World Heritage Sites on Wikipedia: Inscription Controversies in a Context of Constrained Agency for Cultural Heritage Activism

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UNESCO World Heritage sites are places of outstanding significance, and often key sources of information that influence how people interact with the past today. The process of inscription on the UNESCO list is complicated and intersects with political and commercial controversies. But how well are these controversies known to the public? Wikipedia pages on these sites offer a unique dataset for insights into public understanding of heritage controversies. The unique technicity of Wikipedia, with its bot ecosystem and editing mechanics, shapes how knowledge about cultural heritage is constructed, and how controversies are negotiated and communicated. In this article we investigate the patterns of production, consumption and spatial and temporal distributions of Wikipedia pages for World Heritage cultural sites. We find that Wikipedia provides a distinctive context for investigating how people experience and relate to the past in the present. The agency of participants is highly constrained, but distinctive, behind-the-scenes expressions of cultural heritage activism are evident. Concerns about state-like actors, violence and destruction, deal-making, etc. in the World Heritage inscription process are poorly represented on Wikipedia’s World Heritage pages, instead hyper-local, and process issues dominate controversies on Wikipedia. We will consider how this kind of research, drawing on big data and data science methods, adds new dimensions to the debate on heritage controversies, especially its unique contributions, and also its limitations.

# Introduction

Heritage is the processes and outcomes of people engaging with elements of the past – material and immaterial – and attributing social and cultural meanings to them in the present (Smith 2006; Harrison 2013). These are important to understand because they shape peoples’ identities and influence how they think and behave towards other people. Digital heritage are these engagements that are enabled by the Internet (Bonacchi and Krzyzanska, 2019), leaving traces that can be identified and quantified using data science methods. Digital heritage studies represent a major turn from traditional heritage studies, characterized by post-modernism (Kristiansen, 2014), critical theory, and qualitative methods, towards novel ontologies, data-intensive ethnographies, and a new role for heritage scholars as data scientists. Bonacchi et al. (2019; 2018) have sketched out the new digital heritage research program with their combination of data-intensive and qualitative investigations of 1.4m Facebook posts in Brexit-related community groups. They found recurring parallels – both pro- and anti-Brexit – made by Facebook users between the European Union, the Roman Empire and “barbarians” as they use heritage to support their political activism. They demonstrate the potential for understanding public perceptions and experiences of the past in contemporary society using big data obtained from social media. In this paper we extend the digital heritage research program in two important new directions. First, we introduce Wikipedia as an example of an online peer production community where people engage with elements of the past in measurable ways. Second, present a case study using data science methods to investigate the ways people create and consume Wikipedia articles on cultural sites inscribed on the UNESCO World Heritage List (hereafter CS-WHL).

While social media is a vast and diverse online space that we are only just beginning to explore how people engage with the past, there are other contexts of online interactions where heritage is practiced in distinctive, if poorly understood, ways. We can contrast social media, with its fundamental elements of identity, conversations, sharing, presence, relationships, reputation, and groups (Kietzmann et al., 2011), with peer production communities, where online users participate in the collaborative, asynchronous creation, sharing, promoting, and classification of content in highly structured and goal-directed ways (Wilkinson, 2008). Online peer production communities are comparable to more traditions kinds of voluntary associations where groups set and execute goals, with explicitly democratic organizational ideals. While the ideals of many online peer production communities emphasize non-hierarchical and non-bureaucratic organization, analysis of large amounts of user activity indicates that most of these communities are actually undemocratic and noninclusive, functioning as entrenched oligarchies (Shaw and Hill, 2014). This emphasis on governance and management of collective action is a key detail that distinguishes online communities on social media from online communities on peer production projects. It follows that user interactions in the process of generating context in online peer production communities includes technological and social mechanisms that enact the community’s governance policies, for example, limiting a user’s activity according to their status in the community’s hierarchy, or managing conflict with highly structured procedures. These distinctive organizational and technical qualities of online peer production communities make them an intriguing novel context of heritage production to study digital traces of human activity resulting from engagement with the past

## Wikipedia as a Context of Heritage Production

Here we present a study of how people engage with elements of the past in one of the largest and long-lived online peer production communities, Wikipedia. Originating in 2001, this is a highly influential and well-known online encyclopedia, currently with 11 billion page views per month (<https://stats.wikimedia.org/#/en.wikipedia.org>), that anyone can edit. Although anyone can edit, most internet users do not, and the characteristics of people who do edit are important to understand to identify biases in the encyclopedia’s content. In a survey of 1,512 American adults, Shaw and Hargittai (2018) found that majority of internet users (96.5%) had heard of Wikipedia, and 82.5% of those said that they had ever visited the site. Just over two thirds (67.3%) knew that Wikipedia can be edited, but only 8.2% of the full sample had ever edited any page. Factors that strongly predict if a user has ever edited Wikipedia include their gender (male), age (younger), education level (has BA), Internet use frequency (higher) and Internet use skills (higher). Hill and Shaw (2013) a similarly found that among U.S. adult contributors to the English-language edition of Wikipedia, at least 75% are male. While gender disparities have been documented throughout Wikipedia (Adams and Brückner, 2015; Ford and Wajcman, 2017), there are also geographical disparities. Johnson et al. (2016) examined 218,709 English geotagged articles about places in the contiguous United States and 46,124 Chinese geotagged articles about places in China to investigate differences in articles about urban and rural places. They found that articles about rural areas have systematically lower quality, are less likely to have been produced by contributors who focus on the local area, and are more likely to have been generated by bots (automated software agents). These studies indicate that inequalities on a range of variables mean that participation in online peer production communities often exacerbates existing patterns of social exclusion. Graham et al. (2014) examined the global distribution of 3.4 million geotagged Wikipedia articles and find a pattern of places in the Global North being represented in local languages, while articles about places in the Global South are largely being written by others. They find that most of the variation in the spatial distribution of geotagged articles could be explained by three variables: the population of the country, the number of fixed broadband connections, and the number of edits emanating from that country.

