements are naturalized and therefore deserved. According to Sidanius and Pratto (2001), members of the dominant group formulate and then perpetuate the notion that they are superior to the rest of society because of their power and status, nurturing the firm belief that they are on the top rung of the social ladder because they are simply better than everyone else. Many privileged group members adhere to Calvinist and Puritanical religious ideologies of *predestination* and *predeterminism* (Weber 2005).

These doctrines hold that God blesses those He loves with earthly power and prosperity as a sign of His salvation, while cursing those with powerlessness and poverty whom He deems unworthy of salvation and eternal life. Therefore, the rich are the beloved of God, while the poor are despised by Him (Williams and Alexander 1994). Hence, if God damns people by making them poor, then the rich are released from offering kindness and Christian charity (Weber 2005). Strangely, even the non-religious and non-Protestant American elite have been shown to espouse such views through their

choices of political parties and patronage as well as through their chosen charitable contributions that conspicuously skip over the poor and disadvantaged in favor of art museums and cultural institutions (Piff 2014).

Third, the privileged will actively defend their privilege and entitlements through the power structures over which they maintain hegemony. Through special interests' lobbying, major financial contributions to political parties, political action committees (PACs), coercion of tax and public policy and legislation, bribery, and many other actions, a once democratic nation has become a truly plutocratic one in which the wealthy indeed rule in all but name. Because of the relative lack of government regulation over corporate and business activities, and with the existing regulations continuing to shrink under gerrymandered, Republican-led Congresses, record inequality continues to rise, and the safety nets and protections for the poor, as well as the size of the middle class continues to decline (Reich 2013).

Fourth, the privileged will use strategies to manage criticism concerning their privilege with the aim of maintaining that privilege and the resources that accompanies it (Dominelli 2002). From lower status groups in society there may be claims that structures or policies are unfair or unjust to the non-privileged. Since the dominant groups endeavor to maintain their power and control over society as well as maintain their resources and privilege, they will enact policies, laws, or institutions that they feel will placate the masses while still preserving as much of their own comforts as possible. They will only appear to be engaging in democratic practices or creating beneficial policies for the rest of society, when in reality, their own preservation is the ultimate goal.

Low-Cost Hypothesis

The low-cost hypothesis is an environmental behavior theory developed by Diekmann and Preisendorfer (2003). According to this theory, people are more likely to act on their own pro-environmental beliefs and values and sanction those who violate pro-environmental norms when the personal costs of doing so are low. Those costs include financial, psychological, social, political, and time factors.

One critical component of converting personal pro-environmental values into real action is that those proposed behaviors need to be easy-to-perform actions that require minimal effort. According to Diekmann and Preisendorfer (2003), Americans, in particular, like to have an opportunity to demonstrate their "environmental correctness" so long as it is in low-cost domains (e.g., low-effort, time-expedient activities; p. 445). Despite such a desire, even if someone has very strong pro-environmental beliefs and values, should the costs of enforcing pro-environmental norms prove high, the sanctioning of deviant behavior is unlikely to occur (Opp 2001).

The low-cost hypothesis has the following propositions: 1) the lower the pressure of the costs in a situation, the easier it is for individuals to convert those pro-environmental attitudes into real action; and, 2) the higher the costs of enforcing the norms, the more unlikely it is that an individual will choose to sanction the negative deviant environmental behavior.

THEORETICAL FRAMEWORK

The theories of distributive justice, privilege and entitlement, and the low-cost hypothesis were integrated to develop a novel theoretical framework to explain the

emergence of droughtshaming of harmful negative water deviance, unfair drought burdens imposed, and the impact of droughtshaming on community water consumption.

Research Question 1: Droughtshaming: Wealthy or Non-Wealthy

The propositions of distributive justice theory and low-cost hypothesis combined with privilege and entitlement theory served to predict the existence of droughtshaming in California. From distributive justice theory, if individuals determined that a state of injustice existed for themselves, or even for others, they would have felt uncomfortable emotions and would have acted to eradicate them by taken low-cost actions to restore justice. From the low-cost hypothesis, the lower the costs to individuals of acting to enforce environmental norms, the more likely individuals are to enforce those norms.

From privilege and entitlement theory, the wealthy and privileged would have believed that their privilege and entitlements were naturalized and deserved and that they had the right to maintain their comforts and resources, including a beautifully landscaped property with a putting green and golf course. Further, per the theory, such individuals act to maintain their privilege and comforts. Hence, it should have been no surprise to learn that wealthy Californians would use as much water as they want, even in a drought.

During the recent drought, many Californians indicated their perceptions of grievous injustice with respect to the distribution of the state's water resources. These perceptions could be attributed to a number of perceiver factors. First, concerning beliefs, the existence of many blogs, vlogs, droughtshaming websites and apps, as well as legacy and web-based news reports revealed that a great many citizens held beliefs that not all Californians were "doing their fair share" in cutting their water consumption (ABC News 2016; Bardach 2014; Corey and Williams 2016; Gray 2015). News reports of celebrities,

politicians, entertainment industry and tech executives flouting water restrictions and calls for reducing consumption were the very types of conspicuous behavior that prompted citizen pleas for stricter government measures (Gray 2015; Price 2016).

Second, with regard to motives, many Californians were motivated by pro-environmental and pro-community values and a concern for less fortunate, low income residents who experienced dry wells yet could not secure the funds needed to dig a new well (Lin and Martinez 2016; Marcum 2014). Third, in terms of characteristics, news reports suggested that many of the individuals who perceived a state of injustice concerning the distribution and consumption of the state's water were not from the upper echelons of socioeconomic status (Corey 2016; Gray 2015; Hackman 2015; Nagourney and Healy 2015). Social media and stories on sites such as the Huffington Post and Reveal.org strongly seemed to indicate that many Californians were frustrated and angry that the wealthy, powerful, and famous were once again held to a different standard and allowed to break the rules in open view of the powerless masses (Domhoff 2014; Gardner 2014; Hackman 2015; Rogers 2016).

Because of the drought, a number of situational factors existed to combine with peoples' perceptions to produce perceptions of unfair water distribution. First, the worst drought in more than 1,000 years had a stranglehold on the state adversely affecting the entire state's population, the critical Central Valley's agricultural industry, the rare Redwoods, and thousands of species of wild and plant life (Campbell 2016; McCreedy and Van Riper 2014). Circumstances were so grave that for the first time in the state's history mandatory statewide water restrictions were issued by executive order of the governor on top of existing water restrictions in each water district (Boxall 2015; Lin and

Martinez 2016). Third, the identification of 1,000 mega-users consuming water in quantities exponentially greater than the average Californian without any authorities acting to curb consumption or hike rates angered Californians who were cutting water drastically for the community's sake (Corey 2016; Gray 2015; Walker 2014; Weathers 2014). Drawing more ire was the release of information that better than 90 percent of these vast quantities of water were applied to watering lawns, filling swimming pools and spas, and keeping a private golf green lush (Walker 2015; Weathers 2014).

The existence of perceived and situational factors resulting in evaluations that a state of injustice existed with regard to the distribution of the state's water resources, emotional reactions of Californians were indeed identified from the news sources and major news blogs of the time. All these factors indicate that, according to the distributive justice theory framework, individuals with these perceptions of injustice would experience accompanying emotions of distress, anger, and frustration and tension (Hegtvedt 2006). As previously noted, news reports and interviews with community members and residents demonstrated at least some level of adverse emotional responses to the injustice of the water distribution and disproportionately high consumption rates of the wealthy and privileged of the state. Furthermore, according to the justice theory, people need to take action to alleviate the tension and distressing emotions tied to this injustice and to redress the injustice (Adams 1965). However, a critical aspect of redressing the imbalance of this injustice is the "need to maximize positive outcomes with the least expenditure of real costs" (Hegtvedt 2006: 51).

The background on the California drought (see "Literature Review") indicated that seeking redress from the authorities in terms of rate hikes, fines, or fees was

ineffective. The state had announced in news stories that vast overconsumption was not illegal even during the historic drought and that nothing could be done (Williams and Mieszowski 2015). When media reports shaming celebrity negative drought deviants like Oprah Winfrey began bearing positive results, ordinary Californians realized they too had media access: social media access. A very inexpensive means—financially, psychologically, politically, and otherwise—through which they could attempt to rectify the injustice concerning water consumption.

There are very low costs to individuals using free social media to compel water conservation among those best able to reduce their water consumption. Social media platforms such as Twitter provide the relative safety of the Internet with a degree of anonymity, and the ability to shame without face-to-face contact. The platform's power to influence and shame the powerful and privileged results in the potential for real-world adverse threats and damage to reputation from droughtshaming.

Research Question 2: Unfair Drought Burden

The combination of distributive justice theory and privilege and entitlement theory were instrumental in predicting the possible state of an unfair drought burden against certain groups in California. According to distributive justice theory, if individuals determined that there was a state of injustice for themselves, and even for others, they would have experienced distressing, uncomfortable emotions that they would have acted to eradicate by acting to attempt to restore a state of justice. The action or actions taken would have been those that entailed the lowest costs—be they costs financial, emotional, psychological, political, social, etc.

From the theory of privilege and entitlement, there were a number of key propositions. First, because the privileged believed that their privilege and entitlements were naturalized and deserved, then the disadvantage and lack of wealth of the non-privileged was also naturalized and deserved. Further, the privileged would have used their power and authority over societal structures and institutions to both defend their privilege and entitlements and manage criticism concerning their privilege, both with the aim of maintaining their privilege and resources.

Applying these propositions to Research Question 2 concerning unfair drought burden, this study expected to find that the wealthy and privileged would have used their power and authority to ensure that even in a historic drought that any water restriction guidelines would have been developed to their advantage so as to maintain as much of their resources and privilege as possible. Media reports with interviews of wealthy and influential Californians showed that such people were angry and outraged that they were expected to cut their water consumption and that it was unfair and unjust that they were being targeted simply because they were rich; clearly they felt the circumstances of asking them to sacrifice were fundamentally unjust and some likened it to gun ownership rights (Gray 2015; Kuznia 2015; Weathers 2014) indicated While the greatest residential water consumers resided in the wealthiest communities, with at least 54 percent and as much as 80 percent of residential water consumption attributable to maintaining landscaping, lawns, and non-essential water-consuming structures (e.g., pools, spas, saunas, putting greens, water sculptures and ponds, etc.; Mini et al. 2014), the biggest water consumers should have been subjected to the highest percentage of water conservation standards.

That is, once the state issued the first-ever statewide mandatory water restrictions to cut all residential consumption by 25 percent, the residential consumers who consumed too much water, in other words anything in excess of 55 gallons of water per person per day (R-GPCD), the State Water Board's determination of a reasonable daily water consumption amount, those customers would have been assigned the highest water conservation standard (a value of 8 percent or greater than 8 percent ranging from 12 to 36 percent based on previous consumption). While high-consuming water districts would have been assigned high conservation standards, the low-consuming water districts and their customers should have been assigned a commensurately low standard.

Furthermore, individual customers who consumed low amounts of water, even if they resided in high-consuming water districts should have been assigned either a low conservation standard, or if they were consuming water close to or below the 55-gallon daily per person standard, which was the amount of water a person needs for daily survival and good health and hygiene, without regard to outside water consumption, they should have been excluded from having to conserve any water.

Nonetheless, understanding that the wealthy and privileged to act to maintain their resources and privilege, we would have expected that the low water consumers would have been expected to reduce their consumption further, even though they would have done little or no outdoor water consumption, but that the wealthy would have been allowed to consume water far in excess of the daily requirement, as they deemed this justice for them to have the right to maintain their property's beautiful appearance, and hence be allowed to use water for non-essential outdoor watering purposes. This meant that they would be able to maintain their luxuries like private putting greens, water

features, and landscaping while the non-wealthy would be struggling with having to cut their uses of water still further. This would of course place an undue and unfair burden on the very populations who consume the least water and whose income substantially limits that consumption.

Research Question 3: Droughtshaming as a Significant Factor in Reducing Consumption

From the propositions already expounded upon earlier in this chapter for privilege and entitlement theory and the low-cost hypothesis one would have expected that in an effort to safeguard their reputation, wealthy and privileged Californians, who were the biggest water consumers, and even less wealthy and affluent residents, would have taken actions to protect and when necessary, as seen in Barbra Streisand's case, to restore their reputations by conforming to drought norms and cutting their consumption.

