Frankenmetrics: Assembling a scholarly record of monsters

Kellie Dalton[1], Madelaine Hare[2*], Geoff Krause[3], Summer Wilson[4], & Philippe Mongeon[5]

[1] kellie.dalton@dal.ca
https://orcid.org/0009-0008-3692-2505
Dalhousie University

[2] maddie.hare@dal.ca
https://orcid.org/0009-0008-3692-2505
Department of Information Science, Dalhousie University, Canada

[3] gkrause@dal.ca
https://orcid.org/0000-0001-7943-5119
Department of Information Science, Dalhousie University, Canada

[4] summer.wilson@dal.ca
https://orcid.org/0009-0001-6756-6661
Department of Information Science, Dalhousie University, Canada

[5] PMongeon@dal.ca
https://orcid.org/0000-0003-1021-059X
Department of Information Science, Dalhousie University, Canada
Centre interuniversitaire de recherche sur la science et la technologie (CIRST), Université du Québec à Montréal, Canada

*Corresponding author: maddie.hare@dal.ca

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Abstract

Monsters in literature, film, mythology, and popular culture do not exclusively exist in these domains; scholarship across disciplines places monsters at the forefront of scholarly inquiry, and entire fields (e.g., Cryptozoology) are dedicated to such investigation. We conducted a bibliometric analysis of monster scholarship focusing on vampires, werewolves, Frankenstein's monster, and zombies. This analysis investigates what scholarship has been written about these monsters, how it has evolved, who produces this scholarship, and its geographic distribution. We use word co-occurrence to examine key topics within this corpus. This analysis may aid in revealing how monsters inhabit disciplines, time periods, and geographical regions. It may be of interest to

researchers who consider scholarly and cultural perceptions of monsters--often used as symbols and metaphors-- and their interaction with societal events.

1. Introduction

"It is true, we shall be monsters, cut off from all the world; but on that account we shall be more attached to one another." -Frankenstein, Mary Shelley, 1818

Monsters in literature, film, mythology, and popular culture do not exclusively exist in these domains; scholarship across disciplines places monsters at the forefront of scholarly inquiry, and entire fields (i.e., Cryptozoology) are dedicated to such investigation. Some regard J.R.R. Tolkien as contributing to opening the door to the contemporary, concerted study of monsters as central and crucial figures, individuals, and symbols through his 1936 lecture "Beowulf: The Monsters and the Critics," which critically analyzed the epic poem Beowulf (Tolkien, 1990; Kucharski, 2009). Jeffrey Jerome Cohen's 1996 work coined the term "Monster Theory" (Cohen, 1996), which, as noted by Allen (2023), spans cultures and disciplines. Monster studies have thus evolved into an interdisciplinary endeavour, where methods across the sciences are drawn on to explore the concepts of monsters and monstrousness. Allen (2023) describes the motivation behind this scholarly pursuit: "Monsters reveal what a culture thinks of itself and of others; they define the human as much as they define the inhuman. In exploring what monsters are and where they come from, monster theory aims to understand what monsters mean and what cultural work they do" (para. 12).

Bibliometrics, the quantitative study of scholarly outputs (Otlet 1934; Pritchard, 1969), offers the tools to produce a large-scale analysis of scholarly work, which can provide insight into the global scholarly effort on monsters. We conducted a bibliometric analysis of monster scholarship focusing on vampires, werewolves, Frankenstein, and zombies to investigate the scholarly output relating to these monsters, how it has evolved, who produces this scholarship, and its geographic distribution. We also use co-word occurrence to examine key topics within this corpus of monster scholarship. This analysis may aid in revealing how monsters inhabit disciplines, time periods, and geographical regions. It may be of interest to researchers who consider scholarly and cultural perceptions of monsters--often used as symbols and metaphors--and their interaction with societal events.

1.1 Research objectives

Our research questions are as follows:

> **RQ1.** What scholarship has been written about monsters (vampires, werewolves, zombies, and Frankenstein's monster), and how has it evolved over time?
> **RQ2.** Who produces scholarship on monsters?
> **RQ3.** What is the geographic distribution of monster scholarship?
> **RQ4.** What topics are studied in monster research?

