

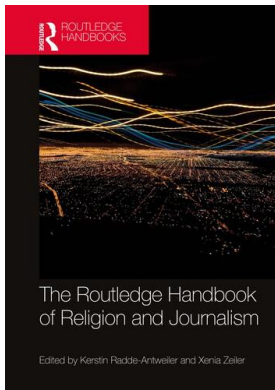
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RELIGIOUS DATAFICATION

Platforms, practices and power

Pauline Hope Cheong

Introduction and theoretical background

In many societies where digital computing and Internet access is available, and even ubiquitous, the age of big data has dawned and is purportedly mounting at a startling rate. Total worldwide data is estimated to swell to 163 zettabytes (a zettabyte is 1 trillion gigabytes) by 2025, which translates to approximately ten times the amount today (Reinsel, Gantz and Rydning, 2017). Indeed, in many ways, the dramatic growth of datafication and the associated Internet of Things (IoT) has pervaded aspects of everyday life in mediated contexts worldwide, including varied dimensions in the religious and spiritual domains.

With the nature of Internet use briskly changing, the Internet is no longer confined to our computers or our smartphones as data flows through our apps, digital wearables and cloud storage services, devices in our homes, networks in our workplaces and sensors in our neighborhoods and cities. In light of the exponential growth of data in the global ecosystem of technologies, the term big data is used to describe extremely vast masses of structured, semi-structured and unstructured data, which can be analyzed computationally (Chen, Mao and Liu 2014, 171). In parallel, datafication refers to the “ability to render into data many aspects of the world that have never been quantified before” (Cukier and Mayer-Schoenberger 2013, 29), thereby allowing for real-time tracking and predictive analyses today. What does a data approach to religion mean? In what ways have religious and interdisciplinary scholars studied large data sets? How do religious actors interact through and with data? What are the implications of big data for religious leaders, followers, workers and journalists working in an era of intensifying datafication, surveillance and the IoT? Given that, many proprietary algorithms and devices operate in the background, unseen or in black boxes (Pasquale 2015), this new wave of Internet development promises greater innovation but also raise new privileges, disadvantages and risks to religious adherents, seekers and reporters.

This chapter has been tasked to provide an overview of datafication and the implications of digital data for religion and journalism. Given these contested terms and the literal and metaphorically big nature of the topic, the remit here is to highlight key trends and implications of growing digital data for the evolving nature of religious knowledge, leadership and community. Understanding the historical and contemporary data-related practices in the religious milieu is important for the advancement of critical understanding and engagement

with data, including the work of religious storytelling and data journalism. The discussion here will thus first examine past and present practices of religious datafication and then proceed to highlight the relevance of datafication for journalism and journalists covering the religion beat.

Accordingly, I will advance and unpack in this article the three key points below related to the development of big data and religion, the latter here meaning, broadly, the individual and institutionalized practices, values, symbols and beliefs that make up specific religious traditions (Woodhead 2011), including the discourse and practice constituted by mediated communication (Cheong 2017). First, although data has recently surfaced as a prominent term and asset, contemporary datafication has a history. While voluminous quantitative and text-based data related to religion is being accumulated and exchanged today, the impulses to archive, quantify, classify and assess based on data is not new in religious contexts and has historical parallels. Given the recent popularity of the term datafication, past scholarship has occluded referencing the concept of big data and the explicit discussion of taking a data approach to religion. Nonetheless, various documented examples of religious datafication provide striking illustrations of its functionalist operations and power dynamics, as discussed in the next section.

Second, over the years, new forms of technologies have facilitated new forms of datafication, constituted by different practices and operant in varied contexts, for example, the application of online algorithms to capture and classify data (Cheney-Lippold 2017). Thus, beyond abstract visions of a datafied society, it is significant to examine how data related to religion is being produced, shared and archived on local and global scales, alongside the emergence of the latest information sharing and communication platforms. Interdisciplinary and religious scholarship have empirically examined various forms of datafication facilitated by a growing range of digital technologies in different settings to make sense of and derive value from digital information.

Third, far from being straightforward, religious datafication is a complex and contested practice. While some forms of data capture are mechanized and programmed to function independently nowadays, for instance, using so-called simple natural language processing algorithms for textual analysis, attention to interpretation and context remains important for the study of digital corpora (Shahin 2016). Data processing algorithms and applications are not objective or neutral but are relational, contingent and performative in nature. This chapter proposes that in spite of its celestial affiliations, religious data is not *pure*. The emerging contours of bigger data sets and flows contribute insights into the dialectics of digital religion, as they intertwine with emergent tensions in the contested areas of religious identity, authority and community (Cheong and Ess 2012, Cheong and Arasa 2015).