This is because with droughtshaming as a very low-cost strategy for exposing negative water deviants, reputations would have been under threat. As privileged individuals, they would have engaged in strategies to maintain their status and privilege, and according to the low-cost hypothesis, they would have taken the easiest and lowest-cost tactics to do so, which would have simply been finding ways to cut their consumption and doing them. By reducing their consumption just enough, they would have appeased the many calls for the wealthy to share in the community's sacrifice rather than behaving as if they are exempt from the crisis.

HYPOTHESES

Therefore, to explore and to attempt to answer the emerging questions concerning the California drought and those groups of individuals in society who might be expected to be targeted by droughtshaming, this study explored three main research questions. For

Research Question 1, “Which communities were droughtshamed more—those with highly privileged residents in wealthy or affluent communities, the comfortable middle class, or the working and lower classes?” two hypotheses were tested:

> Hypothesis 1a: The distribution of droughtshaming tweets is not equally distributed across all communities. Significantly more than 20 percent of droughtshaming tweets will occur in zip codes with a DCI score of 20.0 or less.
>
> Hypothesis 1b: The probability that a droughtshaming tweet has shamed a location in a highly privileged zip code during the period of January 1 through August 31, 2015, is significantly greater than 20 percent.

The combination of distributive justice theory, privilege and entitlement theory and low-cost hypothesis predicted these hypotheses.

For Research Question 2: “Was there an inequality of drought burden during the summer of 2015?” That is, were highly privileged and comfortable communities allowed to consumer water far in excess of the state-established value required for personal consumption while less privileged and highly disadvantaged communities’ residents were expected to reduce their water consumption still further? This research question was addressed through one hypothesis:

> Hypothesis 2: The probability that a zip code with a DCI score that occurs in the range of 60.01–100 (that is, with a DCI score per zip from Quantile four or five) falls into a water supplier district with a conservation standard greater than 8 percent is greater than 40 percent.

The combination of distributive justice theory and privilege and entitlement theory predicted this hypothesis.

For Research Question 3: How significant a factor was droughtshaming in getting Californians to reduce their water consumption during the summer of 2015, the worst period of the drought? This research question was addressed through one hypothesis:

> Hypothesis 3: Droughtshaming (occurring from January through August 2015) was a significant factor in the reduction in cumulative water consumption from June through August 2015 in California water districts.

The integration of privilege and entitlement theory and the low-cost hypothesis predicted this hypothesis.

CHAPTER IV

DATA AND METHODS

The purpose of this chapter is to present the study design, the data sources and sample, and the variables and measurements used in the study. Later in the chapter, the limitations of the data, the methods and procedures for analyzing the data, and a brief Bayesian statistical analyses tutorial are also discussed.

RESEARCH DESIGN

To test the study hypotheses, a mixed methods concurrent nested design was utilized with the quantitative portion dominating the study and the qualitative portion nested within the quantitative. This type of overall design was appropriate given the qualitative data—specifically tweets with text and photo/video content—collected and then coded as nominal or categorical variables (Creswell 2013). These variables were then included in statistical models with interval/ratio variables for testing the hypotheses.

DATA SOURCES

Several sources of data were examined in this study. The first set of data was sourced from the microblogging platform Twitter. This free service allows a user to update their "blog" a virtually unlimited number of times per day, compared to other blogging platforms, via a 140-characters or less text-based "tweet" (McCormick et al. 2017). Tweets enable users to communicate their thoughts, feelings, emotions, beliefs, personal values and worldviews to others on the Twitter platform (Lomborg and Bechmann 2014). Users can also communicate with one another by using private messages, by re-tweeting the tweets of others, or by typing the @reply command to flag

content for or concerning specific users. The platform permits users to express "following" relationships in which the tweets of a user will be displayed in real time in the sequential feed of their "followers." Users, also often called "tweeters," may communicate in the larger digital community's conversation channels by including a # (hashtag) identifier in their tweet text.

Twitter's platform allows tweeters to converse with other tweeters and maintain their personal Twitter microblogs as means by which they can present themselves to the world (McCormick et al. 2017). Because Twitter is essentially "an imagined audience of networked individuals, some of whom bear reciprocal ties to the users themselves and some of whom do not" each tweet's content and message is "projected" outward to all these networked individuals (Marwick and Boyd 2010:115). Platforms like Facebook are structured so that all its users are reciprocally linked to each other and mutually share information with each other (McCormick et al. 2017). However, Twitter enables tweeters to essentially broadcast their content to the wider "Twitterverse." Thus, Twitter enables users to engage with a blended audience via public and private exchanges meaning that tweeters need to carefully consider *what* they tweet and *how* they tweet it (Marwick and Boyd 2010).

The current study involved the collection, coding, and analysis of a specific sample of tweets namely those that contained "#droughtshaming" in their corpus and occurred between January 1, 2015, and August 31, 2015, regardless of the other text contained in the tweet. While there were other sources of social media droughtshaming activity available, such as Instagram photos and videos, YouTube videos, individuals

droughtshaming others on their Facebook pages, the decision was made to gather Twitter data.

Twitter was chosen as the source of droughtshaming data for a number of reasons: 1) the relative openness in terms of access of the data, compared to platforms like Facebook where accessing data is limited significantly by users' personal preferences and Facebook algorithms; 2) data are easy to work through and quickly code, due to text that is brief and targeted with a 140-character limit, and the optional web link, photograph, or video clip; 3) hashtags themselves can be a search criterion making the "#droughtshaming" data easy to find; and 4) the speed and ease at which data can be collected using the free Twitter API.

The Twitter Application Programming Interface, or API, is simply the computer application requiring those requesting Twitter data to first register before being allowed to request and receive Twitter data. Anyone who wishes to collect and analyze tweets must complete an online form citing the reasons for collecting the data. Twitter's API will then assign what is called a consumer access key, that identifies the chosen search criteria and intended purposing of the data, and an access token, that identifies that it is indeed a real person requesting the information once the requester uses Python or whatever their chosen program or language to access and receive the requested Twitter data. The consumer access key and the access token together serve as a digital "key" to fit a unique digital "lock" to access Twitter data. Those two pieces of information are only valid for the original requester and their request.

Any use of Twitter data and the requisite use of their API necessitate a brief discussion of the "600-lb elephant in the room": the representativeness of the sample

returned by Twitter's streaming API. Because of the computer mainframe and application resources required to satisfy a request for historical data, Twitter's streaming API only shares a 1 percent sample of all the actual tweets ever tweeted against a researcher's actual search criteria (Twitter 2017). The algorithms, sampling methodology, and sampling design used to select the 1 percent free sample are confidential and proprietary; no one knows how the sample is comprised, hence resulting in assertions that such samples are often biased and therefore not representative (Morstatter, Pfeffer, and Liu 2014). Furthermore, when requesting data through the Twitter API, the requester has no idea how large the actual dataset would be if one received all of the data that met their search criteria, and thus cannot know the composition and characteristics of the data they should have received. Clearly, this is a problem for social researchers and remains a considerable limitation for working with Twitter data.

Despite such claims and the fact that Twitter maintains a relatively open policy of social media data access, the only alternative to the 1 percent sample limitation — the use of the paid Twitter Firehose service or the Sifter alternative that both return all of the tweets provided you can afford to pay for all of them (i.e., ~$20/day)[4]—requires such expansive financial resources that very few non-profit researchers can afford to avail themselves of the service.

In addition to the cost entailed with securing the actual tweet data, requesters of tweets must possess the servers, computer network, availability, personnel, and free disk space to receive and manage the volume of requested tweets (Morstatter et al. 2014).

[4] Services such as Firehose or Sifter (http://sifter.texifter.com/) charge approximately $20 per day for collecting historical Tweet data. So to receive all the Tweets for the search term, "#droughtshaming" for my study, considering January 1-August 31, 2015, my cost would have been $20 X 243 days = $4860. Beyond that, the computer network, security, database, and storage resources would have been entirely unavailable to me as a graduate student.

Nonetheless, Morstatter et al. (2013) found in their investigation of Twitter's API versus the Twitter Firehose service that despite the fact that in terms of statistical properties the API performs worse than randomly sampled data, particularly at low coverage, and with few search terms that are very general in their description of a phenomenon or event, collection of tweets data by using hashtags and/or extending the search over an extended time period (e.g., weeks to months) minimizes bias between the API and Firehose. Essentially, combining specific hashtags (e.g., "#droughtshaming) with an extended search window (e.g., January through August 2015) results in a 1 percent sample through the API that is a sound approximation of the 1 percent sample if randomly obtained from the Firehose (Lomborg and Bechmann 2014; Morstatter et al. 2013:407). Therefore, this study employed the Twitter API and Python code to collect the necessary tweets for this study.

Before discussing the Twitter data, it is necessary to note the characteristics of the United States' population of Twitter users, as it is impossible, given privacy laws and individual Twitter users' selected preferences to determine the characteristics of the study's sample (Mislove et al. 2011). Based on survey data gathered by the Pew Research Center on Internet and (Greenwood et al. 2016), one in four of all adults use Twitter, and about one-quarter of both men and women using the platform. However, female Twitter users are more active sending out on average more tweets than males (Krogstad 2015). By age, adults aged 18–29 comprise the greatest percentage of Twitter users at 36 percent, followed by 30–49 year olds at 23 percent, adults aged 50–64 at 21 percent, and adults 65 years and older at 10 percent (Greenwood et al. 2016). Therefore, 58 percent of Twitter users were between 18 and 49 years old.

Men and women use Twitter at an equal percentage (21 percent), 52 percent of users had at least some college education, with more than one in four being college graduates. By annual income, the breakdown is as follows: 30 percent greater than $75,000; 26 percent $50,000–$74,999; 18 percent less than $30,000; and, 16 percent $30,000–$49,999. The racial or ethnic distribution[5] of Twitter users in the United States is more equal compared to the other four major social media platforms with 27 percent as African American or Black, 25 percent of users identifying as Latino, 21 percent as White (Krogstad 2015). Of Twitter users, 42 percent are daily visitors, 24 percent are weekly visitors and 33 percent use Twitter less frequently. From the onset of the California drought in 2011 through its zenith in 2015, the percent of adults who used at least one social media site grew from 50 percent to 65 percent—a substantial increase (Greenwood et al. 2016).

Hence, without knowing the racial/ethnic, social class, gender, or educational characteristics of the 1 percent sample that would be returned by the API, Python version 2.7 and its library Beautiful Soup 4 were used to write the script (see Appendix B) to request all the tweets occurring from January 1, 2015, through August 31, 2015, that contained the hashtag "#droughtshaming." Python was an excellent choice for the task given that it is an object-oriented, relatively easy to learn and use programming language (Python 2017). The Beautiful Soup 4 library was specifically created to "grab" many different kinds of data from sources such as social media platforms and web pages (Python 2017).

The Twitter API online "Application Management" form was then completed and submitted (see Appendix C) in order to obtain the necessary consumer key and access

[5] Blacks and Whites include only non-Hispanics. Hispanics are of any race.

token to enable the Python script to obtain the desired tweet data. Once the script was run through the API, it was necessary to wait a total of approximately 20 minutes for all the results to be returned, as the API essentially "meters" the number of tweets returned in a 15-minute period. The first 900 tweets were returned, and 15 minutes later the remaining 266 tweets being returned. In all, 1,166 tweets were returned in a single json file format (see Appendix B). Before proceeding, it is important to put this number into context with respect to data management and processing requirements decisions employed during the balance of this dissertation research.

While the original design of this study planned to use a database management tool, given the relatively small number of tweets obtained with the required hashtag of "#droughtshaming," (n = 1166 tweets) creating or using an SQL or PostGre SQL database would have been inappropriate. Such databases are intended for storing a much larger sized dataset containing much more complex data (Chmara 2002). Therefore, the tweets collected were converted to a comma-separated values (CSV) file. The open source software json-csv located at https://json-csv.com was used to quickly convert tweets file into a csv file. There are a number of advantages to converting a json file to a csv file. First, the .csv format translates data into a tabular structure (numbers and text) in plain text making examination, coding, and cleaning of the raw data much easier and faster. Second, because .csv files are typically opened in Excel, variables can be readily created or calculated using Excel's various functions and formulas. Third, .csv files and Excel worksheet files (.xml) are quite easily uploaded into and analyzed with a wide variety of other programs or languages.