An additional consideration for understanding participation in online peer production communities are the technical schemas of the software that Wikipedia runs on, MediaWiki. This is a complex toolkit that enables participation in Wikipedia in highly structured ways. On one hand, these structured behaviours produce structured datasets that are well suited to data science methods for efficient computational analysis of large numbers Wikipedia articles. On the other hand, they constrain and limit the agency of the user, canalizing their behaviour into a small number of possible actions and acceptable modes of discourse and engagement with other users (Iba et al., 2010). While Wikipedia has elements that are ubiquitous on the Internet, such as links on articles that take the user to other articles or other pages on the Internet, it also has several less common elements that contribute to its unique technicity, resulting in very specific types of relationships between human users and the technical elements of the Wikipedia project (Niederer and Van Dijck, 2010). For example, every edit to an article is tracked in a publicly accessible version control system attached to that article. This exposes the article creation process in highly granular detail; for any given article, we can see how many editors contributed, the size of their edits and their distribution over time, among other things (Priedhorsky et al., 2007). Wikipedia has a special category of edit called the ‘revert’ which allows a user to restore an article to an earlier state to remove recent vandalism (such as the addition of irrelevant or offensive material). This special revert action, combined with a ‘talk’ page attached to each encyclopedia article for threaded discussion among editors, allows us to detect and study the dynamics of conflicts arising from the creation and editing of articles (Suh et al., 2007). For example, a high proportion of ‘revert’ type edits, and a high word count on the talk page can indicate the controversiality of an article (Yasseri et al., 2012).

Table 1: Summary of Wikipedia bot types and functions, from Zheng et al. (2019)

|  |  |  |
| --- | --- | --- |
| Role | Function | Example |
| Generator | Generate article pages based on predefined templates. | Rambot, RussBot |
| Fixer | Fix errors in article pages in order to keep the information neat and correct. | CmdrObot, Yobot |
| Connector | Connect Wikipedia with other sites and databases | KasparBot |
| Tagger | Tag articles with different templates and categories | AnomieBot, Smackbot, Cydebot |
| Clerk | A variety of tasks including updating statistical information, documenting user status, updating maintenance pages | AnomieBot, Smackbot |
| Archiver | Archive closed discussions and maintain the archived content by assigning an index and sorting them alphabetically | AnomieBot, Cyberbot\_I |
| Protector | Detect and regulate destructive behaviors | ClueBot NG |
| Advisor | Provide editors with suggestions about articles that they might want to contribute to. | SuggestBot |
| Notifier | Deliver messages to editors. | NoomBot |

In addition to the human users and the technological system that enables and constrains their activities on Wikipedia, there is an important third element of the ecosystem that contributes to Wikipedia’s uniqueness: the bots. Wikipedia bots are computer scripts that automatically handle repetitive and mundane tasks to develop, improve, and maintain the encyclopedia. While bots are not unique to Wikipedia, they are important contributors, responsible for a large proportion of edits, and shape the human experience in significant ways (Geiger, 2014; Niederer and Van Dijck, 2010, ’ @geiger2009social). They also evolve and autonomously engage in complex interactions with other bots to modify the encyclopedia (Geiger and Halfaker, 2017; Tsvetkova et al., 2017). Zheng et al. (2019) studied all 1,601 bots that were registered at the time of their study, and classified them into 9 bot roles and 25 associated bot functions. Table 1 shows the bots that were identified in our study and their categories and functions according to Zheng et al. (2019).

## UNESCO World Heritage Cultural Sites as foci of Conflict

We investigate how the unique technicity of Wikipedia shapes interactions between people and the past with a case study on the processes of constructing knowledge about cultural sites inscribed on the WHL. We chose the CS-WHL as a bounded set of cultural heritage elements with several characteristics that make it of general interest. It has a global geographic distribution, broad public interest at local and international scales, in both online and face-to-face communities; a wide temporal distribution in both the age of the cultural sites, the ages of inscription on the WHL, and the ages of their appearance on Wikipedia; and finally many CS-WHL have a high intensity of cultural and political discussions that surround events affecting these sites, such as their inscription on the WHL. These qualities make it an ideal data set as an entry point for case studies of digital heritage in online peer production communities, where activities are typically goal-driven (e.g. ‘write quality articles’) compared to social media activity where user activities are more often event-driven (e.g. ‘share reactions to Brexit’).



Figure 1: Cultural Sites on the UNESCO World Heritage List. Countried coloured black currently have no listed cultural sites. Inset shows the distribution of sites per country. Map data from naturalearthdata.com

UNESCO was established in 1945, shortly after the end of the Second World War, for the purpose of helping to rebuild after the war, and preserve peace by promoting the international exchange of ideas. In 1975 the UNESCO-drafted “Convention Concerning the Protection of the World Cultural and Natural Heritage” came into force and established the World Heritage List (WHL) to protect natural and cultural sites and landscapes around the world that have outstanding universal value. Currently there are 869 cultural properties on the UNESCO WHL, with the first sites inscribed in 1978. On average, most countries have 2-3 sites, with most sites located in Italy and western Europe, and several countries having no sites at all, for example, several central African countries, Taiwan, and New Zealand (Figure 1).

In her institutional ethnography of UNESCO’s role in protecting world heritage, Meskell (2018) argues that the WHL is less about preserving heritage than about political and economic transactions between states and state-like actors. Sites that are listed, or candidates for listing, are often foci of disputes and negotiations about territory, sovereignty, and security, as well as international corporate activity (Meskell, 2018). This is because the process of selecting of sites to be inscribed on the WHL has become politicized and driven by countries’ political influence and national strategic interests (Bertacchini et al., 2016). For example, the members of the World Heritage Committee are mostly career diplomats rather than heritage specialists, indicating that the processes and decisions of this committee may be motivated more by political trade-offs than by heritage expertise and judgment (Von Droste, 2011).