Taking a data approach to religion: historical forms and parallels

While the rise of big data has sparked much interest and debate particularly in the last two decades, the archival and application of data, including data-driven processes, are not wholly new to religion. Put in another way, datafication today has a history and has a history in religious hosts and contexts. Over the centuries, religious personnel have advocated for the quantification of different forms of socio-demographic, behavioral and economic data via numeric record keeping and accounting procedures for statistical analyses and strategic planning. As this section will highlight and illustrate, while past studies on religious actors utilizing quantifiable data may not have fully acknowledged the emergence and contested implications of large-scale data sets, datafication practices have long been operant in religious

contexts, before the introduction of modern-day digital technologies. These historical forms of datafication were assembled to connect to particular audiences and publics, and as such, data rich practices were purposeful, socially embedded, and influenced by church leadership and goals.

The functionalist application of statistical analyses to church behavioral data is, for example, reflected in the records of the early modern Reformed churches in Europe. Judith Pollmann (2002) highlighted how a proposal for a systematic examination of records of Geneva's Reformed consistory, the body of ministers and elders overseeing church discipline, was proposed by Robert Kindon in 1972. He advocated for a person "able to develop statistics on the various kinds of moral aberrations...and establish which aberrations were most prevalent" (Pollmann 2002, 423). This person could structure data to help scholars understand patterns of how these moral transgressions were evaluated and handled as well as "measure how all these statistics changed over the years" (Pollmann 2002, 423).

This proposal to order and analyze quantified social data statistically illustrates the significant role that datafication was conceived within the context of the Calvinist church. The personnel, whom we might term a data analyst today, was charged with what appears to be a data-driven process to track the discipline of moral offenders and tasked to produce what might be understood as a longitudinal analysis of trends in church discipline over time. And yet, it is noteworthy that the assumptions about the corpus of church data in this case and the proposed datafication practices were far from perfect, according to Pollmann's analysis of a journal from a church elder in Utrecht, Netherlands in the 1620s. There were different methods of defining, counting and recording individual disciplinary occurrences between different churches. This prevented meaningful data comparisons between churches as well as over time comparisons in the church.

Furthermore, multiple missing cases from the official consistory records existed as large divergences between formal records and individual journal entries about disciplinary cases were found. Public displays of deviant conduct and dishonorable behavior of church leaders and prominent family members were not logged in church records, although other historical documents bore them out. In this regard, it is particularly striking that Pollmann (2002, 430) reported,

it is unmistakable that *the consistory was reluctant to record information* that conceived members of Utrecht's elite, the ministers of the church, and the families from which it recruited its own members.

(italics mine)

In other words, it is significant here to note how church power and authorities appeared to have historically influenced their data entries and these selective records render any ensuing data analyses skewed.

The historical practice of classification and analyses of quantifiable data is also evident, for instance, in the context of the growing significance of financial reporting in various churches, including the Protestant Episcopal Church where statistics were first compiled on the number of church activities in the diocese at their 1808 convention. Swanson and Gardner's (1986) study showed how the Episcopal Church engaged in detailed accounting of financial and socio-demographic data, as well as internal and external audits. These changes were implemented in order to ensure its viability as it moved away from being a state sponsored entity to an ecclesiastical enterprise within the USA capitalistic society in the 1800s. Datafication supported the Episcopacy as top-down influence and bottom up

practices emerged in many local dioceses, such that by 1860 “almost all of the dioceses required the reporting of a wide variety of financial and demographic data” (Swanson and Gardner 1986, 61).

Here, it is pertinent to point out how technological innovations (e.g., the then novel use of balance sheets) facilitated new forms of datafication within the church, which was reflective of changes in church governance and structures in response to economic and constitutional changes. Consequently, Swanson and Gardner (1986) noted that there was an increase in the centralization of control, encompassing the formalization of church reports at the national level.