Using bibliometric methods, we investigated academic discourse about monsters by conducting a descriptive analysis showing characteristics of this scholarship and how it has evolved over time (document types, number of papers), in what journals monster scholarship is published (venues), who produces this research and how they collaborate (institutions, countries), and the geographic distribution of this scholarship (author-affiliated countries). We also aim to illuminate the main topics studied in this corpus of work using co-word analysis.

2. Methods

2.1 Data collection and analysis

As we were working in the lab late one night, we decided on conceptual boundaries to delineate the scope of our analysis. We selected the four monsters, Vampires, Frankenstein's monster (also referred to as "Frankenstein"), Zombies, and the Wolfman, featured as the main characters of the 1962 Halloween hit song "The Monster Mash" by Bobby "Boris" Pickett & The Crypt Kickers, considered quintessential monstrous figures popularized in cinema, pop culture, and literature. This focus allows a more concentrated investigation of these four monsters as objects of scholarly attention and their traces in the scholarly literature.

Using the OpenAlexR package (Aria et al., 2024), we queried OpenAlex, an open database of millions of scholarly works (Priem et al., 2022), for publications relating to the following list of monsters and select synonyms.

- Vampire: vampire OR Nosferatu OR Dracula OR nightwalker OR bloodsucker
- Zombie: zombie OR ghoul
- Werewolf: werewolf OR "were-wolf" OR wolf-man OR "wolf-man" OR lycanthrope
- Frankenstein: Frankenstein

The time period restriction 1900-2024 was applied. No document type restriction was applied. Documents were deduplicated so that they were counted only once per monster type. Our final dataset comprised 18,133 distinct works (18,294 when allowing for duplicates across monsters). All data processing and analysis were conducted in R.

3. Results and discussion

3.1 Descriptive analysis

Table 1 shows the overall count of works in our corpus by monster type. Vampires are the monster most frequently published about (42% of works), followed by zombies (31%), Frankenstein (24%), and werewolves (4%). The terms "vampire" and "Dracula" retrieved the highest number of works relating to vampires. Similarly, "werewolf" and "wolfman" represent the highest number of works

relating to werewolves, though “werewolf” is the preferred term associated with this literature. “Zombie” retrieved the highest number of works for the monster zombie as compared to "ghoul". Finally, Frankenstein represented almost a quarter share of the entire corpus, revealing the predominance of the monster in scholarship in relation to its origination from just one work[1].

Table 1. Count of works by monster type.

Monster type	Works count
Vampire	**7,678**
vampire	5,706
Dracula	1,935
Nosferatu	237
bloodsucker	54
nightwalker	18
Zombie	**5,535**
zombie	5,371
ghoul	168
Frankenstein	**4,301**
Werewolf	**780**
werewolf	531
“wolf-man”	143
wolfman	61
lycanthrope	31
“were-wolf”	15

In examining the global count of works published about these four monsters from 1900-2024 (Figure 1), it is clearly observed that vampires were generally the object of scholarly focus as far back as the 1930s, with a steep increase occurring around the year 2000 onward. Frankenstein’s monster was the second most written about monster after vampires, until around 2010, when zombies surpassed it, climbing higher than vampires in 2018, the 200th anniversary of the original work by Shelley. Frankenstein’s monster, however, saw a higher number of works than vampires or zombies around 2020. Werewolves were the object of scholarly attention more than other monsters in pockets around the 1940s and 1950s, though they remain understudied compared to the other three monsters by a wide margin.

[1] That is, the 1818 novel *Frankenstein; or The Modern Prometheus*, by Mary Shelley.