Several CS-WHL sites are notable for the conflicts and tensions that have surrounded their inscription. The 1992 inscription of Angkor (an ancient city and empire in Cambodia, prominent during the 9th to the 15th centuries AD) was supported by exiled supporters of the genocidal Khmer Rouge regime, hoping to strengthen territorial claims (Locard, 2015). They appropriated Western discourse on national cultural heritage to argue for the safeguarding of Angkor as part of their quest for national independence and international recognition. Early in the Khmer Rouge regime Angkor was declared a symbol of enslavement by a primitive culture, but when the Khmer Rouge adopted a new rhetoric of a supposedly civilizing mission, they presented it as the site one of the great world civilizations (Falser, 2015). The 2003 inscription of Mapungubwe (the site of the first indigenous kingdom in Southern Africa, 900-1,300 AD) was preceded by a recommendation from ICOMOS (International Council on Monuments and Sites, a professional association that is a key advisory body to the World Heritage Committee) not to inscribe because of the farming and mining activity in highly sensitive areas near the site, and the unclear ownership of the mining rights at the time (Meskell, 2011). Despite this negative recommendation, geopolitical machinations within the Committee, especially by the Indian and Russian delegates, led to Mapungubwe being inscribed on the list, although without the typical prerequisites of an integrated management plan or complete buffer zone (Meskell, 2012). These examples of Angkor and Mapungubwe demonstrate the attention that the WHL inscription process can generate due to political activitsm, conflicts and intrigue.

Physical conflict at or near CS-WHL are also major events that galvanise public interest in these locations. World Heritage sites in Palestine, Mali, Syria, Congo and Cambodia have recently been sites of violence, in many cases the violence is specifically linked to their potential WHL nomination, listing or management. In 1998 anti-government and mostly Hindu Tamil groups bombed the holy Buddhist site of the Temple of the Tooth at the WHL site of Kandy (the last capital of the ancient kings of Sri Lanka), killing 17 people and substantially damaging the temple (Coningham and Lewer, 1999). In Mali during 2012, fighting between government and rebel groups lead to the damage and destruction of tombs at the CS-WHL sites of Gao and Timbuktu (Brioschi, 2017). The World Heritage Committee found itself powerless to intervene because of political gridlock (Meskell, 2015), and these Mali sites are currently among the 36 cultural sites on the List of World Heritage in Danger (<https://whc.unesco.org/en/danger/>). In 2015, ISIS militants destroyed the Temple of Bel in Palmyra, Syria (a CS-WML site of monumental ruins, once great city at the crossroads between east and west in the ancient world) (Gornik, 2015). Preah Vihear, inscribed in 2008, is a CS-WHL located on a long-disputed section of the Thai-Cambodia border that has been a site of both violent military clashes and international political intrigue. Although both Thailand and Cambodia supported the nomination of the site to the WHL, the Thai government objected to maps in the nomination package that showed Cambodia as the owner of disputed land next to the temple, leading to protests and military clashes (Sothirak, 2013). Meskell (2016)’s analysis of US diplomatic cables released by WikiLeaks further reveals that settlement of disputes over Preah Vihear were intricately tied to broader issues of foreign policy and US and Chinese investment, especially access to natural gas reserves in the Gulf of Thailand. For example, the cables reveal negotiations for Cambodia to retain their temple, leading to the enhancement of Thailand’s underwater assets, and the United States negotiating for extended contracts with both countries.

# Methods

Our brief review of controversial cultural sites on the WHL shows the intensity and diversity of conflicts and tensions that surround these sites. Many CS-WHL are symbols of national, cultural, political, and religious identity, and the extent of political involvement in negotiations of WHL inscriptions indicates they are of great public interest among local and diasporic communities. Our goal in this study is answer the question of how this interest is expressed within the socio-technical constraints of Wikipedia. How are conflicts over CS-WHL enacted in the canalized interactions of the world’s largest encyclopedia? We attempt to answer this question by studying all the CS-WHL that have Wikipedia articles. We surveyed the basic characteristics of content (article length, number of wikilinks out to other pages, number of citations to non-Wikipedia items), consumption (page view counts, wikilinks in from other Wikipedia pages), and production (edit counts, edit densities, edit sizes, number of unique editors per article, talk page length, talk page topics). There are great many additional metrics available for Wikipedia articles, an we have limited ourselves to the most basic for this initial investigation. By comparing these basic characteristics of Wikipedia articles about CS-WHL to 10,000 random Wikipedia articles we will answer the question: how does engagement with the past compare via CS-WHL on Wikipedia compare to engagement with other topics? Do Wikipedia articles about controversial CS-WHL sites, such as those discussed above, get more attention than random Wikipedia articles? Can we detect conflict in the edit histories, bot activity, and talk pages for Wikipedia articles about CS-WHL sites, and how does this conflict relate to the types of controversies noted above?

The highly detailed edit histories that Wikipedia keeps for every article allow us to further investigate spatial and temporal questions relating to engagement with the past and conflicts surrounding CS-WHL sites. For example, when an article is edited by a user who does not have a Wikipedia user account (or is not logged into their account), their edit is identified by that person’s IP address. This IP address can be used to geo-locate the user to the city they were in when the made the edit. We geo-located all edits with IP addresses for all Wikipedia articles CS-WHL sites to determine the country of origin of those edits. This helps us to answer the question: are the editors of articles about CS-WHL located near the sites they edit, indicating local community interest in the online representation of their heritage? Or are editors located in other countries, implying a digital colonialism of world heritage information on Wikipedia where one community’s heritage is interpreted and communicated by another? The time and date stamps attached to every edit on every article allows us to investigate temporal patterns of activity on CS-WHL Wikipedia articles. Analyses of these data help us to answer the question: is Wikipedia editing activity correlated with events outside of Wikipedia relating to the CS-WHL sites, such as conflict events, or their inscription on the WHL?