The importance of recorded transactions and events is also evident in the extensive use of bookkeeping and accounting practices among the United Society of Believers, known as the Shakers, who functioned as a religious community from 1747 to 1923. Faircloth (1988)’s examination of historical archives uncovered the presence of detailed financial records of each household unit living in the Shaker community at Pleasantville, Kentucky, documented in day books, cash books and ledgers. The importance of careful accounting was underscored in key textbooks written by church elders, which stressed the creation of quantified records as a virtuous practice of accountability. In this way, the extensive use of numbers in budgets and the promotion of accounting practices was promoted and viewed as a “manifestation of holistic stewardship,” to assist religious actors in accomplishing their spiritual goals (Irvine 2005, 212).

Moreover, while religious beliefs can conflict with the secular data approach of accounting, Irvine’s study (2005) of a budgetary system in an Australian diocese showed there was little resistance in the community as church goals were captured within the budget and the church’s progress was measured against its financial targets monthly. Notably, it was argued that

the budget was actually used as a surrogate for the spiritual goals of the church, to objectify, legitimate and justify certain actions, and to monitor the success and accountability of the church in achieving its stated goals.

(Irvine 2005, 233–234)

In a similar vein, the study by Rixon and Faseruk (2012) on Anglican priests’ adoption of secular accounting management practices in Canada highlighted their pragmatic reliance on quantified data for strategic planning in their organization. Priests were found to be generally supportive of the work of professional accountants and relied on budget information and reports in their long-term capital planning to achieve their church mission. In this regard, while accounting practices record numbers and rely on the quantification of data extensively, it is “not merely an objective inert technique, but a *social craft dependent* on the outplaying of an almost infinite array of organizational variables” (Irvine 2005, 234, italics mine).

In sum, I discussed in this section multiple cases in history that illustrated how datafication was introduced and developed as part of the *modus operandi* in different religious settings. Although past studies did not reference the concept of datafication, their documentation illustrated how various dimensions of religiously related behaviors (and aberrations) were defined, recorded and compared. And yet, this rendering of various forms of religious practices into coded data and quantifiable metrics was not simply a perfunctory undertaking to meet church needs. Attempts to archive and analyze data statistically were aligned with the fulfilment of spiritual visions and church growth. Moreover, the construction of formal records and official bigger data sets involved religious authority and in some cases, changes

in church governance as the selective sampling of data, censorship of data, interpretation and compliance with new data practices unfolded over the years.

The capacity to record, archive and process religious data has expanded with the use of new technologies. The next section discusses how the more recent proliferation of computing and digital technologies have facilitated more expansive forms of online capture and coding, while supporting new scholarship on the archival and analysis of religiously affiliated conduct.

Religious datafication in the digital age

With the emergence of computerization, digitalization, social media and networked applications, the scale of big data has increased exponentially. Datafication is nowadays more commonly associated with a vast and wide variety of data sets and the swift velocity at which data is captured and processed. Among other significant concerns, this has reinvigorated a debate on what kinds of data are being shaped, tracked by religious institutions and actors, and in turn how big data is used to constitute religious authority and community. The constitution of big data takes on wider implications alongside the application of digital tools with a potential global reach.

New mediated platforms for engaging religious content and interactions have helped to generate new troves of online data through web retrieval, weblogs, content and link analyses. For example, in the earlier stage of development on the World Wide Web, websites of religious groups and individual blogs generated large-scale data that could be archived and analyzed. The diversity of publicly accessible data included textual and audio discourses, images on web pages, tags, hits, comments and incoming and outgoing hyperlinks of websites. Online and log data enable extraction of user statistics and online search behaviors, including the duration and frequency of page views, personal information and sociodemographic data and Internet Protocol (IP) addresses. In tandem, growing web content provided scholars interested in religious communication new avenues and bigger datasets to mine, classify and analyze from various producer and individual standpoints. In what follows, key examples of studying religion with a big data approach to online and log content will be discussed. While space limitations do not permit this review to be exhaustive, collectively examples here illustrate the diversity in research paradigms and methods that have been applied to the analysis and comprehension of large quantities of religious data.

Viewing churches as emerging mediated organizations, Sturgill (2004) examined a random subset ($N = 251$) out of more than a thousand Southern Baptist church web sites. The sites were coded in four categories for the presence or absence of evangelical material (e.g., presence of a pastor's sermons), organization information (e.g., church address, Church staff listing), interactive features (e.g., email address and online donations) and affiliations with a larger community (e.g., denominational information). Statistical tabs were run to calculate an index, weighted by the number of features in each category, to allow for comparative analyses between the categories. Results reported that for the sample of churches analyzed, the index value for promoting the church as an organization was significantly higher than the index value for other categories coded, suggesting that church websites were primarily used to further organizational goals. It was also noted that churches' lack of links to non-church sites made it harder for web users to locate evangelistic materials.