Once in the .csv file format, each tweet from the dataset was carefully examined to determine if it met all three of the criteria for inclusion, and thus would be eligible for later analysis. The inclusion criteria for each tweets were as follows: 1) the tweet had to contain the hashtag "#droughtshaming"; 2) the tweet must have had either a photograph or a video clip that depicted some behavior or phenomenon indicative suggestive of negative water deviance; and, 3) the content of the tweet and its image or video clip (or the longitude and latitude returned by the Twitter API) had to provide enough information to be tied to a physical address.

Every tweet's photo or video clip was examined for evidence of negative water deviance. While the text of many tweets explicitly stated the kind of deviance depicted, other tweets required visual inspection of photos and videos as well as careful listening to the comments of videographers because tweeters frequently used their text to provide location details or to express a variety of emotions and sentiments concerning the deviance itself. Each image or clip was reviewed for indications of excessive water consumption (e.g., very green lawn with lots of foliage and flowers on a block of browning lawns), wasteful water consumption (e.g., poorly maintained sprinklers that run for hours.), non-essential (e.g., spraying water on structures, buildings, pavement, sidewalks, etc.), or unnecessary water consumption (e.g., washing car mirrors or windshields whose views are not obstructed, running sprinklers 24-hours after rainfall).

Given that a photo or video clip actually depicted one of these types of negative water deviance, it was then examined to ensure that it could be connected to a physical address. The tweet text itself had to provide sufficient information to determine the *precise* location of the droughtshamed property or in the very least, the block of the

property (e.g., the 1600 block of Elston Avenue in Chicago). If only a block or intersection was provided in the text of the tweet to indicate the location, then the audio commentary or visual cues from the accompanying video clip or the visual content from the attached photo had to indicate enough information to single out the location. For example, if the "1600 block of Elston Avenue in Chicago" was cited in the tweet then the image or video clip would have had to have shown the front of the actual organization with its name clearly visible. By doing a Google Maps search with the organization name and the block, street and city information, a physical street address was obtained. Any droughtshamed locations for which a specific street address could not be confirmed were excluded from the final dataset. A small number of droughtshaming tweets of non-California locations in Nevada, Arizona, and Canada were excluded from the dataset as well. As a further means of verifying the addresses for all acceptable tweets and to facilitate mapping and geolocation options, the U.S. Census Bureau's Geocoder API for the 2010 Census[6] was accessed.

This application operates per the process of geocoding, which is taking a street address and returning an actual or calculated latitude/longitude coordinate. The Census Bureau's Geocoding Services engine required a physical address be entered either as a single record or for a database or list of address values known as a batch record submission. In order to use the batch option, each address had to be broken out into its separate components (e.g., street number and name, city, zip code, state) each of which had to be entered into their separate respective fields in a delimited form (e.g., .csv file), preceded by a unique identifying number determined by myself.

[6]https://geocoding.geo.census.gov/geocoder/locations/addressbatch;jsessionid=KXJ9goqkOn1DC_VBJiGPm8LECEvLFujeWCIRDhfDBKuHokfBueqo!-1204835676?form

Fortunately, no use of programming languages or scripts was required, with the API returning a new .csv file that added the longitude and latitude, county, census tract, and census block to the original input tweet dataset. When there is an issue with an address, such as multiple addresses for a location or where portions for an address may be inconsistent or inaccurate, the Geocoder returns multiple addresses enabling the researcher to check each of these options with resources such as United States Postal Service, local Chamber of Commerce online records, or other online databases that contain valid sources of address, address type, and occupant information. Thus using these aforementioned methods, the physical addresses for legitimate droughtshaming tweets indicating evidence of negative water deviance were confirmed.

After confirming valid addresses for all of the true droughtshaming tweets, each tweet's attached photo or video clip was also scrutinized for the type of location being droughtshamed: 1) residence; 2) apartment building; 3) business or commercial location, including water supplier districts and water companies; 4) government or taxpayer-funded location such as a city hall, public park or public school; and, 5) a miscellaneous "other" category that included types like private institutions or schools.

Upon identifying the January 1 through August 31 of 2015 tweets with the "#droughtshaming" hashtag, that contained one or more instances of negative water deviance depicted in a photograph or video clip, and for which a confirmed physical address was obtained, a final tweets dataset was created (n = 151) for analysis.

This study also used the 2015 Distressed Community Index (DCI) dataset for the state of California developed by the EIG. This bipartisan public policy organization specifically investigates questions of geographic inequality in the U.S., specifically in the

areas of economic inequality and lack of investment in underprivileged communities and the adverse consequences suffered by such communities. As a measure, the DCI score is constructed as a percentile. Key to understanding any percentile is that, in and of itself, a percentile indicates the relative standing of a given value within a statistical dataset (De Vellis 2017). This means that a person's, a country's, or in this case a community's, standing compared to all other scores is what is important-- not in comparison to the mean, but compared to everyone else. This is exactly what a percentile provides.

These percentile values of the DCI then naturally range from zero to one-hundred and values are calculated for a population occupying a zip code—not a town or city—and hence, a community is defined as being at the zip code level of analysis. Seven different indicators are used to calculate the DCI score for any given community.1) percentage of the population lacking a high school degree; 2) housing vacancy rate; 3) percent of individuals ages 16 years and older not currently working; 4) the percent of the population living in poverty; 5) the median income rate, which is calculated as the ratio of a zip code's median income to that of the state in which it is found as found in the American Community Survey's 2014 5-year estimates; 6) the percent change in the number of jobs from 2010 to 2013 (negative numbers indicate jobs lost); and, 7) the percent change in the number of business establishments (negative numbers indicate loss of businesses; EIG 2016).

The DCI data span the years of 2010–2014 substantially overlapping most of the drought period, recalling its start in late 2011 and its end in 2016 (Campbell 2016). Therefore, the DCI provides an accurate basis from which to understand the underlying social and economic dynamics during one of California's worst environmental

catastrophes. Further, the DCI conceptualizes community and analyzes data right down to the zip code level (EIG 2016).

By quantifying such factors as educational attainment, unemployment among adults, housing vacancy rates, the poverty rate, median income ratios, the percentage of jobs gained or lost, and the percentage of businesses gained or lost, the DCI provides a clearer picture of two Americas that vary greatly with geography. In one America community, residents enjoy all the benefits that accompany economic prosperity: greater emotional and physical well-being, better healthcare outcomes and longer lifespans, thriving commerce offering social mobility through socioeconomic opportunity, and flourishing school systems with successful students (EIG 2017). Such communities are privileged or highly privileged.

In another America, the circumstances are somewhat bleaker depending on the community. Many communities' residents suffer extreme distress and disadvantage in economic wastelands lacking gainful employment opportunities, with students struggling in underfunded and ineffective school systems, and residents are saddled by poor well-being and adverse health outcomes. These communities are highly distressed. Still other communities are not so destitute yet they still experience substandard school systems, a dearth of sufficient high-quality employment at a living wage, a lack of meaningful economic investment, and a need for civic, economic, and political intervention. These communities may range from working class areas to less comfortable lower middle class areas. Frequently, geography, or location, matters.

Significantly, unlike measures of inequality such as Lorenz Curves and the Gini Coefficient (Hale 2009), the DCI situates socioeconomic advantage or extreme distress

and disadvantage into real geographic spaces across cities, towns, counties, and states right down to the neighborhood level as zip codes. This design enables researchers and policymakers to see areas that are strictly segregated, and thus may be either homogeneously advantaged or entirely disadvantaged, versus those areas that are diverse and consist of a range of incomes and levels of advantage or disadvantage. The DCI is therefore extremely useful and practical in attempting to understand the droughtshaming phenomenon as it relates to the privileged communities in which individuals have been criticized for the water consumption behaviors. It is also likewise useful for understanding, a) the lack of privilege and prosperity in many of the communities that have not had their residents targeted for criticism, or b) which lower income and hence lower water consumers may be saddled with further cutting their consumption by restriction measures aimed at the much wealthier water consumers who share their water supplier district.

The third and final dataset used in the study was the 2014–2017 Water Supplier Report dataset as collected and curated by the California State Water Resources Control Board, a division of the California Environmental Protection Agency. These data were collected by order of the governor's January 17, 2014, Drought State of Emergency declaration mandating all the state's water suppliers' report the consumption and reduction data of their entire customer base within their respective districts (i.e., service areas).

VARIABLES AND MEASUREMENTS

Table 1 provides a general description of the variables and their measurements. The main outcome, or dependent variable, for this dissertation's analyses for Hypotheses

1a, 1b, and 2 was tweets—number of tweets—and specifically, the proportion of tweets as they are distributed in various kinds of California communities. Recall that for the research group, EIG, which developed the DCI used herein, and for this dissertation, a community is defined as a population of people living in the same zip code. For testing Hypothesis 3, the percent of cumulative water consumption per water district was the outcome variable for June-August 2015.

Table 1. Description of Variables and Measurements Used in the Analysis

Variables	Measurements
Dependent variables	
tweets	number of tweets; proportion of tweets
Cumulative Water Consumption	percent reduction in residential gallons per capita daily (June-August 2015)
Independent variables	
DCI score	0-100
California zip codes	five-digit United States Postal Service
zip code Quintiles	1 = DCI score 0-20.0; 2 = DCI score 20.01–40; 3 = DCI score 40.01–60.0; 4 = DCI score 60.01–80.0; 5 = DCI score 80.01–100.
water supplier districts	California water suppliers (n =402)
conservation standard	8 percent standard; Greater than 8 percent
standard number of tweets per water district	number of tweets
water district population	

The input factors, or independent variables, for this dissertation's analyses for Hypothesis 1a, 1b, and 2 were DCI score, California zip codes, water supplier districts, and conservation standard. According to the DCI, communities, measured in terms of zip code, rather than towns or cities, can be scored into one of five socioeconomic quintiles, with their DCI score representing the dominant socioeconomic status and general prosperity and degree of privilege of the residents comprising the community.

Those levels were Quintile one: DCI score 0–20.0 described wealthy, or highly privileged, communities; Quintile two: DCI score 20.01–40.0 described upper middle

class communities; Quintile three: DCI score 40.01–60.0 described middle class communities; Quintile four: DCI score 60.01–80.0 described working class communities; and, Quintile five: DCI score 80.01–100.0 described low income, or highly disadvantaged, communities. Thus, the five quintiles were comprised of zip codes organized according to their respective DCI scores. The state of California had a total of 2,589 zip codes and 402 water supplier districts responsible for administering the water supply for the towns and cities under its jurisdiction. These districts were also legally responsible for instituting any governor- or legislation-mandated water restrictions or water-consumption-related initiatives.

For testing Hypothesis 3, only the number of tweets per water district and the population for each water district, as a control for population, was included in the Bayesian Regression. By January 1, 2015, all California's water districts were under enforced water restrictions and this no districts would differ in this regard.

LIMITATIONS OF THE DATA

With use of social media data still quite young in the social sciences, there are a number of constraints that must be acknowledged prior to undertaking any serious scholarship. Computer-mediated, or more generally, digitally-mediated communication injects an unknown degree of distortion to the process of research, in part because such systems are not created to enable the representative observations scientists need (Jürgens and Jungherr 2016). Not surprisingly, possible new and as of yet unknown biases and limitations may contaminate social media data itself (Jürgens and Jungherr 2016).

Perhaps more significantly, sampling and representativity issues pose challenges for social media researchers. Sampling depends on a well-defined population with a

known distribution, something that rarely exists on the Internet. However, social media platforms such as Twitter and Facebook are designed as "monolithic, centralized architectures of digital services" that, in theory, create a well-defined population permitting statistically valid samples (Jürgens and Jungherr 2016).

Nonetheless, social media platforms are actually corporations with motivation to guard their business model, and consequently will restrict data access. Instead, researchers are compelled to access a limited amount of data via a desired platform's API, which is designed to restrict its users to only the data accessible through the interface. Since this study collected historical Twitter data, the search API used in the data collection process was limited by Twitter's rate limits. Thus, for an individual investigator, the maximum number of tweets anyone can receive is the last 3,200 tweets, regardless of the specified search query criteria (Twitter 2017).