We obtained data about Wikipedia articles by scraping the HTML pages with the rvest package for R (Wickham, 2019). We used the SelectorGadget (Cantino and Maxwell, 2017) extension for the Chrome web browser to identify specific elements of interest, or nodes, on the HTML pages, and wrote custom R functions to extract data from these nodes. The highly structured nature of most Wikipedia pages afforded us much efficiency during data collection, however, a not insignificant number of pages had minor irregularities, for example, exotic table formatting or minor deviations from widely used templates, that necessitated more complex programming. An especially challenging issue was minor irregularities in spelling place names, for example, “Saint Kitts and Nevis” and “St. Kitts and Nevis”, which can confound programmatic joining and summarizing of data by failing to recognize as the same place and leading to under-counting. We attempted to correct these manually in our code. We collected data during May 2019, and due to the dynamic nature of Wikipedia, it is highly likely that articles in our study have subtly changed since our data collection as users and bots continue their activity. It is unlikely that articles in our sample have been deleted from Wikipedia since our data collection, because of the high notability of CS-WHL, but it is possible that new articles have since appeared about sites that were not represented on Wikipedia since we collected the data.

# Reproducibility and Open Source Materials for This Study

To enable reuse of our materials and improve reproducibility and transparency (Marwick, 2017), we include the entire R code (R Core Team, 2020) used for all the analysis and visualizations contained in this article in our compendium at <http://doi.org/10.17605/OSF.IO/AY27G>. Also in this version-controlled compendium are the raw data for all the results reported here. All of the figures and quantitative results presented here can be independently reproduced with the code and data in this repository. In our compendium our code is released under the MIT license, our data as CC-0, and our figures as CC-BY, to enable maximum reuse (for more details, see Marwick et al. (2018)).

# Results

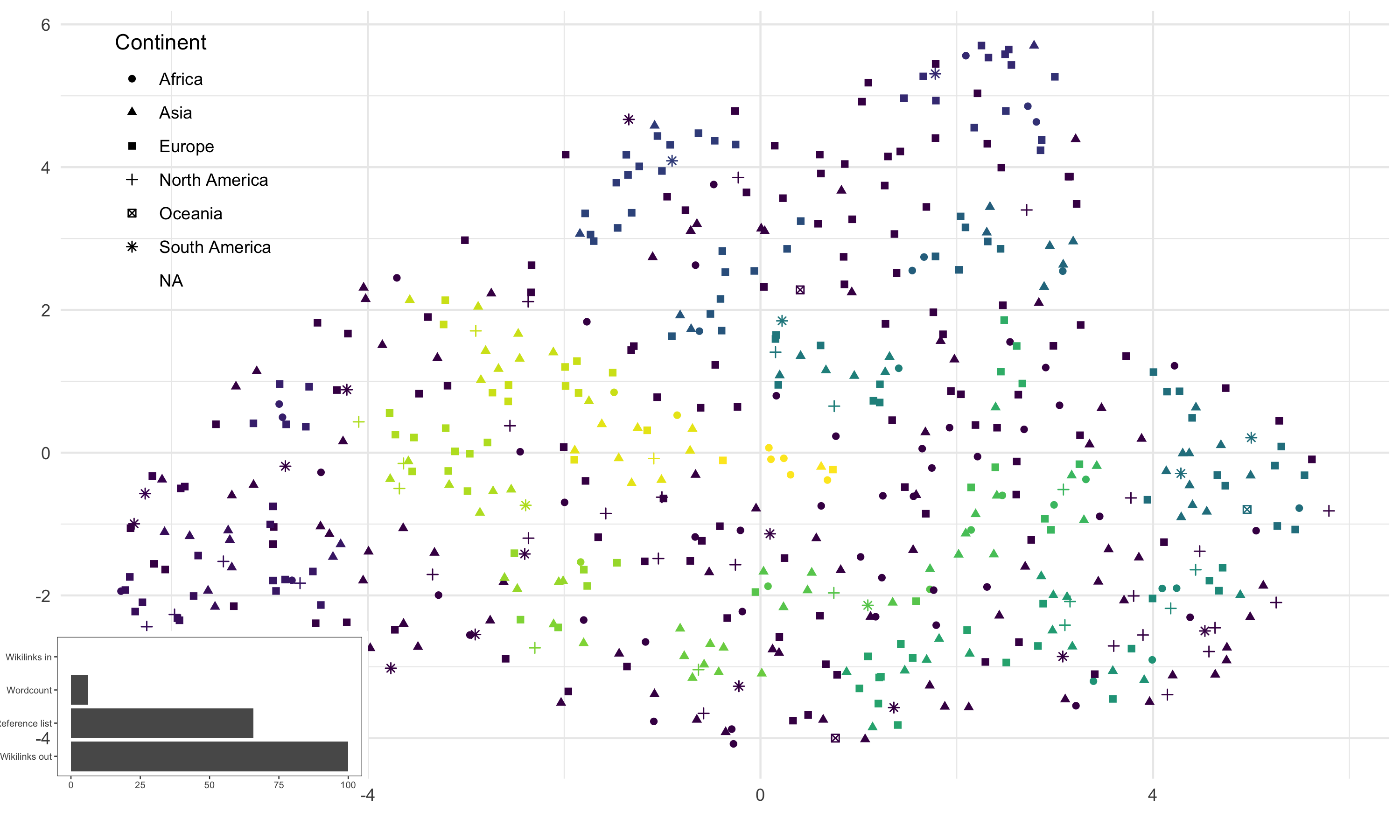


Figure 2: Results of UMAP and HDBSCAN analysis to identify clusters of articles. Point colour indicates cluster membership. Inset plot shows variable loadings to show variables most influential on cluster membership