In another large-scale study, Jansen, Tapia and Spink (2010) examined more than a million queries related to religious information seeking from transaction logs of web search engines from 1997 to 2005. Each record within the transaction logs contained data in three

fields, namely time of day, user identification/IP address and query terms of online religious information seekers from their longitudinal analyses. The authors reported the following:

- Religious information seeking was persistent over the time frame examined and compared favorably with other forms of web searching like commerce or entertainment.
- Mainstream religious adherents, not just those of new religious movements, are engaged in online religious seeking.
- The core set of high user terms like Christian, Bible and Church was fairly stable with much of online seeking behaviors utilizing mainstream religious terms.

Overall, the authors concluded that their examination of the big data that tracked religious information seeking over time did not support the predominant claim that the American religious landscape was becoming increasingly secularized or factionalized.

Another query log analysis related to religious online big data identified 124,422 religious queries from 15 million queries that were part of 60,759 user sessions in May 2006 (Wan-Chik, Clough and Sanderson 2013). This paper also explored differences in user search patterns between five major world religions: Christianity, Hinduism, Islam, Buddhism and Judaism. Results showed that compared to all queries, religious related queries were almost double in session length, had greater query length and a higher number of unique URLs clicked. Within religious-related queries, Christianity-related searches were the most frequent and had the longest length of queries. Subjects being searched among various religions also varied, for example, Buddhism-related queries related to lifestyle and culture, while Hinduism-related queries were predominantly about spiritual practices and observances. The authors concluded that while query log analysis was a method to study user behavior, it did not provide information on user intent and why searches are conducted in particular ways, the information needs of religious users and their satisfaction with the search results.

A pioneering study that examined blogging as a religious practice triangulated quantitative and qualitative research methods which combined a content and hyperlink analysis of 200 blogs (789 individual posts and close to 20,000 hyperlinks) with interviews with a subset of those bloggers (Cheong, Halavais and Kwon 2008). Blog pages were archived and content analyzed, utilizing a coding frame of eight blog level variables and 99 entry level variables for the first four blog entries listed on the index page that were over 50 words in length. Results illustrated the different types of religious content in blogs, including news, everyday personal descriptions of religious experiences, didactic content, theological criticism and social issues. Extraction of hyperlinks from the blogs for analyses showed that bloggers connected to mainstream news sites, religious views outlets, other popular non-religious and religious bloggers, Wikipedia, etc. In sum, given the rising popularity of weblogs, the study examined both the structural and descriptive concerns of religion online by drawing upon the big data assessable via blog entries and blog links and contextualizing this data by interviewing bloggers who write about religion.

Alongside the development and widespread adoption of spatial applications like Google Earth, interdisciplinary scholars have attended to the study of web content associated with a particular location and discovered links between religious online and offline activities through geotagged, georeferenced or geocoded data from the Internet. Cheong et al. (2009) highlighted how new forms of religious multiscalar and multimedia data like spatial narratives, videos, photographs, architectural visualization, mental maps and digital applications can help build situated spatial knowledge. The archival of these multiscalar data for geographic information systems representation and use can advance understanding of the evolving constitution of religious identity, authority and community. Drawing on an examination

of 177 websites and spatial analysis of hyperlinks (using connectivity indices composed of in links and out links), the authors reported how religious organizations assemble and (re)present sacred place and religious community with a variety of hypertextual and spatial information associated with mental and physical maps. For this reason,

instead of merely presenting their religious organizations in cyberspace, in varying degrees, religious leaders are involved in the (re)presentation or framing of religious experiences and ecclesiastical information to develop networked communities and changing time-space instantiations.

(Cheong et al. 2009, 294)

Specifically, the authors noted how

[i]n this sense, websites may also be conceived as imagined spaces that reflect the codified representations of the spiritual vision of religious leaders. Religious leaders may ontologically map elements of cyberspace to control, engage, and build the religious community, and websites may thereby be seen as expressions of their power.

(Cheong et al. 2009, 294)

Hence, while burgeoning web content, online traffic and hyperlinks provide growing sources for datafication of religious phenomenon, it is also important to recognize how these digital and dynamic data are strategically configured.