Another data limitation is that while Twitter is enabled with tweeter location data, only if this preference is voluntarily selected by a user in their account preferences, and that location is not altered (either to prevent others from determining it or as a joke by typing in humorous text for the location such as "location: parts unknown," or "Hell," or "Paradise," etc.) and the user is not being deceptive can it perhaps be trusted (Mahmud, Nichols, and Drews 2012).

Nonetheless, one mitigating factor is that some users enable GPS tracking of their location, which enables longitude and latitude to be permanently recorded for any tweets from a location, particularly when a photo or video is taken on a spot and then posted to the user's Twitter feed (Twitter 2017). This proved useful to this study. Several cases in which the user's location was not specifically stated to be in California because the user's

account had “Paradise” manually typed in for their location (i.e., their town of residence), while two other users had symbols and fictional locations from literature entered as their town of residence. While the intent was to have only Californians’ tweets studied, there was no way to ensure with absolute certainty that this would be the result.

Of course, the same human deception motives that may emerge in other types of data collection and social data can just as easily impact social media research. People can lie or misrepresent themselves, their opinions, attitudes, beliefs, appearance, location, etc. However, in the case of social media, many people, potentially family, friends, neighbors, employers, coworkers, etc. can see one’s posted content and perhaps very possibly ascertain the poster’s identity (Baym 2013). For example, it is possible that some of the droughtshamed address information entered could have been incorrectly but unintentionally reported, or purposely provided for locations that were not actually engaging in selfish or harmful negative water deviance behaviors. However, what would be the motivation to take time out during one’s own schedule to pull over, exit one’s car, attract attention by photographing or digitally recording negative water deviance, perhaps risking being confronted or even arrested by police as a trespasser or prowler, and then posting the content with the address of someone else whose property they were nowhere near. There really is no motivation.

It is of course possible that someone droughtshamed another person, such as a neighbor, due to another completely unrelated conflict or disagreement, simply to embarrass the person. However, in reviewing every single droughtshaming tweet with photographs or video clips, not a single instance of unsubstantiated droughtshaming could be identified.

METHODS AND PROCEDURES OF DATA ANALYSIS

The relatively small size of the sample, the fact that computational social science modeling paradigms were being followed, and the nature of the hypotheses were all reasons for choosing Bayesian methods rather than traditional frequentist ones. This study made use of generative models by incorporating information, newly gained from earlier tasks of the design, into later calculations and models—a typical Bayesian approach—and hence this choice of Bayesian techniques negates the concerns typical of frequentist models requiring sufficient sample sizes to satisfy validity concerns vis à vis statistical significance and p-values (Gelman et al. 2003; Gill 2015; Marden 2000). A brief tutorial on Bayesian analysis can be found in Appendix D.

Research Question 1, "Which communities were droughtshamed more— those with highly privileged residents in wealthy or affluent communities, the comfortable middle class, or the working and lower classes?" was investigated through testing two hypotheses. Hypothesis 1a, significantly more than 20% of droughtshaming tweets will occur in zip codes with a DCI score of 20 or less, was tested using a confidence interval of a proportion test calculated by using the sample of droughtshaming tweets collected to determine the distribution of the true population tweets. To clarify, the EIG's DCI treats each California zip code as its own community, and this study has collected a sample of tweets, each of which has shamed locations in specific zip codes. Further, the DCI categorizes all California zip codes, and thereby all California communities, into one of five DCI Quintiles, each of which exists at some specific value on the DCI continuum ranging from the greatest wealth and privilege for those with a DCI score 0-20.0 all the

way up to the greatest distress and socioeconomic disadvantage for those with a DCI score somewhere 80.01–100.

By calculating the confidence interval of a proportion, this investigator was able to determine the proportion of all of California's droughtshaming tweets among the DCI quintiles, and hence to estimate the distribution of the true California droughtshaming tweets population with 95 percent confidence. Because the DCI metric is a percentile then one would expect that 20 percent of a random sample of droughtshaming tweets to occur in zip codes with a DCI score of 20.0 or less, that is, for one in five tweets to droughtshame a location in a highly privileged zip code.

The formula for a confidence interval (see Figure 1) was calculated separately for each of the DCI quintiles, with an n = 158, which was the total number of tweets, and for n = 101 zip codes, the total number of zip codes in which droughtshaming tweets occurred in the study. The confidence interval set at 95 percent, and hence z = 1.96 for each of the quintile's proportion calculations.

$$\hat{\rho} \pm z^* \sqrt{\frac{\hat{\rho}(1-\hat{\rho})}{n}}$$

Figure 1. Formula for a Confidence Interval of a Proportion

The second hypothesis tested for Research Question 1, Hypothesis 1b, the probability that a droughtshaming tweet has shamed a location in a highly privileged zip code during the period of January 1 through August 31, 2015, is significantly greater than 20 percent, was tested by calculating Bayes' theorem. By design, Bayesian analysis makes use of real data and known information to calculate the most accurate outcome, therefore known values were included in the theorem. If droughtshaming tweets were

randomly sprinkled across the state of California, then Bayes' Theorem should have yielded a result of approximately 20 percent, due to the fact that the DCI for a zip code is measured as a percentile with possible values ranging from 0 through 100. The outcome of Bayes' Theorem, the *posterior*, would therefore provide the actual probability against the expected probability of 20 percent. The P(A) was defined as the probability that a zip code is highly advantaged, with all zip codes possessing a DCI score ranging from 0–20.0 being identified as highly privileged or advantaged zip codes per the EIG's own evaluation. The value for P(A), the *prior*, was the number of highly privileged California zip codes according to the DCI (n= 354) divided by the total number of California zip codes (n = 2589). P(B), the *new evidence from the Twitter data*, was defined as the probability that a droughtshaming tweet has occurred in a zip code. The value for P(B) was the number of California zip codes with droughtshamed locations (n = 95) divided by the total number of California zip codes (n = 2589). P(B|A), the *conditional probability*, was defined as the following: Given that a zip code is a highly privileged community, what is the probability that a droughtshaming tweet has occurred. The value for P(B|A) was the number of highly advantaged zip codes of droughtshamed locations (n = 35 unique, non-duplicated zip codes) divided by the number of highly privileged California zip codes (n = 354).

$$P(A \mid B) = \frac{P(B \mid A)\, P(A)}{P(B)},$$

Figure 2. Bayes' Theorem

Next, Research Question 2, "Was there an inequality of drought burden during the summer of 2015?" was investigated by using Bayes' Theorem to test Hypothesis 2, The probability that a zip code with a DCI score that occurs in the range of 60.01-100 (that is, with a DCI score per zip from Quantile four or five) falls into a water supplier district with a conservation standard greater than 8 percent is greater than 40 percent. Referring again to the theorem, P(A), the prior, was defined as the probability of a water supplier district having a water conservation standard greater than 8 percent.

The value for P(A) was the number of water supplier districts with a conservation standard greater than 8 percent (n = 387) divided by the total number of California water districts (n = 402). P(B), the *new evidence from the Twitter data*, was defined as the probability that a water supplier district has a zip code in it with a DCI score somewhere in the range of 60.01–100. The value for P(B) was the number of water supplier districts that have any zip codes in them having a DCI score ranging from 60.01–100 (n = 12) divided by the total number of water supplier districts (n = 402). P(B|A), the *conditional probability*, was defined as given that a water supplier district has a water conservation standard greater than 8 percent, what is the probability that a water supplier district contains at least one zip code that falls in a DCI score range of 60.01–100. The value for P(B|A) was the number of water supplier districts with water conservation standards greater than eight percent that have at least 1 zip code with a DCI score ranging from 60.01–100 (n = 11) divided by the total number of water supplier districts with conservation standards greater than 8 percent (n = 377).

Finally, to investigate the third research question concerning how significant droughtshaming was in getting Californians to reduce their water consumption during the

summer of 2015 (June, July, and August of 2015), the worst period of the drought, Hypothesis 3 was tested using a series of Bayesian Linear regression models. Four models were specified using Bayes' theorem: 1) a null model; 2) a model with the likelihood of the number of tweets predicting these consumption data; 3) a model with the likelihood of the water district population predicting these consumption data; and 4) the likelihood of the number of tweets as well as water district population predicting these consumption data.

CHAPTER V

RESULTS

Chapter four reports the findings of this study. This chapter provides descriptives of the droughtshaming data collected and discusses the overall composition of locations shamed. This chapter also discusses the results of the confidence interval of a proportion test for Hypothesis 1a as well as the tests of Bayes' Theorem for Hypotheses 1b and 2 and the Bayesian linear regression results.

NEGATIVE WATER DEVIANCE DROUGHTSHAMED

A variety of instances of negative water deviance was identified in the images from the tweets. Examples of negative water deviance consisted of the following types and modes: 1) Water wasting behavior from sprinklers: dysfunctional/in need of repair demonstrating the 'geyser phenomenon,' with disproportionately high amounts of water being sprayed or emitted; spraying water on residential, government, commercial structures such as buildings, on pavement, sidewalk, streets, alleys, walls; 2) observable evidence of conspicuous, excessive water consumption: comparatively (to one's neighbors) very green lawns, present landscaping requiring lots of water (i.e., foliage that is not drought-tolerant or drought-resistant); 3) non-essential water consumption: car-washing cars; pavement, walk or structure washing, watering or pressure-washing anything; 4) unnecessary watering: watering any foliage on a property within 24-hours post-rain; and, 5) luxury water consumption: swimming pools, spas, golf courses, water parks.

DISTRIBUTION OF TWEETS IN ZIP CODES

Table 2 shows the proportions for the five different groups of zip codes' DCI scores, the quintiles, thus allowing the investigator to see how the true population of droughtshaming tweets, for all of the state of California, were distributed across wealthy, privileged communities and disadvantaged communities alike. Recall that had the droughtshaming tweets been randomly distributed among the five groups of DCI zip codes, then one would expect 20 percent of the droughtshaming tweets to shame locations in each of the respective quintiles' zip codes so that one-fifth of the droughtshaming tweets occur in highly privileged zip codes, one-fifth in upper middle class zip codes, one-fifth in middle class zip codes, one-fifth in working class zip codes, and one-fifth in low income zip codes. (See Appendix E for California map of tweets.)

Table 2. Ninety-five Percent Confidence Interval of a Proportion of Droughtshaming Tweets Occurring in California Zip Codes by DCI Quintile. Twitter, January-August, 2015 (N = 158)

DCI Quintile	Quintile Zip Codes	Sample Null	Proportion Observed	Interval LL	UL
One	39	20	.39	.29	.48
Two	24	20	.24	.15	.32
Three	17	20	.17	.09	.24
Four	17	20	.17	.09	.24
Five	4	20	.04	.01	.07

However, as is indicated in Figure 3, it is clear that zip codes of wealthier communities account for a much higher proportion of droughtshaming activity than was expected. According to these findings one can be 95 percent confident that the true population proportion of droughtshaming tweets that occurred in the wealthiest zip codes was between 29 and 48 percent; between 15 and 32 percent for affluent zip codes;

between 9 and 24 percent for middle class zip codes; between 9 and 24 percent for somewhat disadvantaged or working class zip codes; and, finally between .16 and 7 percent for highly disadvantaged or low income zip codes. From these data it is apparent that the tweets disproportionately targeted locations in highly advantaged and in affluent communities, while shaming locations in middle and working class communities far less frequently, and hardly focusing on locations in highly disadvantaged communities at all.