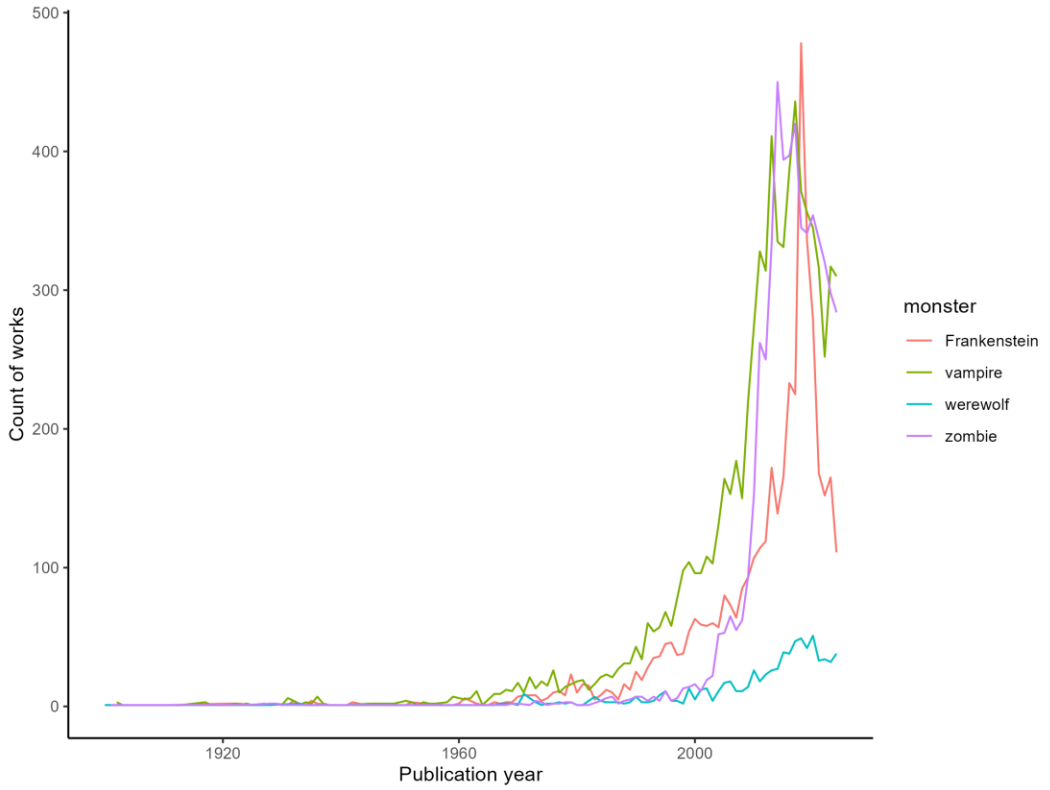

Figure 1. Count of works by monster type, 1900-2024

It is useful to consider the types of documents that scholars produce about monsters. In looking at document types with a frequency of 100+ in our dataset by monster types (Figure 2), we see that vampires have the greatest diversity of document types (all eight types) produced about them, while Frankenstein and zombies each have six, respectively, and werewolves only two (articles and book chapters). Articles (n=11,500) are the most common document type produced about all four monsters, followed by book chapters (n=3,128). Books (n=985) are the most frequently produced document types after these, followed by preprints (n=651), LibGuides (n=609), dissertations (n=543), other types (n=356), and datasets (n=258). The high presence of LibGuides also implies the creation of research resources for pedagogical purposes, indicating that Frankenstein, vampires, and zombies may be objects of both academic study and objects of study by students in higher education.