Of the 869 cultural sites on the World Heritage List at the time of writing, we found Wikipedia articles for 582. To characterize the overall variability of article according to the basic characteristics described above, we applied a Uniform Manifold Approximation and Projection (UMAP) to reduce the dimensionality of our data (McInnes et al., 2018). After a two-dimensional projection was obtained, we used Hierarchical Density-Based Spatial Clustering of Applications with Noise (HDBSCAN) to identify clusters (Campello et al., 2013), and Random Forests to identify variable loadings (Breiman, 2001) so we could determine which of the basic characteristics were most important in driving variability between the articles. This revealed 30 clusters, with the most important variables for determining cluster membership being the number of items in the reference list at the end of the article, the number of words in the article, and the number of Wikilinks out from the target article to other Wikipedia articles. That said, 256 (0%) articles were not assigned to a cluster by the HDBSCAN algorithm, indicating that the basic characteristics of CS-WHL articles do not partition the articles in highly structured and discrete groups.

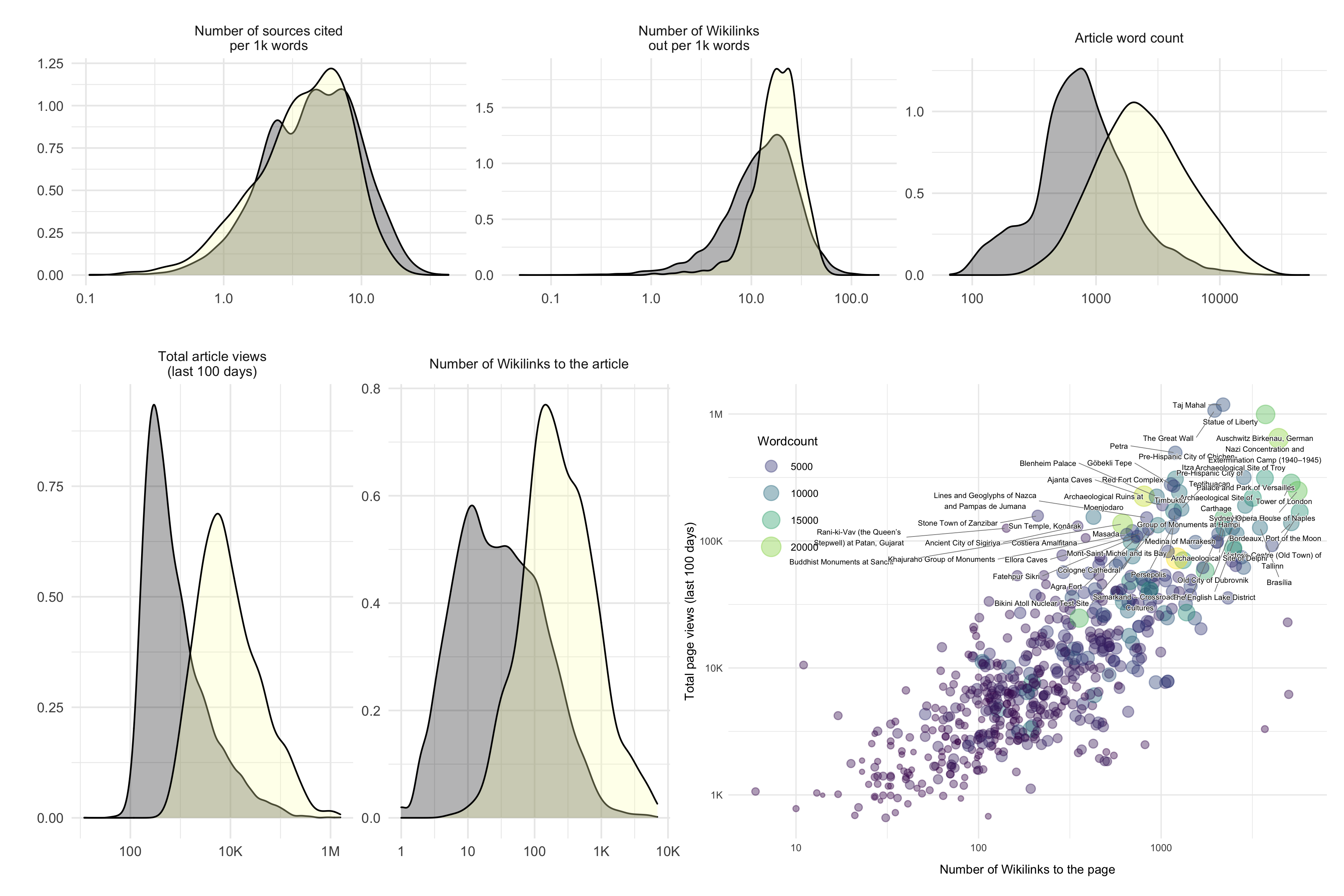


Figure 3: Content and consumption of Wikipedia articles about CS-WHL. The top row of density plots show the distributions of basic content characteristics of Wikipedia articles about CS-WHL (yellow) compared to 10,000 random Wikipedia articles (grey). The density plots on the lower left show basic characterstics of consumption. The lower right shows a scatterplot of consumption metrics for Wikipedia articles about CS-WHL and labels on the most intensively consumed articles

As a group, the basic details of content for Wikipedia articles for CS-WHL differ little from a sample of 10,000 random Wikipedia articles (Figure 3). The scholarly nature of the articles, measured by the number of sources cited in the reference list per thousand words in the article body, is similar for CS-WHL articles and random articles. The number of Wikilinks out from the target article to other Wikipedia articles is also similar for CS-WHL articles and random articles. However, the total number of words in a CS-WHL article is typically much higher than a random article.