As part of a large-scale multimedia public relations operation, Chen (2011) examined how the Church of Jesus Christ of Latter-Day Saints (or the Mormon Church) employed marketing strategies, specifically search engine optimization (SEO) techniques to promote its web ranking and influence online search results. Drawing upon what Chen (2011, 190) recognized as a “solid ground-level support structure as well as well-organized campaign from the top,” the Mormon Church started its SEO efforts in 1996 and then Church leaders encouraged their followers to share their faith through social media. A variety of *ethical SEO tactics* were employed, including the creation of attractive content like pro-Mormon videos, use of diverse keywords and the construction of millions of external links to official church web sites (LDS.org and Mormon.org) (Chen 2011, 189). An “online missionary program” became an official Church mission in 2009 where missionaries proselytize through social media, help build links and direct traffic to official church web sites (Chen 2011, 191).

In the above ways, I highlight how Church leadership direct online attention and assemble a multitude of digital data to advance proactive marketing campaigns and influence online search behaviors. Accordingly, the dialectics of digital religion exists, observed in the emergent tensions between the use and exploitation of big data for religious identity and group promotion. Drawing upon the examples above, it is significant to note how bold concerted efforts to construct appealing content and influence online traffic are interlaced with practices to overshadow competing ideas and silence critics in the religious marketplace of ideas. Correspondingly, the intersection of big data, religion and the marketplace highlights how mega churches and well-resourced religious groups can embed different mediated relations and outputs in their sacred spaces and outreach activities for further reproduction and reconsumption, in order to boost their visibility and presence in the information economy (Poon, Huang and Cheong 2012).

For the same reason, Shelton, Zook and Graham (2012) noted the dialectics of religion at work in both the gains and drawbacks of the dynamic spatialization of religion using digital

and web-based applications. The mapping and interpretation of extensive geocoded data is mingled with complexity, given that “online representations are simultaneously products and producers of offline social practices” (Shelton, Zook and Graham 2012, 603). Their study used a bespoke software program to tally the references to particular religious keywords that were geotagged to particular locations and indexed in Google Maps in February and July 2010, to produce global, metropolitan and regional level visualizations of religious cyberscapes (e.g., 7,519 geotagged references containing the term Catholic near Chicago, Illinois). They argued that *geotagged* web content and references by Internet users and the *politics of representation* of religious groups online are contested processes. Compared to the demographics of their devotees in certain regions, it was reported that some religious groups “seem to possess a disproportionately powerful voice in the Web 2.0 world of Google Maps” (Shelton, Zook and Graham 2012, 612) with user-generated content being “subject to same uneven power relations at work in the material world” (Shelton, Zook and Graham 2012, 606).

As can be seen in this section, the earlier development of web technologies that are still used today dovetail emergent tensions, prospects and problems for religious data science and study. As online sources and content enable new forms of datafication related to religion, significant challenges like understanding platform bias and interface affordances that mold and frame data input and query for our records and analyses remain. In this regard, insights about and from earlier studies of religious datafication echo recent empirical investigations as well as growing critical scholarship related to platform power and data selection bias in other socio-cultural domains (e.g., Bucher 2012, Helmond 2015). The next section further discusses the operations and dialectics of big data religion set in contemporary digital applications.

Data streams and deluge: religious apps and platform power

At the present time, in tandem with the latest growth of social media and digital applications on so-called smart devices, the tracking of religious data has grown with new data generating and sharing activities online on a day to day, moment to moment basis. For some, this presents an opportunity for rethinking how spirituality can be constituted in light of new big data-centric practices. For example, there are multiple data points that parishioners bring to a religious community in the 21st century, including attendance, personal information, personal giving, and personal development; all of which could be tracked and analyzed toward fulfilling a “higher calling to data analysis” (Gutzler 2014, 25).

To augment the prevailing understanding of datafication in the religious context, this section discusses one of the most prominent and striking examples of religious big data that is being collected internationally via YouVersion today. Its popular mobile Bible app offers a free Bible experience in more than one thousand languages, for online access and via smartphones, tablets and other digital devices. With over 300 million installs worldwide, YouVersion data is a compelling illustration of how big data is being collected in the routine and quotidian ways people use their app to read and share the Bible. Drawing from user interactions or what has been termed *Bible engagement* online, YouVersion is able to report a variety of user statistics, including the number of bookmarks created, Bible reading plans (offering a selection of passages with accompanying reflections) completed, verses shared, audio chapters accessed and chapters read. The data set here is considerably large and is also a dynamic data stream, as its app allows for real time tracking of religious data. Its most updated report, at the time of this chapter’s preparation, showed that in 2017, there were 16.7 billion chapters read, 3 billion audio chapters accessed, 1.4 billion highlights and bookmarks created, 39 million reading plans completed and 222 million verses shared (Youversion 2017).