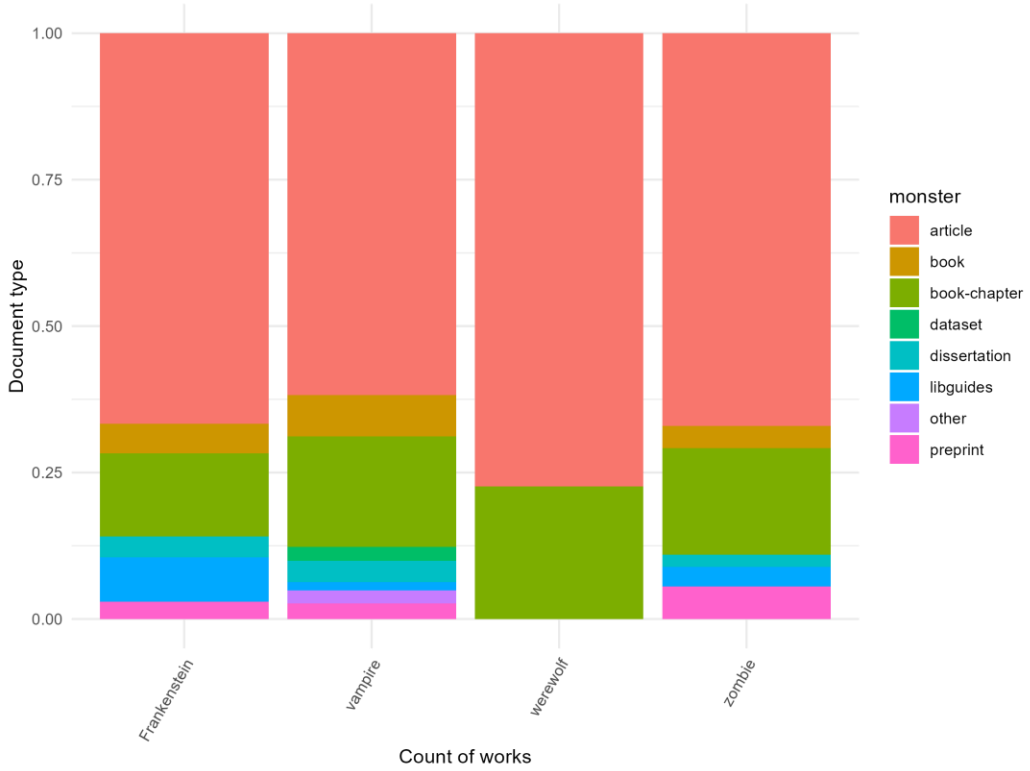

Figure 2. Count of document types (Freq > 100) by monster type

We aimed to investigate where monster scholarship was published. For a more focused analysis on the traditional scholarly journal venue, we filtered to the document type "article" in Table 2 and looked at the top 10 venues for each monster type. While the OpenAlex data resulted in a few incomplete entries (e.g., Directory of Open Access Journals rather than specific journals), the results reveal the venues in which monster scholarship on our four monsters is most frequently published. Relating to Frankenstein, *Science Fiction Studies,* the *European Romantic Review*, and *Studies in Romanticism* host this work, while for vampires, the *Journal of Dracula Studies*, *Journal of Mammalogy*, *Gothic Studies*, and *Journal of Popular Culture* are common venues. Works about werewolves are found in venues such as *Gothic Studies*, *The Medieval Review,* and *Folklore*. Zombie-related scholarship is often published in *The New Scientist,* the *Journal of Consciousness Studies*, and *Nature*, as examples.

These venues also hint at where monsters as metaphors or symbols, or where monstrous figures or images have bled into other disciplinary thinking or language. The *Journal of Mammalogy*, for example, focuses on a branch of zoology concerned with mammals. This can be understood to be relating to "vampire bats", rather than the mythical creature "vampire". This can be similarly observed for the *Japanese Society for Artificial Intelligence* journal, which publishes research on artificial intelligence agents that are trained on the social deduction game Werewolf (also known as Mafia). The "werewolf cat" or Lykoi breed is the result of research in the field of veterinary medicine.

3.2 Publication venues

Table 2. Top 10 venues for each monster type (journal articles).

Monster type	Source	Works count
Frankenstein	DOAJ (DOAJ: Directory of Open Access Journals)	38
	Science Fiction Studies	38
	PubMed	30
	European Romantic Review	25
	SSRN Electronic Journal	20
	Deleted Journal	17
	Studies in Romanticism	17
	The Wordsworth Circle	16
	Dirigido por ...: Revista de cine	14
	Notes and Queries	14
Vampire	Journal of Dracula Studies	67
	PubMed	60
	DOAJ (DOAJ: Directory of Open Access Journals)	53
	Journal of Mammalogy	40
	Choice Reviews Online	39
	Gothic Studies	35
	The Journal of Popular Culture	28
	SSRN Electronic Journal	25
	Nature	19
	Bulletin of the Center for Children's Books	18
	The New Scientist	18
Werewolf	The Japanese Society for Artificial Intelligence	21
	PubMed	12
	Gothic Studies	6
	Journal of the American Psychoanalytic Association	5
	The Medieval Review	5
	Bulletin of the Center for Children’s Books	4
	2022 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)	3
	American imago	3
	Contemporary Psychology	3
	DOAJ (DOAJ: Directory of Open Access Journals)	3
	Folklore	3
	French Studies	3
	Images	3
	Plant Psychology	3
	Psychological Medicine	3
	SSRN Electronic Journal	3
	World Literature Today	3
Zombie	SSRN Electronic Journal	132
	The New Scientist	34
	Nature	25

DOAJ (DOAJ: Directory of Open Access Journals)	23
Bulletin of the Center for Children's Books	19
Choice Reviews Online	16
PubMed	15
Research Portal Denmark	15
The Journal of Popular Culture	15
Deleted Journal	13
Journal of Consciousness Studies	13

3.3 Leading institutions

The top global production of scholarship about monsters (Table 3) can be attributed to The Ohio State University, Cornell University, and the University of Glasgow. The appearance of multiple Latin American institutions in the top ten, and the predominance of vampire-related works in most Latin American countries, can partly be attributed to works related to vampire bats, as these countries coincide with the species' habitats.