The basic metrics of consumption of CS-WHL articles show substantial differences from our sample of random articles (Figure 3). We measure consumption by counting the total number of views of the article over the 100 days prior to our data collection date, and the the number of Wikilinks from other articles into the target article. Wikipedia article view counts are popular widely-used measures of cultural interest or salience (Cao et al., 2020; McIver and Brownstein, 2014; Roll et al., 2016). Wikilinks from other articles are a measure of the centrality of an article, if many other articles link to it, then the article is well-integrated into the encyclopedia and viewed as important for supporting information presented in other articles. CS-WHL articles are typically viewed far more frequently than other Wikipedia articles, reflecting high consumption by internet users generally. They are also much more often linked to by other Wikipedia articles than our random sample of other articles, indicating consumption by other Wikipedia articles and Wikipedia users in their editing work (Figure 3). This indicates that consumption of CS-WHL articles is generally very high. But is this attention evenly distributed across all CS-WHL articles?

The scatterplot on the lower right of Figure 3 shows the values of inward Wikilinks, article views and article word count for all CS-WHL articles. The labeled points in the upper right quadrant are the articles that receive most of the attention. Of the CS-WHL notable for conflict discussed above, only Timbuktu is visible among these highly popular articles. It is also the only site on the List of World Heritage in Danger that is among these highly popular articles. We reviewed the talk page for the Timbuktu article to determine if the attention received by the article might relate to the issues leading to armed conflict at the site. Of the 6162 word on the talk page, only 168 are on the topic of conflict and destruction, with the editors discussing how to describe the scale of the damage to the temples. The majority of talk page content is about filling in missing detail, suggestions for or notifications of minor corrections. This is also the case for the talk page for Auschwitz, another very popular CS-WHL article. Although Wikipedia articles on this site in other languages have different points of emphasis (Wolniewicz-Slomka, 2016), the discussion among editors is generally technical and precise, and provocative comments usually ignored rather than directly disputed. This can be contrasted with the talk page for the Holocaust, where Pfanzelter (2015) found abundant evidence of conflict among editors.

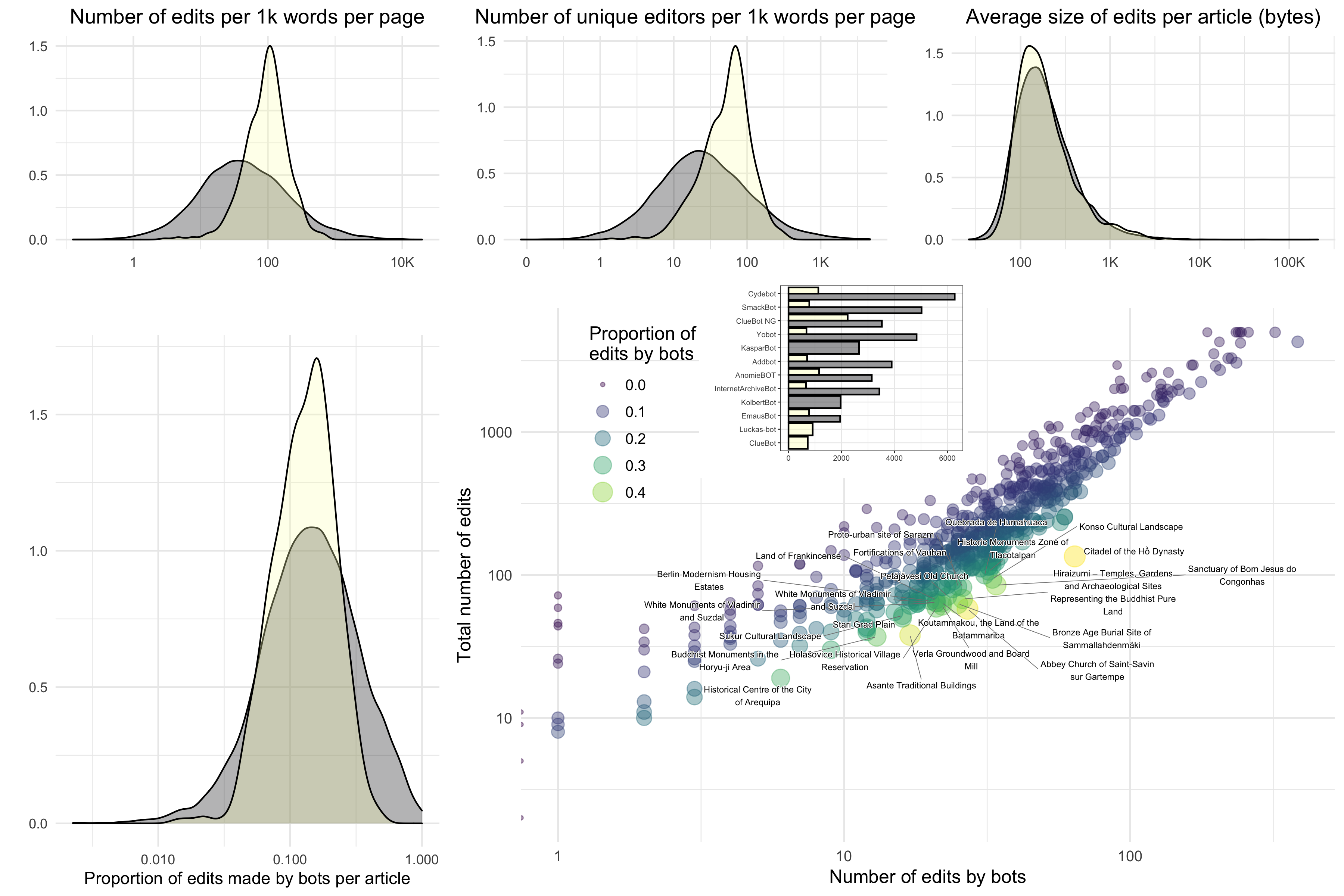


Figure 4: Production of Wikipedia articles about CS-WHL. The top row of density plots show the distributions of basic article production characteristics of Wikipedia articles about CS-WHL (yellow) compared to 10,000 random Wikipedia articles (grey). The density plots on the lower left show the distribution of edits made by bots. The lower right shows a scatterplot of production-by-bot metrics for Wikipedia articles about CS-WHL and includes labels on the articles where bots were responsible for >30% of edits. Inset on the scatterplot shows the number of edits for the top ten bots in our sample.