Beyond descriptive data analyses, this form of religious big data collection allows for comparative analyses at the aggregate and possibly other fine-grained levels. Although user statistics regarding age, sex or religious affiliation are not recorded, Youversion does record the location of users, and reported that in 2013, the Bible App had been installed in every country in the world (Anon 2013). Its 2017 report pinpointed Joshua 1:9 as the *verse of the year*; the Bible verse that was shared, bookmarked and highlighted most often by its global users. National level analyses using geocoded data collected from users in different countries offered cross national comparisons between the top verses around the world, for instance, in the United States (Romans 8:28), South Korean (Proverbs 16:9), Australia (Romans 12:2) and India (John 3:16).

In these ways, the upside potential of this application is twofold. Religious big data collected by and analyzed by YouVersion facilitate innovative insights into how millions of people practice their religion and interact with sacred texts. This data can also serve as a timely channel of feedback to enhance the way this religious app functions to enable people to accomplish their Bible reading goals. Yet while its blog title reads “engage in Scripture like never before” (YouVersion), emergent tensions for the construction of religious identity, community and authority exists with this application. Here, it is important to recognize how the Bible app is designed to encourage particular forms of *engagement* and prevailing notions of *sharing*, which are in turn, categorized and tracked to illustrate its growing use and impact.

In *Hooked: How to form habit-forming products*, Nir Eyal (2014) discussed the Bible App as an exemplar by drawing upon his own user experiences and an interview that he conducted with Bobby Gruenewald, Founder of the YouVersion Bible App. His account highlights the immense scope of Youversion’s data collection via its Bible App as well as the potency of apps writ large to facilitate specific guided and habitual user interactions. The relevant excerpt below illustrates these big data dynamics and scale:

Gruenewald’s team sifts through behavioral data collected from millions of readers to better understand what users want from the Bible app. “We just have so much data flowing through our system,” Gruenewald says. The data reveals some important insights on what drives user retention.

(Eyal 2014, 186)

Eyal (2013) also noted that because the Bible App was generating so much data, Google contacted them, and Youversion had completed work with Google engineers to help with their data storage and analyses.

Markedly, an examination of user data showed how users could be motivated to complete reading plans. Eyal (2014, 186) argues that the Bible app was designed to facilitate various forms of expedient and habitual interaction, “to make absorbing the Word as frictionless as possible.” He notes that “Gruenewald says his data also revealed that changing the order of the Bible, placing the more interesting sections up-front and saving the boring bits for later increased completion rates” (Eyal 2014, 187).

In another analysis of the YouVersion app, Hutchings (2014) stressed how the Bible App functions persuasively to influence distinctive user behaviors and social interaction, including the use of gamification and incentives like the awarding of badges to those recognized as successful Bible readers. In addition, it was proposed that the Bible app allows users to access the Bible “through an interface designed to visually and procedurally emphasize sharing... when we look at the actual choice of texts to share...very specific categories of Bible text

flourish while others attract less attention” (Hutchings 2014, 25). According to Cheney-Lippold (2017), in our highly surveilled and mediated environments, algorithms help construct subjective notions of identity, including who we are, how we know each other, and who we can be to affect social participation and citizenship. Online activities generate data streams from which algorithms aggregate data, create categories and extract patterns that guide the action of institutions and states. Consequently, as algorithms in the Bible app function to create and recreate pious selves using digital data to mark and reinforce specific types of religious engagement, datafication here also facilitates the construction of particular religious identities that can be organized and cultivated for multiple purposes, including fueling further app interactions and developments.