Table 3. Top 10 global institutions for monster-related works.

Institution	Works count
The Ohio State University	41
Cornell University	39
University of Glasgow	39
Smithsonian Tropical Research Institute	38
University of Cambridge	38
Universidad Nacional Autónoma de México	37
The University of Sydney	36
Universidade de São Paulo	36
The University of Melbourne	34
Universidade Estadual Paulista (Unesp)	34

Zooming in to the top Canadian institutions (Table 4, Figure 3), it can be observed that the University of British Columbia and the University of Toronto are the top producers of monster scholarship, followed by Western University, the University of Alberta, and McMaster University. Most of the top Canadian universities are also the largest ones. Carleton University and the University of Windsor are more productive than might be expected given their size, while the absence of McGill University and the University of Ottawa (both large research universities) is more surprising.

Table 4. Top 10 Canadian institutions for monster-related works.

Institution	Works count
University of British Columbia	24
University of Toronto	19
Western University	16

University of Alberta	15
McMaster University	14
Carleton University	11
University of Windsor	11
Wilfrid Laurier University	11
Université du Québec à Montréal	10
Université de Montréal	10

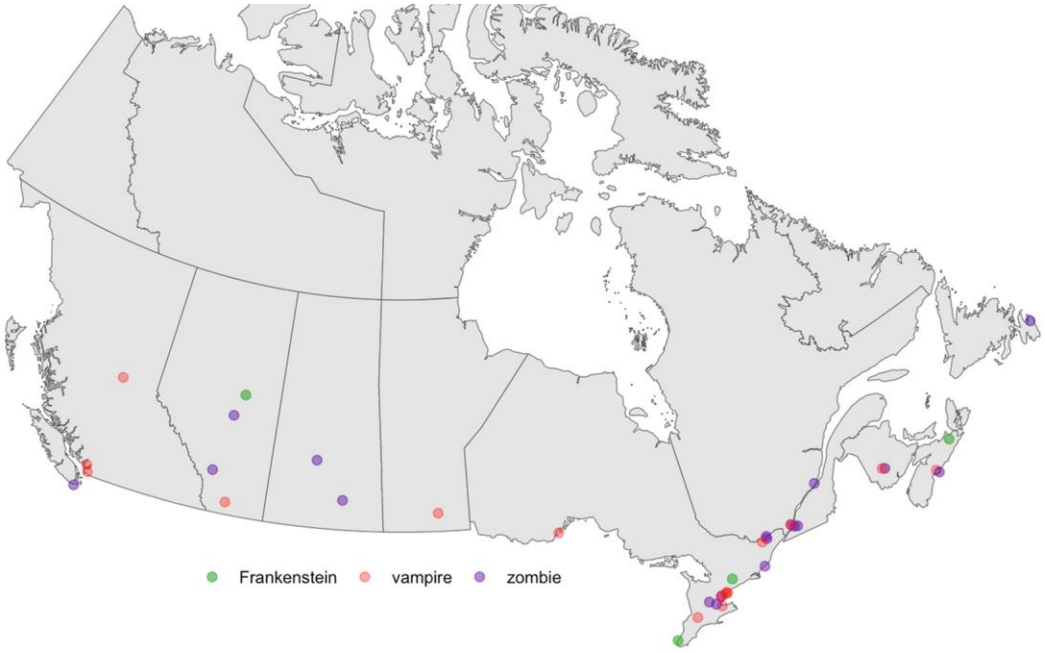

Figure 3. Map of most frequent monster in works affiliated with Canadian institutions

Table 5 shows collaboration statistics for each monster type. Co-authorship is also known to be more frequent in some fields than others, particularly in the natural and medical sciences. This may account for the higher mean author numbers in the vampire-related works in particular. While cross-institutional and international co-author counts will depend on co-authorship more generally, it is interesting that zombie and werewolf-related works switch positions here, indicating that while werewolf-related works may be slightly more likely to have more authors, they are slightly more likely to be affiliated to the same institution and/or country.

Table 5. Collaboration statistics by monster type.