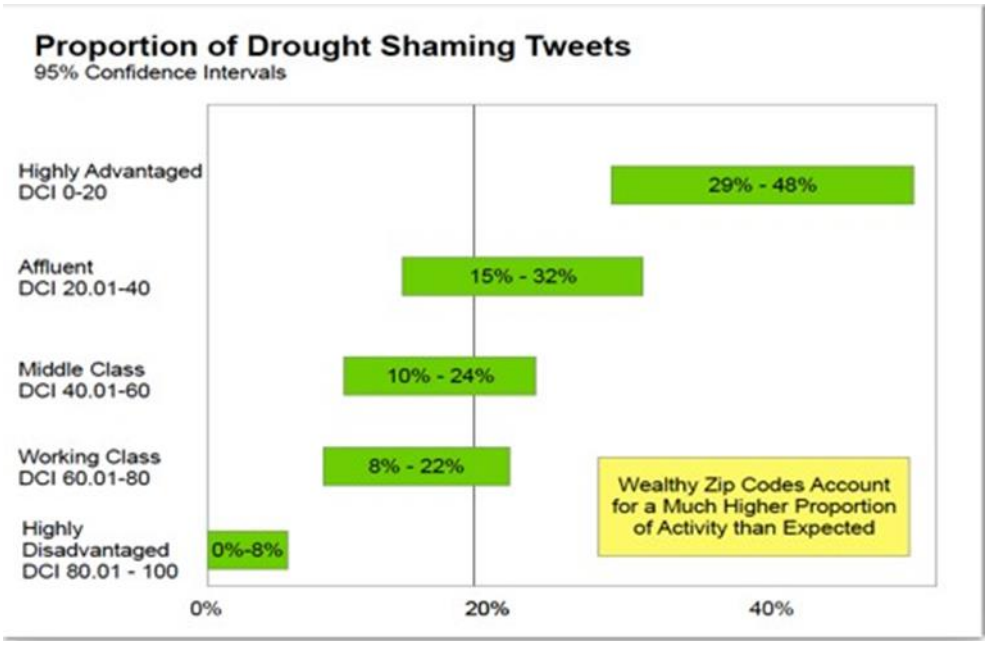

Figure 3. Confidence Interval Showing True Proportion of Population of Droughtshaming Tweets Across California Communities

Quintile One Droughtshaming Tweets

The droughtshaming tweets in this category targeted locations in the most privileged and prosperous kinds of communities in the state of California. A total of 71 tweets were spread across 39 zip codes located in 20 water supplier districts across the state. The zip codes had a mean population of 32,475 residents, a mean DCI score of 10.22 and a mean of 1.82 tweets per zip code. The tweets droughtshaming these locations, some of the most privileged and wealthy California communities, shamed 31

single-family residences, 21 business or commercial locations, and 16 government or taxpayer-funded locations. Of the commercial locations, four of these were apartment building complexes, but one location was actually a water supplier—the California Water Services Company's Dominguez location. Eleven of the government locations were public parks. The cities with the greatest number of droughtshaming tweets were Los Angeles with 35 tweets, Santa Monica with seven tweets, and San Francisco and San Diego with three tweets each. The remaining cities and towns each had a single tweet.

Quintile Two Droughtshaming Tweets

The droughtshaming tweets in this category targeted locations in very affluent and prosperous kinds of communities in the state of California, but not as wealthy and privileged as the Quintile one communities. A total of 31 tweets were spread across 24 zip codes located in 18 water supplier districts statewide. The zip codes had a mean population of 32,006 residents, a mean DCI score of 28.18 and a mean of 1.29 tweets per zip code. The tweets droughtshaming these affluent communities shamed six single-family residences, 19 business or commercial locations, and six government or taxpayer-funded locations. Of the commercial locations, four of these were apartment building complexes, but once again, as in the case of Quintile one, a water supplier was droughtshamed—the San Jose Water Company.

Another commercial location targeted was a Toyota dealership (see Figure 4) in Daly City droughtshamed July 27, 2015. Five of the government locations were public parks, including Golden Gate Park in San Francisco, and the California Department of Transportation—CALTrans. The cities with the greatest number of droughtshaming tweets were San Francisco with five tweets, Los Angeles with 4, East Los Angeles with

three, and Beverly Hills, Santa Monica, San Diego, and San Jose each with two tweets. The remaining cities and towns each had a single tweet.

Figure 4. Droughtshaming a Daly City Toyota dealership. Observe evidence of excessive water consumption: *daily* watering of *very* green grass, waste of water on the sidewalk

Quintile Three Droughtshaming Tweets

The droughtshaming tweets in this category targeted locations in comfortable middle class kinds of communities not as privileged as the Quintile one and two communities. A total of 17 tweets were spread across 15 zip codes located in 11 water supplier districts. These zip codes had a mean population of 40,819 residents, a mean DCI score of 51.19 and a mean of 1.13 tweets per zip code. The tweets droughtshaming these affluent communities shamed five single-family residences, 10 business or commercial locations, and two government or taxpayer-funded locations.

One of the five residences was droughtshamed on June 22, 2015 (see Figure 5), and was located in a Los Angeles neighborhood. Of the commercial locations, three of these were apartment building complexes. Both of the government locations were public

parks. The cities with the greatest number of droughtshaming tweets were East Los Angeles with four and Los Angeles with three. The remaining cities and towns each had a single tweet.

Figure 5. Droughtshaming a Los Angeles residence. Observe evidence of excessive water consumption: watering of *very* green grass, waste of water on the sidewalk and gutter

Quintile Four Droughtshaming Tweets

The droughtshaming tweets in this category targeted locations in somewhat disadvantaged working class communities compared to the prosperous kinds of communities in Quintiles one through three. A total of 27 tweets were spread across 16 zip codes located in 10 water supplier districts. The zip codes had a mean population of 47,005 residents, a mean DCI score of 70.09 and a mean of 1.59 tweets per zip code.

The tweets droughtshaming these communities shamed four single-family residences, 17 commercial locations, and six government or taxpayer-funded locations. Of the commercial locations, two were apartment building complexes and 1 was a golf

course. Surprisingly, however, a third water company, for the second time serving customers in the San Jose area (Quintile two had shamed the City of San Jose Water Company), the California Water Services Company's San Jose location was shamed. This company served residential customers in the outlying areas of San Jose area. The government locations shamed included three public parks, two public schools, and the Burbank, California City Hall. The cities with the greatest number of droughtshaming tweets were East Los Angeles with 12 tweets, San Francisco and San Jose with three tweets each, and San Diego and Sacramento with two tweets each. All the remaining cities and towns each had a single tweet.

Quintile Five Droughtshaming Tweets

The droughtshaming tweets in this category targeted locations were among the most disadvantaged low-income communities in California compared to the communities from Quintiles one through four. Five tweets were spread across four zip codes located in two water supplier districts. The zip codes had a mean population of 36,313 residents, a mean DCI score of 86.68 and a mean of 1.25 tweets per zip code. The tweets droughtshaming these communities shamed two single-family residences, three commercial locations, and no government locations. Of the business locations, one was a golf course. There were only two cities with droughtshaming tweets in Quintile five: Los Angeles with four tweets and San Francisco with a single tweet.

DROUGHTSHAMED DEVIANCE

The tweets Californians used to droughtshame residents, government facilities, and business or commercial locations identified a wide variety of instances of negative water deviance. While this dissertation was not designed to conduct a sentiment or

content analysis of the corpus of tweet texts, inspecting the word cloud (see Figure 6) comprised from all of the 158 tweets provides strong clues to the general tone and themes. From the start, the centrally placed “droughtshaming” in the largest-sized font and darkest shade of green signaled that this word, as one would have expected from a dataset of tweets resulting from a “#droughtshaming” API search, appeared more often than any other word. The next largest word and closest in shade color was the word “water,” which again should have been no surprise given that droughtshaming by its very purpose targets the uses of water.

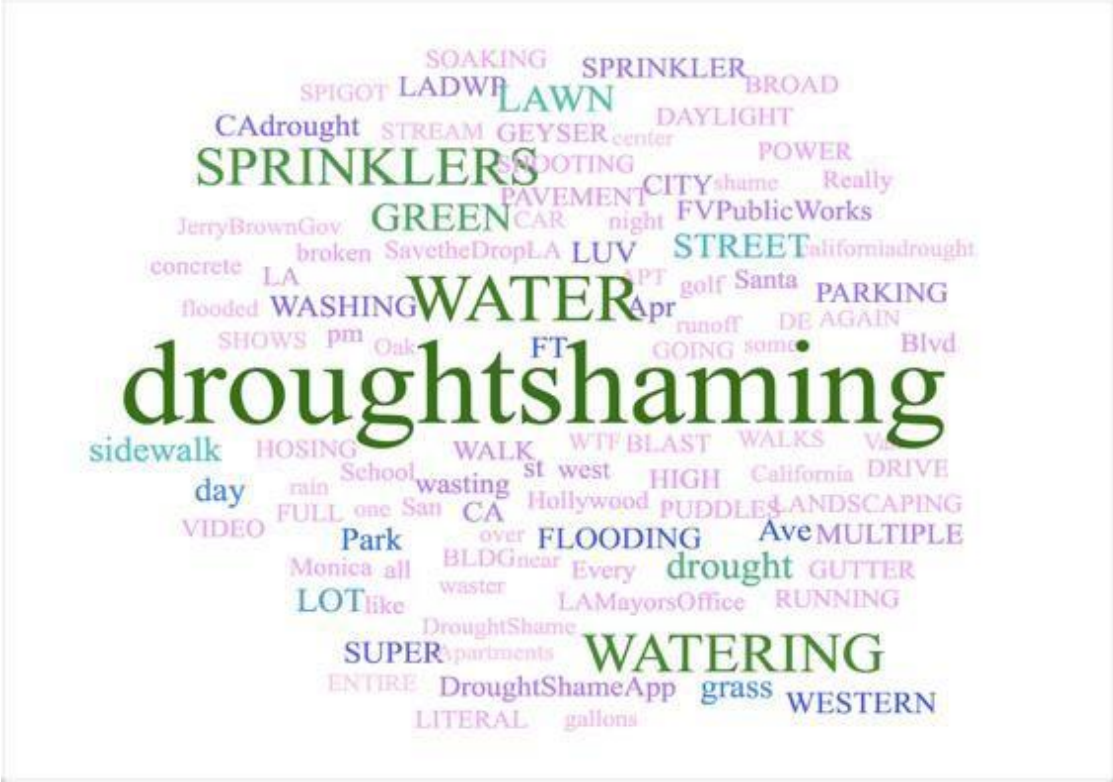

Figure 6. Word Cloud of Tweets’ texts (N = 158) showing words with highest frequencies in largest-sized green font

Next, the words “sprinkler” and “watering” were slightly smaller and paler green indicating their less frequent appearance across the corpus of tweets. Scattered around those more frequent words were negative water deviance behaviors (e.g., “flooding,”

"broken," "wasting," "geyser," "shooting," "runoff," "blasting," etc.) and their accompanying locations or areas of that deviance (e.g., "lawn," "pavement," "car," "walks," "street," "gutter," "drive," "spigot," and "landscaping," etc.). Even more interesting are some of the texts indicating emotions such as anger, frustration, and outrage based on review of the original context and the accompanying punctuation: "really," "shame," "wtf," "really," and "again."

Examples of the acts of negative water deviance consisted of the following types and modes: 1) Water wasting behavior from sprinklers: dysfunctional/in need of repair demonstrating the "geyser phenomenon," with disproportionately high amounts of water being sprayed or emitted; spraying water on residential, government, commercial structures such as buildings, on pavement, sidewalk, streets, alleys, walls; 2) observable evidence of conspicuous, excessive water consumption: comparatively (to one's neighbors) very green lawns, present landscaping requiring lots of water (i.e., foliage that is not drought-tolerant or drought-resistant); 3) non-essential water consumption: washing cars, pavement or structure watering or pressure-washing anything; 4) unnecessary watering: watering any foliage on a property within 24-hours post-rain; and, 5) luxury water consumption: swimming pools, spas, golf courses, and water parks.

For the Bayes' Theorem test of Hypothesis 1b, (see Table 3) the posterior probability of P(A|B) = .37, or 37 percent demonstrated that rather than the expected probability of 20 percent, which would have indicated that the droughtshaming tweets were distributed equally across the five DCI quintiles, and thus all five different communities, that there was a 37 percent probability that a droughtshaming tweet would have shamed a location in a wealthy, privileged zip code. This finding supported the

proportion test finding for Hypothesis 1a with both results strongly indicating links between droughtshaming and locations in prosperous communities.

Table 3. Bayes' Theorem Probability of a Droughtshaming Tweet Occurring in Highly Privileged California Zip Code. Twitter, January-August, 2015 (N = 158)

Variable	Measure	Relevant Zip Codes	Total Zip Codes	Probability
P(A)	Prior Belief	354	2589	.14
P(B)	New Evidence	95	2589	.04
P(B|A)	Conditional Probability	35	354	.10
P(A|B)	Posterior Belief	2589	---	.37

For the Bayes' theorem test of Hypothesis 2 (see Table 4), the posterior probability of P(A|B) = .92 demonstrated that there was a 92 percent probability that any zip code with a DCI score in the range of 60.01–100 would be located in a water district with a water conservation standard greater than 8 percent. (Note: conservation standards for the state in 2015 were either 8 percent or greater than 8 percent, nothing less than 8 percent.)