As shown above, digital and social media applications have facilitated new religiously affiliated data generating activities in recent years, resulting in massive tomes of data, tracked in real time on a global scale. In turn, a complex and paradoxical phenomenon emerges whereby the analysis of this latest form of big data can be applied to reformatting the digital platforms and interfaces themselves, which simultaneously also collecting data. Indeed, a deliberate pun of the ostensible religious roots of the Bible App has been issued, traced to the irony of its apparent success. According to Eyal (2013), as seen in the title of his article posted online that was initially submitted on the Bible App to the publication *The Atlantic*, “getting 100 Million downloads in more psychology than miracles.” Pointedly, he proposed that the Youversion company is a “case study of how technology can change behavior by marrying the principles of consumer psychology with the latest in big data analytics” (Eyal 2014, 181). Hence, it follows that the Bible App represents and exemplifies historical and larger trends that have emerged with digital platforms designed to maximize dataflow and turn personal and social activities into algorithmic relations, to optimize particular kinds of work performances and engagement (e.g., Lupton 2016). Correspondingly, it is significant to note how contemporary datafication is closely linked to managing communications and the meticulous construction of identity, thus increasing the possibility of greater control by religious elites and/or entrepreneurs.

Conclusion: big data provocations and implications for religious investigations

The rise of big data today is ostensibly tornadic and profoundly provoking. Although datafication has intensified with mounting forms of data capture and real time analyses with networked digital technologies, this chapter has underscored how the proclivity to quantify aspects of religious behaviors and the application of statistics to support religious goals is not merely a novel occurrence. In addition, while data is now a prominent term, religious datafication is by no means a set of unified practices. This chapter has provided a review of multiple forms of religious datafication, which have emerged with newer technologies and examined by interdisciplinary scholars over the years. As with other new media, dialectical tensions are intertwined with technology use that capture and archive religious data, engendering new privileges and disadvantages for religious actors in their construction of religious identity, community and authority (Cheong and Ess 2012, Cheong and Arasa 2015). As far as these dialectics hold, then, this chapter highlights how different forms of religious datafication are not neutral acts but are distinctive social crafts cultivated in diverse contexts and fused with power. As such, datafication can be understood as a complex and contested process, co-constituted by religious leaders and adherents in opportune as well as daily communication and interactions.

With this in mind, it is worth considering how practices of religious journalism are shaped and negotiated in this age of massive datafication facilitated by computational applications and devices. Most broadly, the use and reliance of big data and data-centric practices, including the use of automation and robo-journalism, to help generate stories can be expedient, yet also problematic as it poses ethical dilemmas and challenges for news content creation (Carlson 2015). Of particular relevance to religious representation and community is the uneven resources and power exercised by well-resourced groups and individuals over data production and archival, particularly data inequalities reflected in the asymmetries between those who capture and store data and whom data mining targets (Andrejevic 2014). As highlighted in this chapter, those enacting authority, competence and resources have influenced the rules and norms of how aspects of religious practice are quantified and rendered into data. In turn, the datafication of personal religious behaviors has been used to shape digital platforms and online searches for spiritual information. In this sense, data are not facts and can be erroneous, incomplete and insufficient (Gitelman 2013). As Bulkeley (2015) points out, the use of big data like Google search data numbers “to draw conclusions about religion remains on shaky ground.” This is in part because “while the results of analyzing these data seem admirably clear and quantitative... they do not easily map onto the actual beliefs, feelings and attitudes of the general population.” Therefore, future investigation and accounts of religious data related practices should attend to the concentrations of power with respect to religious data ownership, data geographies and routine experiences of datafication. Achieving this goal may necessitate a multidisciplinary storytelling approach in the era of big data (Howard 2014), where religious news reporters, analysts and designers build collaborative practices to offer new insights to the world.

Additionally, media coverage and public discourse have historically fixated upon the novelty of big data, and/or its utopian and dystopian extremes. Contemporary moral panics over the loss of privacy and surveillance through online data tracking have been expressed. Yet at the same time, harvesting big data linked to and generated by religious practices have been promoted as the key to understanding religious publics, increasing access to sacred scriptures and the building of pious communities globally.

In light of this phenomenon, it is worthwhile for journalists covering the religion beat to acknowledge the complex and historical significance of so-called naturally occurring data and religious datafication in specific religious communities. Aside from attending to growing data (e.g., how big is big data in numbers), there is a need for wider critical reflection in news coverage that is not merely data-driven. Within the recently developed field of data journalism, multiple commentators have stressed the importance of understanding how to critically engage with data beyond how it is used, to attending to the social and cultural contexts in which data related practices are conceived and at work (e.g., see Gray and Bounegru forthcoming). In the context of religion, it is important to explicate the axiology of big data, including the religious philosophies and missions which informs us how and what kinds of data are of value, to whom.