Monster	Mean Authors	Mean Affiliations	Mean Countries
Vampire	2.42	1.71	1.25
Zombie	2.04	1.61	1.21
Frankenstein	1.37	1.25	1.09
Werewolf	2.24	1.57	1.14

Works about monsters indexed in OpenAlex are overwhelmingly published in English, followed by French, German, and Spanish. While OpenAlex has a greater coverage of non-English works than other databases, English still predominates, and results will tend to favour publications written in English and from English-speaking countries. This may further exacerbate discipline-level coverage, as works in the sciences are more likely to be published in English, regardless of the place of publication, institutional affiliations, or authors' first language. Some search terms may be more likely to return non-English works than others.

Table 6. Monster-related works by language.

Language	Works count
English	14,162
French	1,029
German	660
Spanish	432
Portuguese	221
Dutch	137
Italian	128
Afrikaans	106
Indonesian	79
Romanian	77

3.4 Geographic distribution

The United States and the United Kingdom top the list of works produced by author affiliations (Table 7), both overall and for all monsters except Werewolves, where Japan takes second place (Table 8). Brazil and France are also among the top institutions for Frankenstein and Vampires, as well as China for Werewolves and Zombies. Australia and Canada also both produce substantial work on Zombies. Note that works may be attributed to multiple countries.

Table 7. Top author-affiliated countries for monster works.

Country	Works count
United States	1,824
United Kingdom	818
France	338
Australia	280
Canada	257
Brazil	252
China	229
Germany	219
Spain	133
Japan	133

Table 8. Top countries by monster.

Monster	Country	Works Count
Frankenstein	United States	347

	United Kingdom	120
	Brazil	79
	France	75
	Spain	54
Vampire	United States	732
	United Kingdom	378
	France	150
	Brazil	130
	Australia	118
Werewolf	United States	71
	Japan	35
	United Kingdom	27
	France	16
	Netherlands	9
Zombie	United States	674
	United Kingdom	293
	China	145
	Australia	115
	Canada	113