What this result actually means is that when lower DCI communities were situated in California water districts with a conservation standard greater than eight percent then those working class and lower income citizens are subjected to the much higher mandatory water restrictions to which the other more privileged and wealthier communities are held based on their income-driven higher water consumption (California State Water Resources Control Board 2015). This is because conservation standards for water districts were assigned based on the consumption rates of the entire base of

customers for May 1, 2015, and had to be reduced to an amount below their May 1, 2014, level (California State Water Resources Control Board 2015). While the average Californian living in a Quintile four or five zip code consumed 55-65 R-GPCD (55–65 residential gallons per capita daily) which was entirely consistent with the Water Board's recommendation for personal daily indoor consumption, they were required to cut their water consumption by the percentage indicated by the district's mandate (California State Water Resources Control Board 2015).

Table 4. Bayes' Theorem Probability of a Disadvantaged or Highly Disadvantaged California Zip Code Being Located in a Conservation Standard Greater Than Eight Percent. EIG Distressed Community Index, 2015

Variable	Measure	Relevant Districts	Total Districts	Probability
P(A)	Prior Belief	377	402	.94
P(B)	New Evidence	12	402	.03
P(B|A)	Conditional Probability	11	377	.03
P(A|B)	Posterior Belief	402	---	.92

Hence, for any Quintile four or five community located in a district with a standard greater than eight percent, each individual residing would have had to cut their personal daily consumption by at least sixteen percent and as much as thirty-six percent. This created an unfair situation in which the lowest water consumers were essentially "punished" by the water deviance committed by wealthier others.

The Bayesian linear regression model run for Hypothesis 3 resulted in four possible models. Before considering the data, each of the four models had an equal probability of accounting for the June through August 2015 cumulative percent reduction

in water consumption: .25 or 25 percent. The null model with the Bayes' factor of 1.00 was essentially for baseline comparison purposes. For the next model, the Bayes' factor of 2.17 indicated that the evidence was more than two to one in favor of the number of tweets per district resulting in these water consumption data. For the model with only district population as a predictor, the Bayes' factor of .63 indicates that the evidence is .63 to 1 in favor of the null model, and hence that the population in a water district is not a strong predictor of how much water a district's population conserved over the period of June through August 2015. The final model with both the number of tweets and the population that existed in each water district had a Bayes' factor of 1.03 indicating that there was no evidence either way. The second model of only the tweets was the strongest model with the highest probability of resulting in the water data. Further, a review of the effects, the Bayes' factor for inclusion indicated that the tweets per district was almost twice as likely to be included in the true model.

Table 5. Bayes' Theorem Probabilities of Droughtshaming Tweets Accounting for Reduction in Water Consumption, cumulative from June-August 2015. California State Water Resources Control Board, June-August, 2015

Model	P(M)	P(M|data)	BF^M	BF^{10}
Null Model	.25	.21	.78	1.00
Number Tweets per District	.25	.45	2.45	2.17
Population per District	.25	.13	.45	.63
Tweets + Population	.25	.21	.81	1.03

Table 6. Analysis of Effects on Cumulative Percent of Water Consumption Reduction

Effects	P(incl)	P(incl|data)	BFInclusion
Number Tweets per District	.50	.66	1.96
Population per District	.50	.34	.52

The conservation standard imposed on each of the state's water supplier districts was intended to help reduce statewide water consumption rates of residential customers, and the period of June through August of 2015 was deemed especially critical in stemming the adverse effects of the drought, not only for the toughest summer of the drought, but in terms of immediate future water supply needs that were in real danger for that upcoming fall (California State Water Resources Control Board 2015). The Water Board later announced in the fall that for the entire three-month period that the state's residential consumers succeeded in reducing their overall water consumption by more than twenty-seven percent.

While the data were not made available in time to be analyzed for purposes of this study, the fact that the statewide consumption metric was met, and that tweets were found to be a significant predictor of the overall water reduction values suggest that droughtshaming played a meaningful, albeit small, role in reducing the state's water consumption during the summer of 2015.

These findings thus support the hypotheses and reinforce somewhat the claims made by low-cost hypothesis theorists and those researchers investigating digital norms enforcement through shaming (e.g., Gerbaudo 2012; Jacquet 2015; Jacquet et al. 2014).

CHAPTER VI

DISCUSSION AND CONCLUSIONS

This dissertation examines the droughtshaming phenomenon that occurred during the most recent and historically extreme California drought of 2011–2016. This chapter summarizes the findings concerning the three research questions guiding this dissertation. Specifically, which communities, in terms of socioeconomic prosperity and privilege were droughtshamed more, and if there was an inequality of drought burden in which some socioeconomic groups suffered more, and finally, if droughtshaming during 2015 was a significant factor in the reduction of water consumption during the 2015 summer months. This chapter discusses the implications of the main findings, the contributions and limitations of the study, and suggests directions for future research.

SUMMARY OF THE FINDINGS

Businesses were droughtshamed more (51 times) than residences (48 times) and government sites (30 times). In the wealthiest communities, residences were shamed more, but in the affluent, middle class, working class, and low-income communities, businesses were shamed more. In fact, the wealthiest communities had more shamed locations of all three types than the other four quintiles.

Among the 30 government shaming tweets, 21 of them were of public parks, including the world-famous Golden Gate Park, the California Department of Transportation, the Burbank City Hall, and public schools. Perhaps most surprising is the fact that three water companies were droughtshamed: two different companies in the San Jose area and another from Dominguez. Two golf courses were shamed. The City of Los

Angeles followed by East Los Angeles had the most droughtshaming tweets and then San Francisco, and Santa Monica.

The working class and low-income communities received the fewest tweets and the ones they received are telling. The fifth quintile had only five tweets but three of those were of businesses, including a golf course. However, the fourth quintile had 27 tweets and only four were of residences; 17 commercial sites, including a golf course, and six government locations were shamed.

The occurrence of these tweets definitely indicates that perhaps social justice or eco-warriors may have been at work in droughtshaming the properties. In other words, we see lots of residences shamed among the wealthy communities, and slightly less commercial and government sites, but in the other quintiles, there are easily more businesses shamed than other locations, and in the lower quintiles there are only a few residences shamed with golf courses emerging as some of the business sites shamed. This implies a pattern of shaming high-status targets: wealthy residences in wealthy areas, businesses in less or non-wealthy areas, especially with golf courses—a pursuit of the privileged—in the lowest quintiles.

The findings for Hypothesis 1a and Hypothesis 1b strongly indicated a link between privilege and droughtshaming tweets with a disproportionate chance—greater than one in three (37 %)—that a droughtshaming tweet would target a wealthy location, and that the true proportion of droughtshaming tweets that shame wealthy locations was 38.60 percent and 23.76 percent for affluent locations.

Hypothesis 2 demonstrated that there was an inequality of drought burden in the respect that that there was a 92 percent probability that any of California's residents

living in working class and low income zip codes would be living in a high water conservation standard district. This demonstrated that there was little official concern for the hardship forced on the state's more vulnerable community members.

Hypothesis 3 demonstrated that despite the small dataset of tweets and the limitations of working with social media data that the existence of droughtshaming tweets in a water district was indeed a factor in Californians' reduction in consumption during the hottest and most severe portion of the drought—the summer of 2015. And while it is routine for social scientists to employ the more oft-utilized linear regression model with comfortable p-values, this speculative type of new data requires the firmer understanding provided by statistical probabilities.

IMPLICATIONS OF THE FINDINGS

The findings of this study support and confirm the findings of other studies concerning water conservation versus consumption and social class. A disproportionate number of highly privileged and then affluent communities were droughtshamed in this study, behaviors that a review of the literature on entitlement attitudes of the privileged and environmental attitudes has borne out. Those most likely to disregard the science of climate change and to endorse pro-consumption views reside in very wealthy and affluent communities (Jost et al. 2004; Lindenberg and Steg 2007). They share political and ideological views that reinforce their entitlement attitudes that they have the right to consume as much water or energy as they choose (Kuznia 2015:2). The fact that the vast majority of all droughtshaming locations existed in either the wealthiest and next wealthiest communities indicated that the studies attributing the poorest water

conservation habits to the rich and affluent and the highest conservation lifestyles to the less wealthy and unprivileged (De Oliver 1999; Jackson 2006) were accurate.

Further, the fact that there was a 92 percent probability that any of California's residents living in working class and low income zip codes would be living in a high water conservation standard district demonstrated that there was little official concern for the hardship forced on the state's more vulnerable community members. Board member for the Metropolitan Water District of Southern California, Brett Barbre, announced water conservation was a "'war on suburbia' and likened his rights to waste water to the right to bear arms...'They'll have to pry it [water] from my cold, dead hands'" (Kuznia 2015:2). Nonetheless, this same board managed to see that the statewide water conservation standards, that appeared so across the board democratic, forced poorer Californians to cut their essential water consumption allotments while still allowing the wealthy communities to have large enough water allotments to ensure their landscaping and pools still received water (California State Water Resources Control Board 2015). All of these unjust aspects of water policy merely supported the existing research on privileged Americans' disregard for the needs of others, particularly in a crisis (Bardach 2014; Stellar et al. 2012).

With respect to the literature on the effects of shaming, the small dataset of tweets from this study make drawing any major conclusions premature. However, we do know two things. First, the mandatory statewide twenty-five percent water conservation standard set for each water supplier district, that was so critical to immediate summer and fall water supplies, was not only met but also exceeded by nearly 3 percent (California State Water Resources Control Board 2015). In addition, the tweets were found to be a

significant predictor of the overall reduction in water consumption from June through August of 2015. Since the data were not available that could provide us with a fuller picture of droughtshaming's impact on the state's water consumption, we can only say that the tweets played a role, but how much of one, cannot be determined at this time.

Nonetheless, the fact that droughtshaming was occurring at all via multiple avenues—apps, state-sponsored and private websites, and tweeting via other hashtags—reinforces the findings of other social media and collective behavior scholars. The work of Jacquet et al. (2011) that investigated the effectiveness of shaming as a social sanction for those who overconsumed public resources may have indeed been borne out by this study's findings. It is indeed possible that fear of being shamed and experiencing reputation harm may have served as a powerful incentive for conspicuously consuming less water as Panagopoulos' (2010) three experiments found to be the case. Still the findings of this study are a first step into the largely unstudied field of using social media or online shaming to compel pro-environmental behavior.

The existing literature along with these findings very strongly suggest that there may be tremendous merit in committing the financial resources necessary to collect all the available historical Twitter data for the "#droughtshaming" and to expand the search for other droughtshaming tweets that lack this specific hashtag. It is very possible that the droughtshaming tweets without this specific hashtag will number in the tens of thousands during the study period. The only way to know for certain is to attempt to collect as many of these tweets as possible. If someone had the funds to do so, they may be able to answer with greater precision and confidence how much of a role droughtshaming played in convincing water wasters and conspicuous water consumers to change their ways, if only

during the drought. If these data were to prove compelling, then they could serve as the basis for policies that systematically shame the worst water deviants—the mega-users—instead of trying to institute fines that such individuals have successfully overturned in the past. By starting with the worst of the worst, and observing the result, such a program could be expanded to the next tier of deviants, and so on.

LIMITATIONS AND FUTURE RESEARCH

Droughtshaming's true impact remains clouded and convoluted. While people shamed locations across the entire length and breadth of the state of California, the small dataset did not demonstrate the pervasiveness of the phenomenon. People were shamed not only on Twitter, using "#droughtshaming," but they were also shamed on Twitter without the term, in what one could estimate was exponentially more tweets with a variety of other hashtags. Further, the existence of droughtshaming apps and websites served to diffuse and spread the effects of droughtshaming beyond just the social justice movement implied by the hashtag. Future studies examining the role of social media and digital norms enforcement need to engage in careful Internet research prior to data collection in order to develop a precise list of search terms.

Collecting historical Twitter data on any topic was extremely constraining. The small data to which one is allowed free access limits statistically valid hypothesis testing and modeling. Being uncertain about the truth of the information provided in any tweet, entails having to suspect the accuracy of all the location data and individual tweet details, such as home city of the tweeter, the correct time of day of the post, and any other content of the tweet. Further, with only 140 characters permitted per tweet and the speed with

which individuals often tweet, addresses were often misspelled, incomplete, and the description of the droughtshaming offense difficult to discern.