Basic variables related to the production of Wikipedia articles on CS-WHL differ in key ways from other articles (Figure 4). The number of edits per thousand words, or edit density, and the number of unique editors per thousand words, or editor density, are substantially higher for CS-WHL articles. CS-WHL articles are intensively word-smithed by a more diverse community of editors than usual. The absolute size of edits (i.e. additions or removals of text) is about the same for CS-WHL articles as other articles. The involvement of bots in producing CS-WHL articles is also about the same as for other articles. Bot activity is most intense on shorter, low-profile CS-WHL articles, in Figure 4 the labeled points are sites where bots have done >30% of edits. Most of these bot edits are in the fixer, tagger, connector, and clerk roles. None of these articles with intensive bot activity are CS-WHL sites of conflict or on the List of World Heritage in Danger. The most active bot on CS-WHL articles is Cluebot NG (vandalism detection and reverting), compared to Cydebot (automatic implementation of category deletions) for the random articles. The AnomieBOT is very active on CS-WHL articles compared to random articles, this bot performs clerical duties in an article’s reference list.

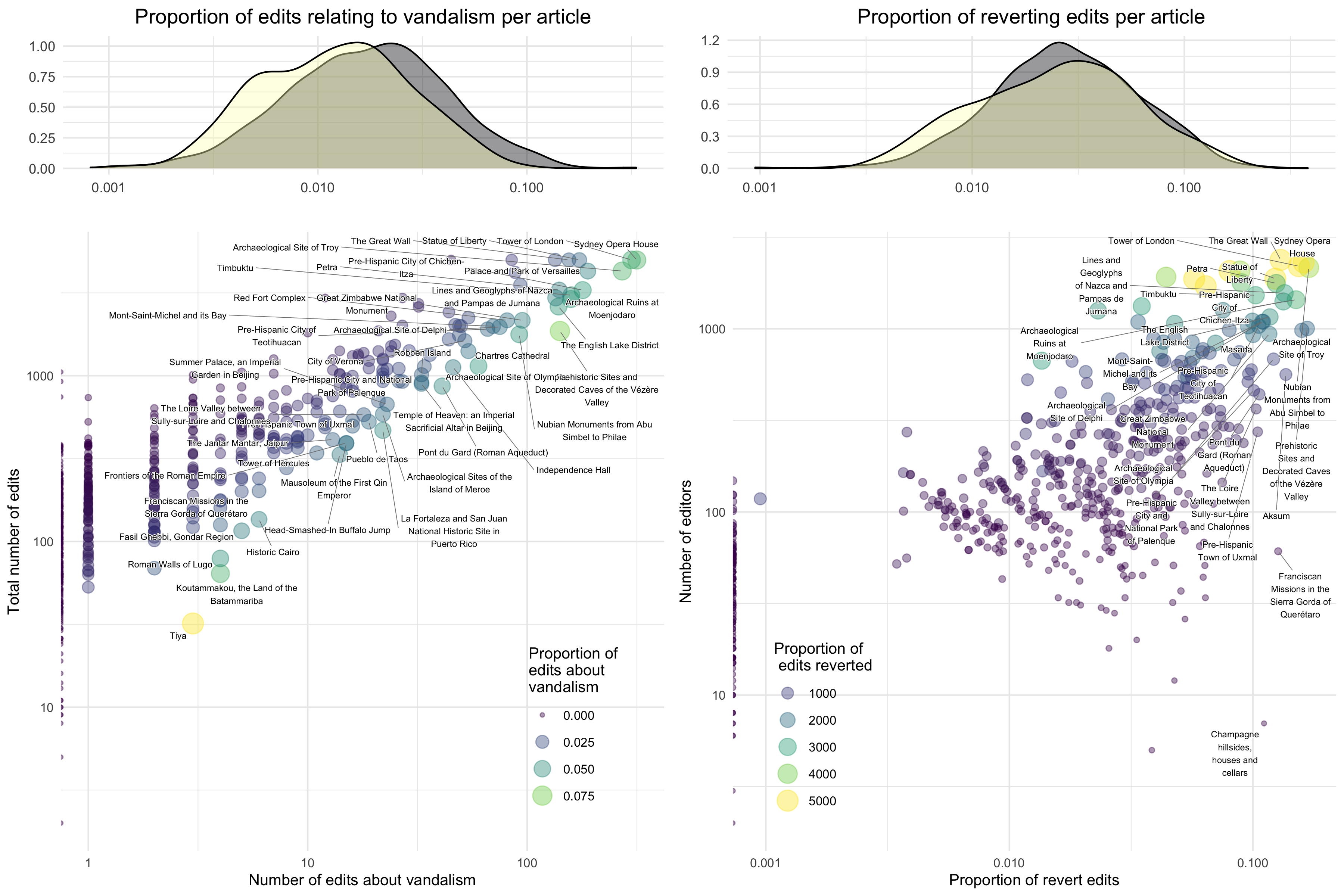


Figure 5: Reverted edits and edits about vandalism in Wikipedia articles about CS-WHL. The top row of density plots show the distributions of proportions of edits relating to vandalism, and the proportion of revert edits in Wikipedia articles about CS-WHL (yellow) compared to 10,000 random Wikipedia articles (grey). The scatterplots below show reverted edits and edits about vandalism metrics for Wikipedia articles about CS-WHL, and includes labels on the articles with high proportions of these types of edits.