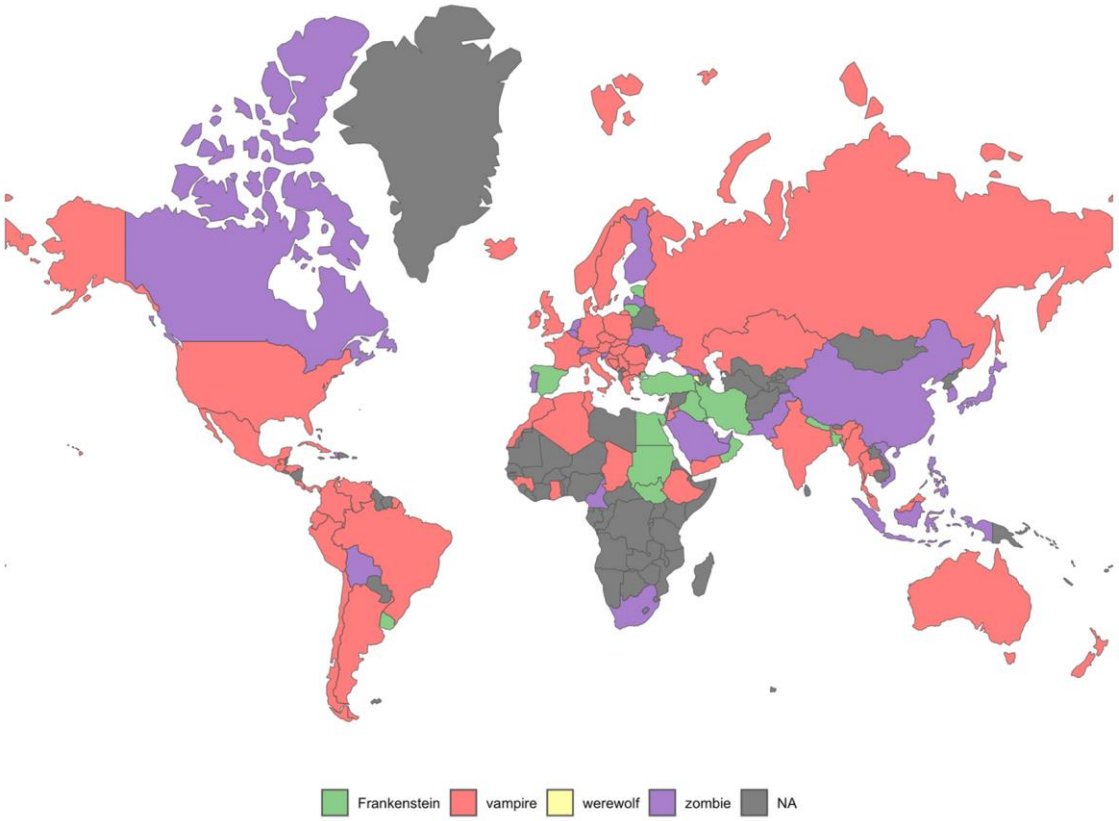

Figure 4. Map of most frequent monster type by country of affiliated institutions

3.5 Topical analysis

3.5.1 Common title co-words

The top common co-word analysis looked at the top 20 co-words from the titles of our monster-related works. Because we queried for multiple alternative terms the top results for the co-word analysis tends to be one of the alternative query terms. For example, in our search for titles with vampires (Figure 5), the top co-word is "vampire" and the second "Dracula". A filter was also applied to remove words of two letters or less from the results for more meaningful results.

The top results for vampire-related works reflects the popularity of Bram Stoker's *Dracula* as an object of study, as a good amount of the top co-words were "Dracula" or in reference to Bram Stoker's name ("Bram", "Stoker", "Stoker's"). A significant number of results reflect the prevalence of vampire bats in vampire-related research ("bat", "bats"), including two terms that were the taxonomic names for two species of vampire bats ("rotundus", "desmodus"). "Buffy" and "Slayer" also show up in the top 10 co-words, representative of the cultural prominence of the hit movie and television show "Buffy the Vampire Slayer". Other results speak to related topics of interest, including terms such as "gothic", "fiction" and "rabies".

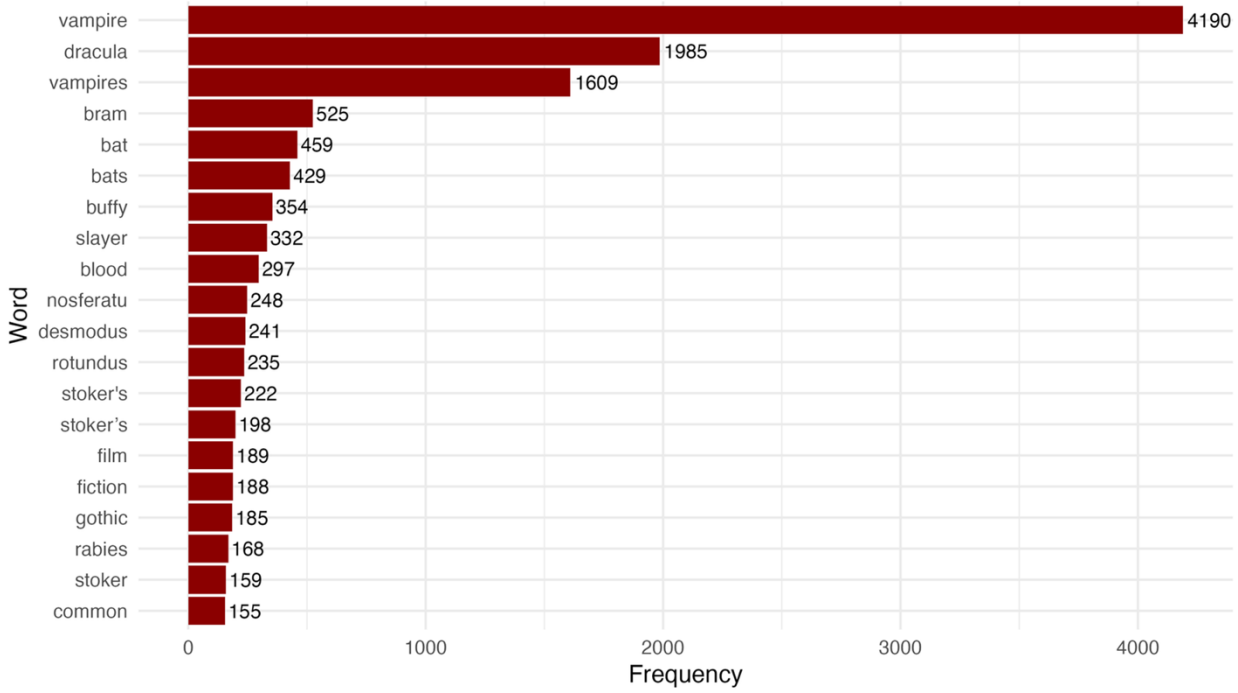

Figure 4. Top 20 title co-words in works related to vampires.