In terms of the DCI data that was used to organize the various communities according to zip codes, few communities are entirely homogenous with respect to income, education, and the other factors comprising this index. Nonetheless, this study, as did the DCI's creators the EIG, treated each zip code as its own essentially uniform community leveled by its own relative privilege or disadvantage.

With respect to the data from the California State Water Resources Control Board, since not all the necessary water data was available to conduct the desired analyses because of changes in water consumption reporting requirements due to the drought itself, cumulative percentage data was the only data available for the period.

In working with such a new form of data as digitally-mediated communication content, or microblogs, there are many challenges and limitations. The field of sociology still is considerably uncertain in its scholarship of Internet and social media behavior. The fact that individuals can manifest a "real self," or a "virtual self," and a mixture of the two means that understanding peoples' motives for using social media, including for committing such acts as droughtshaming, may not be understood for decades to come.

Besides the reality of droughtshaming, it is difficult, if not impossible, to estimate the impact of other forms of norms enforcement that were not examined in this study, such as neighbors speaking face-to-face to water deviants, individuals contacting the authorities to report their deviant neighbors, or the role of Internet and television news reports of the drought and of those less fortunate community members suffering through it. Once thing is possible to know; with cell phones everywhere, unless laws change, the

selfish and entitled behavior of community members will continue to be the target of others who are willing to watch and post the deeds of others.

The rise of the Internet and social media provide an untold bounty of possibilities for testing existing sociological theories. With climate change wreaking greater and ever-more widespread havoc across the country and the globe, and given that people are fundamentally egoistic and self-serving, unless people begin to discover ways to elicit more pro-environmental behavior from their fellow human beings, the species is in serious trouble.

This study has shown that people are willing to act in the interests of the greater good. They are not only unafraid to shame residential properties but also that they are not afraid to shame more powerful entities such as the government and commercial enterprise, supporting the view that shaming is not cyber-bulling but an instrument of social justice from the weak against the powerful. Some people do care.

Future studies could be useful in this area of social activism or pro-environmental justice. By observing the calendar for upcoming major political and environmental events and then by carefully choosing the right key words, a researcher could collect streaming live Twitter data over hours, days, and weeks and observe a phenomenon as it unfolds with all the data they wish to study. This is much preferred to the method used in this study in which historical Twitter data limitations and the lack of a social media "crystal ball" prevented me from gathering a much fuller, richer, and comprehensive set of data.

By collecting such streaming data, more comprehensive studies could be performed concerning the power of social media social networks, and thus would enable researchers to see how "eco-warriors" or "social justice warriors" work together to spread

their agenda and news. Identifying whose posts are effective based on the content, location, and the day and time posted could help social scientists understand the role of timing and spatiality in a variety of topics from norms enforcement, to social movements, collective behavior, influence, persuasion, and social cognition. I firmly believe that sociologists' ability to understand social media as a data source and not merely a research or professional networking tool will be a turning point in the field.

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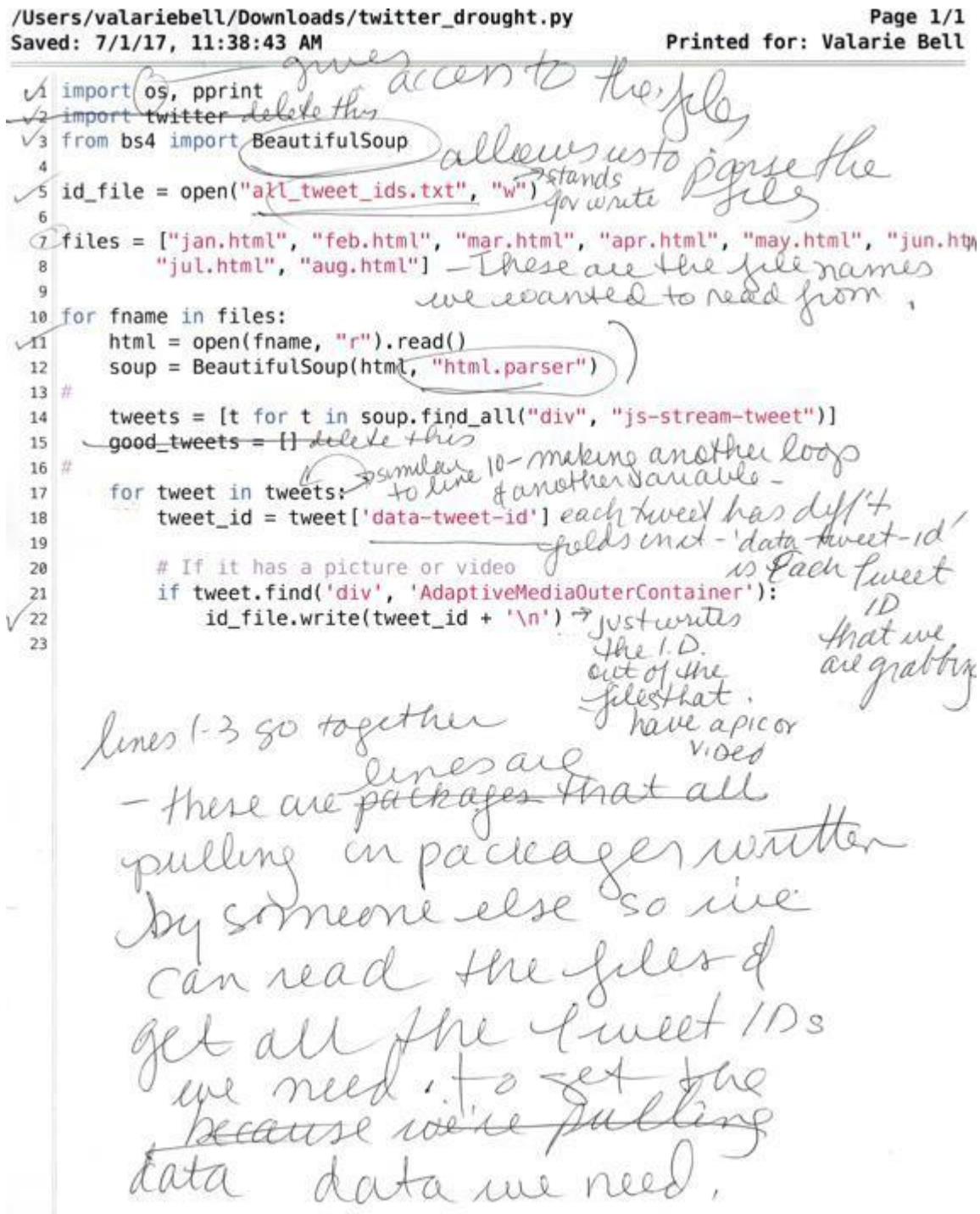
APPENDIX A

Python Script

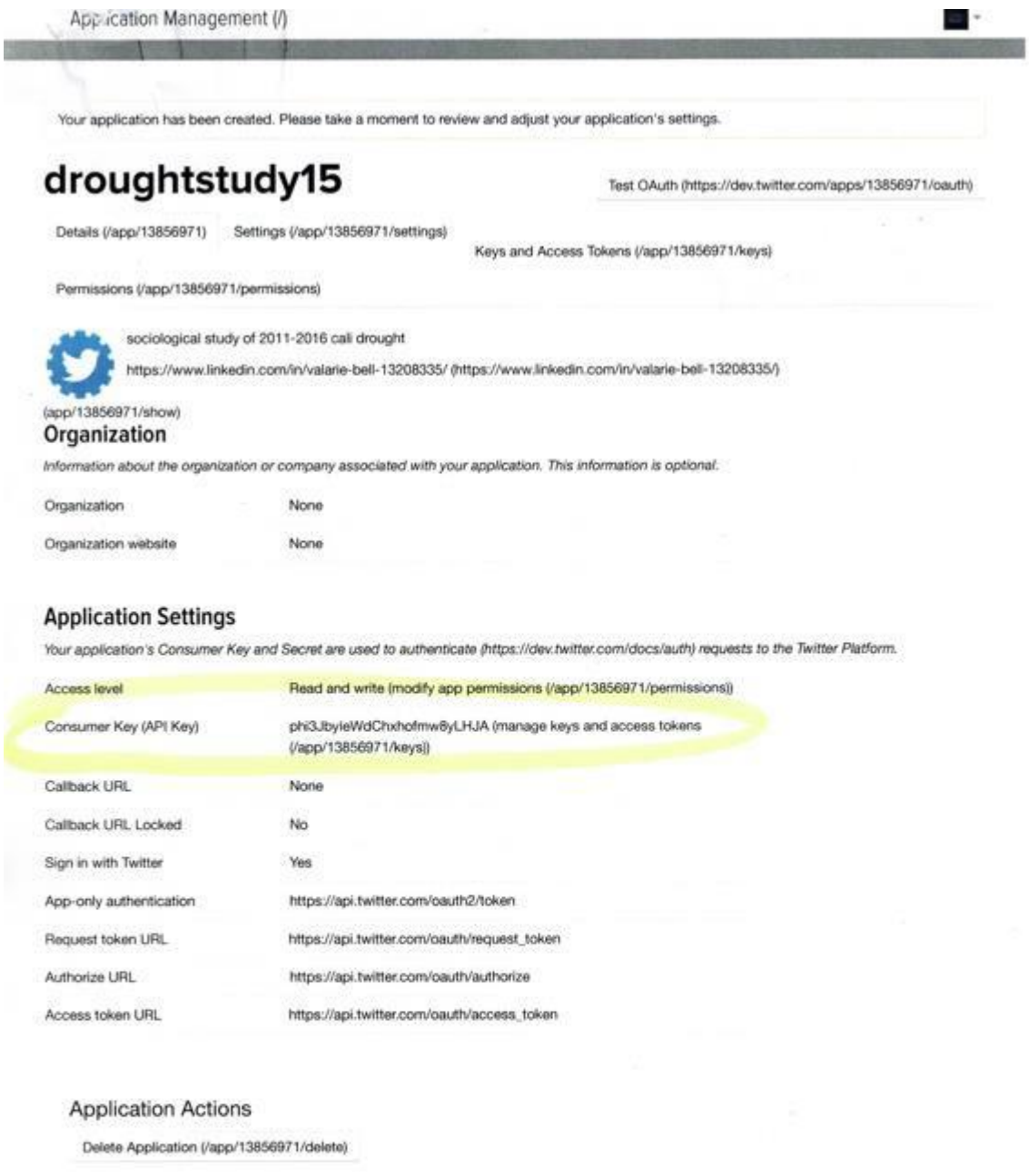
```
# Valarie Bell 5/27/2017 Python/ TWITTER API WEBSCRAPE OF DROUGHTSHA MI
NG TWEETS

#specifying the Twitter API obj
ects import twitter
api = twitter.Api(consumer_key='phi3JbyIeWdChxhofmw8yLHJA',
consumer_secret='hKzVXZP5uG1fpehyH9PEs3Kkz2gP21dbbqZvMWFOtROycZMBj
Z', access_token_key='3018449844-
C4aXPVNVVMyw2COY7wLsOGronbWEds7QJXnYouT',
access_token_secret='amFlypAyM9SM4UN7ej2m165ONpc5LNMT9mBStN2CEOkAd'])
# telling the Twitter API to search based on this query through the
#dr ought sha mi ng Tweets
# rangi ng fr om Januar y 1, 2015 through August 31,
2015 results = api.GetSearch(
raw_query='q=%23dr ought sha mi ng%20since%3A2015-01-01%20until
%3A2015-08-31&src=typd')
```