For the special ‘revert’ edit type, we see that the proportion of all edits per CS-WHL articles is similar to other articles, but has a left-skewed distribution indicating a higher number of articles that have very few revert edits (Figure 5). We also identified edits with the string ‘vandal’ in the edit summary as a similar type of edit to the revert edit, e.g. “Edits by 72.49.241.71 identified as vandalism”. CS-WHL articles generally have fewer edits about vandalism than our random sample. The shape of the distribution of edits about vandalism has a smaller second mode to the left of the peak, indicating that a large number of CS-WHL articles have very few edits about vandalism (Figure 5). Among the CS-WHL articles that have high proportions of reverts and edits about vandalism are highly iconic sites in the Western canon of culture history, e.g. the Sydney Opera House, the Tower of London, and the Statue of Liberty. In reviewing a sample of several hundred reverted edits for each of these, we found that nearly all of them are undoing the addition of short strings of text (e.g. profanities, spam, nonsense). Much of this vandalism is playful, in the spirit of “‘I am’, a statement that one is present and alive”, as Baker (2003) described historical graffiti on the Reichstag in Germany by Russian soldiers in WW2. Once again, of the CS-WHL sites with a history of conflict or on the in-danger list, only Timbuktu appears here as having high proportions of revert and vandalism-reversing edits.

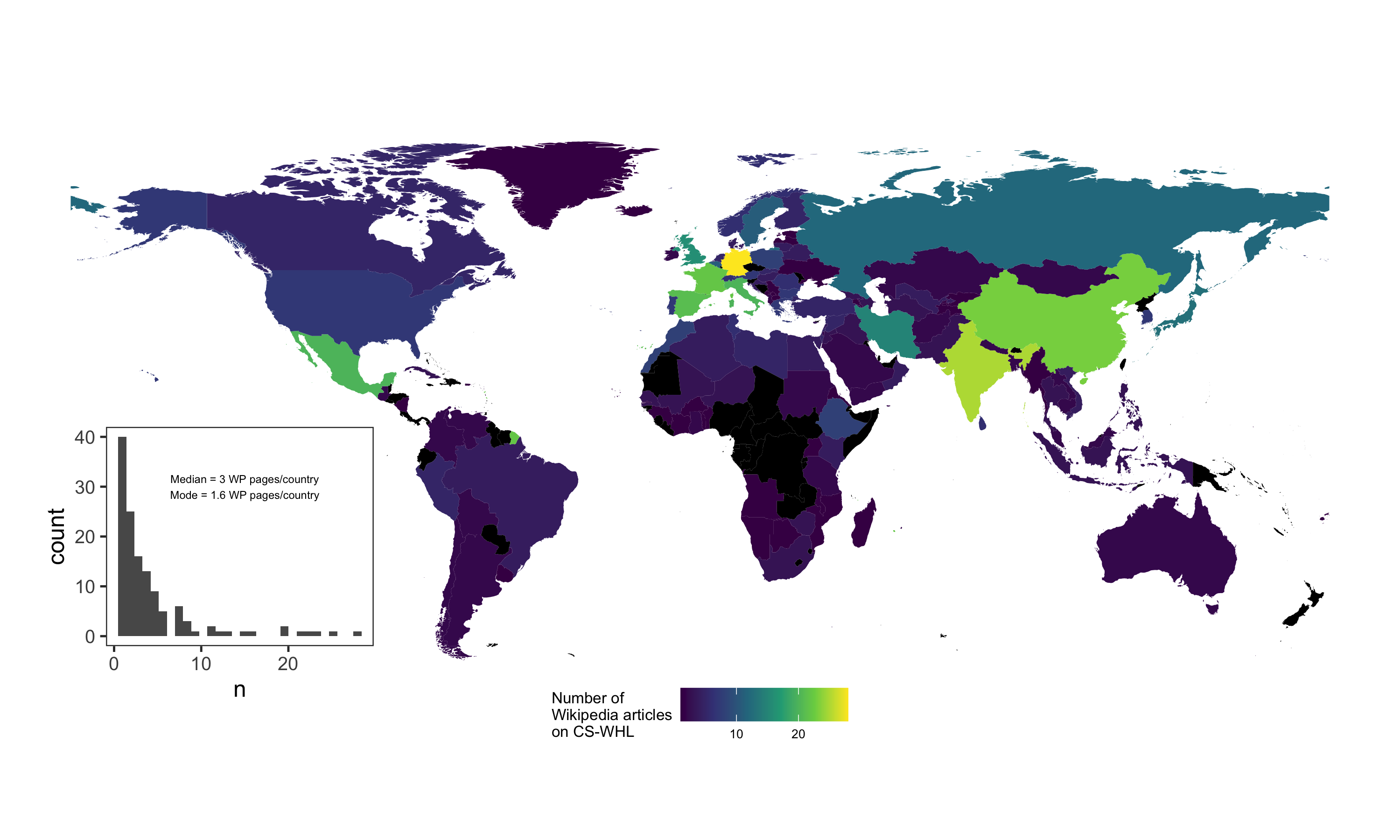


Figure 6: Wikipedia articles for Cultural Sites on the UNESCO World Heritage List. Countries coloured black currently have no Wikipedia articles for CS-WHL sites. Inset shows the distribution of articles per country. Map data from naturalearthdata.com

Figure 6 shows that most countries have between 2-3 CS-WHL on Wikipedia, with Germany, India, China, France and Spain being the countries with the most articles about their CS-WHL.

# Discussion

Come back to danger list (Brown et al., 2019; Hølleland et al., 2019)

# Conclusion

# Acknowledgements

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### Colophon

This report was generated on 2020-05-27 16:07:30 using the following computational environment and dependencies:

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