Here, understanding how religious big data operates in context with small data within specific sites is helpful for understanding the contours and contradictions of increasingly datafied publics. News that address the intersection of religion and big data should therefore examine alternative and more nuanced ways to describe datafication processes and outcomes, including how data is mined and matched with other data to make inferences about religious practice and community. As a leading voice in registering critical concerns over datafication, Van Dijck (2014) argues that datafication is rooted in the widespread secular belief of *dataism* as people place their faith in large corporations and public institutions while they trade their

personal data in exchange for free services. Thus, instead of normalizing datafication as an objective and legitimate means to monitor and comprehend people's religious behaviors, attitudes including religious beliefs toward datafication need to be closely reexamined to advance a more robust and ethical approach to big data.

Last but not least, while this chapter has briefly discussed the growth of big data, storytelling related to the tracking and archival of voluminous religious data flows should also touch upon instances of missing data or data gaps. It is pertinent to consider the role of what might be termed as *ex-data*, or the *data cleansing* processes and data that is struck off the record for our understanding of how datafication, religion and power work, particularly in contexts where data availability and accessibility is challenging and entails high costs to journalists (e.g., Ma forthcoming, Carmona, Cruz and Guerra forthcoming). In line with the proliferation of cutting-edge technologies that have become more commonplace in many cities, apps, which generate and track mass and individual activities, can be employed with facial recognition technologies to detect, monitor as well as expunge religious data. The case in the mainland Chinese context serves as an example of such innovation in religious datafication and its complications. According to a report by Grigg and Murray (2017), local authorities in Wenzhou have ordered all churches in a city known as little Jerusalem to install surveillance cameras, which enable the recording of church services, as well as of the conveners and those in attendance. In the name of addressing religious extremism, authorities in Xinjiang have also required the Uyghurs, China's ethnic Muslim minority, to install an app in their smartphones that can detect and block religious videos, images and documents, while keeping logs of their online and social media communicators. These recent surveillance developments regenerate critical questions concerning the datafication of religious practices and the implications of such active monitoring and strategic management of spiritual interactions with the latest ecosystem of digital platforms and facial recognition technologies. It is hoped that future research and journalism continue to document the adjoining of religion and big data, as well as to register its diverse international practices and concerns as a profoundly impelling practice.

Further readings

Cheney-Lippold, J., 2017. *We Are Data: Algorithms and the Making of Our Digital Selves*. New York: NYU Press.

As part of the ongoing scholarly discussion on datafication, this book unpacks how contemporary algorithms organize everyday life drawing upon big data derived from online activities and the application of data analysis and visualization tools. Compelling examples in this book illustrate how algorithmically assisted processes create and assign social categories of gender, race, sexuality and citizenship in the present day increasingly surveilled and mediated environments. Although religion is not the foci here, the book provides a lens to think about the social creation of religious realities in light of new datafication processes. As highlighted in this book chapter, there are interesting implications for the creation and maintenance of algorithmic identities in the religious realm, including the cultivation of particular forms of pious selves and distinctive patterns of religious engagements via digital applications.

Gitelman, L., ed., 2013. *Raw Data is an Oxymoron*. Cambridge: MIT Press.

Collectively the articles in this book articulated by scholars grounded in the humanistic disciplines confront the popular notion that *raw data* is available, accessible and neutral. Instead, the veneer of data objectively is interrogated to reveal significant characteristics of the social construction of data, including how data is *cooked and consumed* in their collection, application, visualization, and projection, in multiple historical and contemporary settings. As pointed out here in this article, religious governance and beliefs are in less obvious ways *baked into data*. Historical and contemporary data collection activities are generated and interpreted by particular religious audiences and publics within distinctive circumstances of their emergence, storage and transmission.

Gray, J. and Bounegru, L. eds., forthcoming. *The Data Journalism Handbook: Towards a Critical Data Practice*. Amsterdam: Amsterdam University Press. Available at <https://datajournalismhandbook.org/handbook/two>, accessed 1 February 2019.

This newly edited book of chapters from data journalists and practitioners in various parts of the world addresses the recently developed and institutionalized practice of data journalism. As reflected in the sub-title, this corpus of work advocates for the advancement of critical data reflection and engagement as journalists hone their craft in collaborative and innovative ways. For example, the third section of the book focuses on how journalists procure and organize data in contexts where data availability and accessibility are limited, and where journalists face significant risks in investigative data gathering and attempts to produce data-rich reports. Multiple challenges for critical data practice as well as practical information about various data landscapes are presented, which helps deepen understanding of evolving and alternative data practices, with implications for religious data journalism.

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