/Users/valariebell/Downloads/twitter_drought.py
Page 1/1
Saved: 7/1/17, 11:38:43 AM
Printed for: Valarie Bell
import os, pprint
import twitter delete this
from bs4 import BeautifulSoup
id_file = open("all_tweet_ids.txt", "w")
files = ["jan.html", "feb.html", "mar.html", "apr.html", "may.html", "jun.ht
"jul.html", "aug.html"]
for fname in files:
html = open(fname, "r").read()
soup = BeautifulSoup(html, "html.parser")
#
tweets = [t for t in soup.find_all("div", "js-stream-tweet")]
good_tweets = [] delete this
#
for tweet in tweets:
tweet_id = tweet['data-tweet-id']
# If it has a picture or video
if tweet.find('div', 'AdaptiveMediaOuterContainer'):
id_file.write(tweet_id + '\n')
gives access to the files
allows us to parse the files
stands for write
These are the file names we wanted to read from,
similar to line 10 - making another loop & another variable -
each tweet has diff't fields in it - 'data-tweet-id' is each tweet ID that we are grabbing
just writes the I.D. out of the files that have a pic or video
lines 1-3 go together
- these are packages that all pulling in packages written by someone else so we can read the files & get all the tweet IDs we need. to get the because we're pulling data data we need.

```
1  import os, pprint, time
2  import twitter
3  import simplejson as json
4
5  api = twitter.Api(consumer_key="YVaLrY5BjwIJa0gJ40rvaKRJy",
6                    consumer_secret="bEurBYR6SohWx1BVlb4S0hswNhwbGpt9J7T883sJ
7                    access_token_key="2204269638-N8u4oZvIROwBZ1uxrj50BjgM4W2Y
8                    access_token_secret="13uiP6U8NsUhRIi2FyQxLtfLnUcpDQnBO5N4
9
10
11 ids_f = open("all_tweet_ids.txt", "r")
12
13 tweets_f = open("processed_all_with_date_900_.txt", "a")
14
15 tweet_infos = []
16
17 ids = [i.strip() for i in ids_f.readlines()]
18 i = 0
19 for t_id in ids[0:]:
20     print i
21     i += 1
22
23     try:
24         info = api.GetStatus(t_id)
25
26         if info.coordinates is not None:
27             info.coordinates['coordinates'].reverse()
28
29         tweet = {
30             'id': t_id,
31             'text': info.text,
32             'date': info.created_at,
33             'coordinates': info.coordinates,
34             'user_location': info.user.location,
35             'tweet_url': "https://twitter.com/" + info.user.screen_name + "
36         }
37
38         tweet_infos.append(tweet)
39     except:
40         print "Bad id?"
41
42
43     time.sleep(0.25)
44
45 tweets_f.write(json.dumps(tweet_infos, indent=4 * ' ') + '\n')
```

APPENDIX B

Twitter API Documentation



Application Management (/)

Your application has been created. Please take a moment to review and adjust your application's settings.

droughtstudy15

Test OAuth (https://dev.twitter.com/apps/13856971/oauth)

Details (/app/13856971) Settings (/app/13856971/settings)

Keys and Access Tokens (/app/13856971/keys)

Permissions (/app/13856971/permissions)

sociological study of 2011-2016 cali drought

https://www.linkedin.com/in/valarie-bell-13208335/ (https://www.linkedin.com/in/valarie-bell-13208335/)

(app/13856971/show)

Organization

Information about the organization or company associated with your application. This information is optional.

Organization	None
Organization website	None

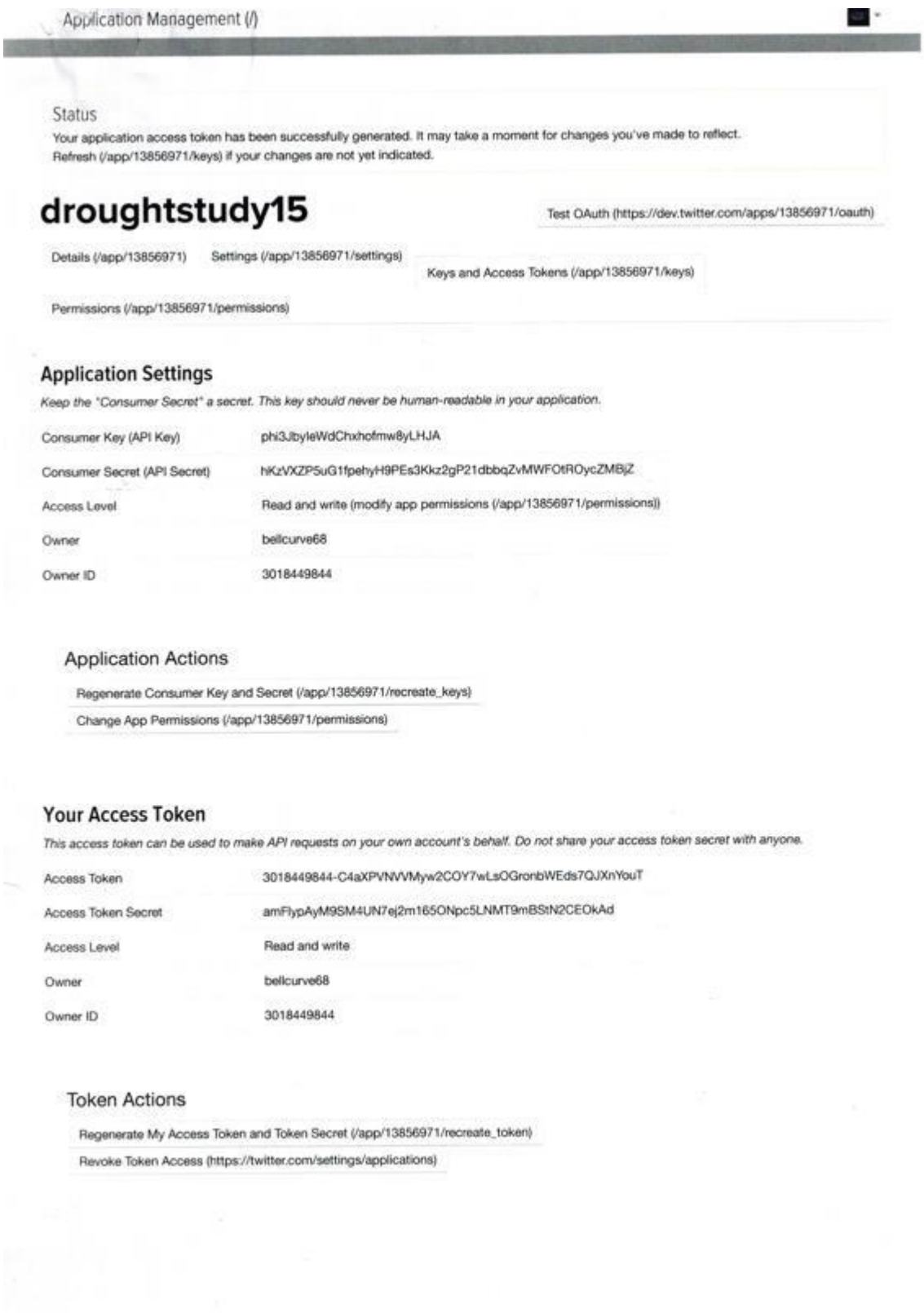
Application Settings

Your application's Consumer Key and Secret are used to authenticate (https://dev.twitter.com/docs/auth) requests to the Twitter Platform.

Access level	Read and write (modify app permissions (/app/13856971/permissions))
Consumer Key (API Key)	phi3JbyIeWdChxhofmw8yLHJA (manage keys and access tokens (/app/13856971/keys))
Callback URL	None
Callback URL Locked	No
Sign in with Twitter	Yes
App-only authentication	https://api.twitter.com/oauth2/token
Request token URL	https://api.twitter.com/oauth/request_token
Authorize URL	https://api.twitter.com/oauth/authorize
Access token URL	https://api.twitter.com/oauth/access_token

Application Actions

Delete Application (/app/13856971/delete)


Application Management (/)

Status

Your application access token has been successfully generated. It may take a moment for changes you've made to reflect.
Refresh (/app/13856971/keys) if your changes are not yet indicated.

droughtstudy15

Test OAuth (https://dev.twitter.com/apps/13856971/oauth)

Details (/app/13856971) Settings (/app/13856971/settings) Keys and Access Tokens (/app/13856971/keys)

Permissions (/app/13856971/permissions)

Application Settings

Keep the "Consumer Secret" a secret. This key should never be human-readable in your application.

Consumer Key (API Key)	phi3JbyleWdChxhofmw8yLHJA
Consumer Secret (API Secret)	hKzVXZP5uG1fpehyH9PEs3Kkz2gP21dbbqZvMWFOtROycZMBjZ
Access Level	Read and write (modify app permissions (/app/13856971/permissions))
Owner	bellcurve68
Owner ID	3018449844

Application Actions

Regenerate Consumer Key and Secret (/app/13856971/recreate_keys)

Change App Permissions (/app/13856971/permissions)

Your Access Token

This access token can be used to make API requests on your own account's behalf. Do not share your access token secret with anyone.

Access Token	3018449844-C4aXPVNVVMyw2COY7wLsOGronbWEds7QJXnYouT
Access Token Secret	amFlypAyM9SM4UN7ej2m165ONpc5LNMT9mBStN2CEOkAd
Access Level	Read and write
Owner	bellcurve68
Owner ID	3018449844

Token Actions

Regenerate My Access Token and Token Secret (/app/13856971/recreate_token)

Revoke Token Access (https://twitter.com/settings/applications)

APPENDIX C

Bayesian Analysis Tutorial

Bayesian Analyses

Bayesian statistics is based on the practice of first considering and then incorporating prior knowledge into a model combined with a given set of current observations in order to make statistical inferences (Ghosh, Delampady, and Samanta 2006). Prior information can be used from observational data, previous analogous or comparable experiments or established knowledge from the specific discipline forming the theoretical and conceptual foundation for the analysis (Lynch 2007). Bayesian analysis can be particularly useful when a researcher is exploring relatively unexamined scholarly ground, and hence there are little or no current test data, but for which there may be a strong prior understanding about the parameter of the proposed model, and thus a distribution can be used to model that parameter (Ghost et al. 2007). By integrating prior information about a parameter, a researcher can calculate a posterior distribution for that parameter and thereby calculate an acceptable estimate of reliability (Lynch 2007).

Furthermore, Bayes' Theorem allows researchers to update a hypothesis based on new evidence, update a belief based on a new belief, and change beliefs about probabilities based on new evidence (Gill 2015).

In less technical language, in conducting Bayesian analyses, Bayes' Theorem allows researchers to have a more robust understanding of reality and its effects (Gill 2015). Bayes' Theorem is essentially a way to work out the likelihood of something occurring based on some specific piece or pieces of evidence. Probability, in the Bayesian sense is defined precisely as most non-statisticians understand it: how plausible a situation or outcome tends to be based on the information they already have (i.e., their prior assumptions) at the time they are reckoning the chance of something occurring (Lynch 2007). For frequentist analyses, investigators believe that probabilities represent

long-run frequencies with which events occur, and if necessary, they will need to conceive of essentially "a 'fictitious' population" from which the particular situation under investigation could be characterized as a random sample, thus enabling them to pointedly discuss long-run frequencies (Huber 2013: 83).

Frequentist statistics allows an investigator to test whether or not an event, identified as a hypothesis, occurs. Such testing calculates the probability of a hypothesis over the long run of an experiment; in other words, one keeps repeating an experiment under identical conditions to obtain the outcome (Gill 2015). However, the experiment is theoretically repeated infinite number of times but practically done with a stopping intention. Unfortunately, frequentists often misinterpret this entire process, complete with p-values as what is essentially Bayesian probability concerning the given situation (Huber 2013).

Bayesian models do not depend on such normal distribution-related assumptions and p-values but instead allow investigators to consider dozens of distributions based on the actual features of the data and the theoretical framework itself. While quite powerful and versatile, Bayes' Theorem is actually quite simple. It is expressed as following formula (see Figure 2):

$$P(A \mid B) = \frac{P(B \mid A)\, P(A)}{P(B)},$$

Figure 2. Bayes' Theorem

Where P(A|B), the parameter or value that an investigator wants to discover, represents the probability of finding observation A given that a piece of evidence, B, is present.

P(A|B) is the *posterior probability*. P(B|A) is the probability of B, the new evidence turning up, given the outcome A is true, or is obtained. P(A) is the probability of the outcome A occurring, or being true, *without knowledge* of the new evidence B. and P(B) is the probability of B, the new evidence. It is important to consider that Bayesian analysis provides more accurate and reliable models and results; yet findings are frequently counterintuitive to the expected findings, making novice Bayesian investigators believe the results are flawed when they are not (Gill 2015).

APPENDIX D

California Tweets Map