The top results for co-words relating to zombies (Figure 6) are commonly associated features of zombie media, such as "apocalypse", "walking", "undead", as a few examples. "Politics" was associated with 81 results; analysis of the full titles reveals that several of these titles refer to a political analysis of zombie-related media in popular culture, but more often "Zombie" is

referenced in political works to describe something that is operational in function but its actual purpose may be defunct – for example the term “Zombie Democracy” or the idea of "Zombie liberalism”.

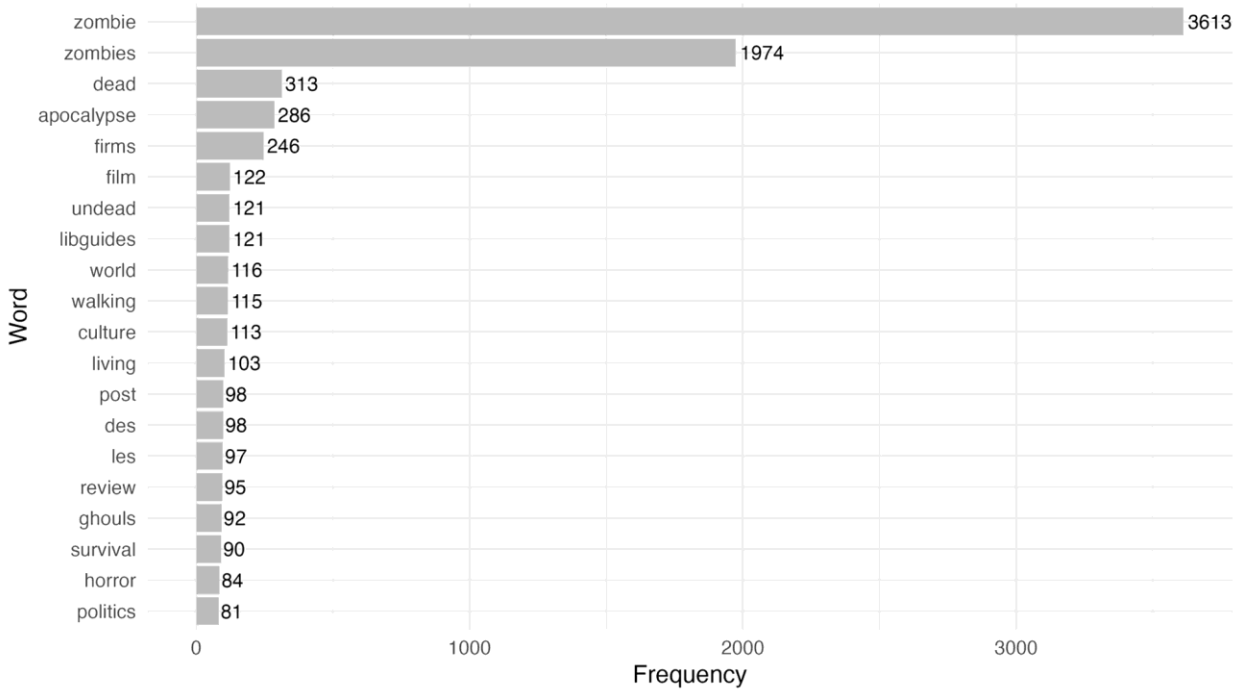

Figure 6. Top 20 title co-words in works related to zombies.

Most of the top resulting co-words for werewolf-related works (Figure 7) were terms in reference to the Maned wolf, a species of wolf found in South America and known for particularly long legs (alternative names for the species include “brachyurus” and “chrysocyon”’which are in the top five results). The actual titles reveal that there is not any significant connection between the Maned wolf and werewolves (at least not any greater than any other wolf). An additional result of interest is “Freud”, with 19 works having “Freud” as a co-word. This is due to a famous case study of the psychologist Sigmund Freud whose patient had a vivid dream of several wolves outside his window. After this dream the patient's temperament became radically more anxious, and this patient was nick-named “Wolfman”, which explains the presence of “Freud” in the results.

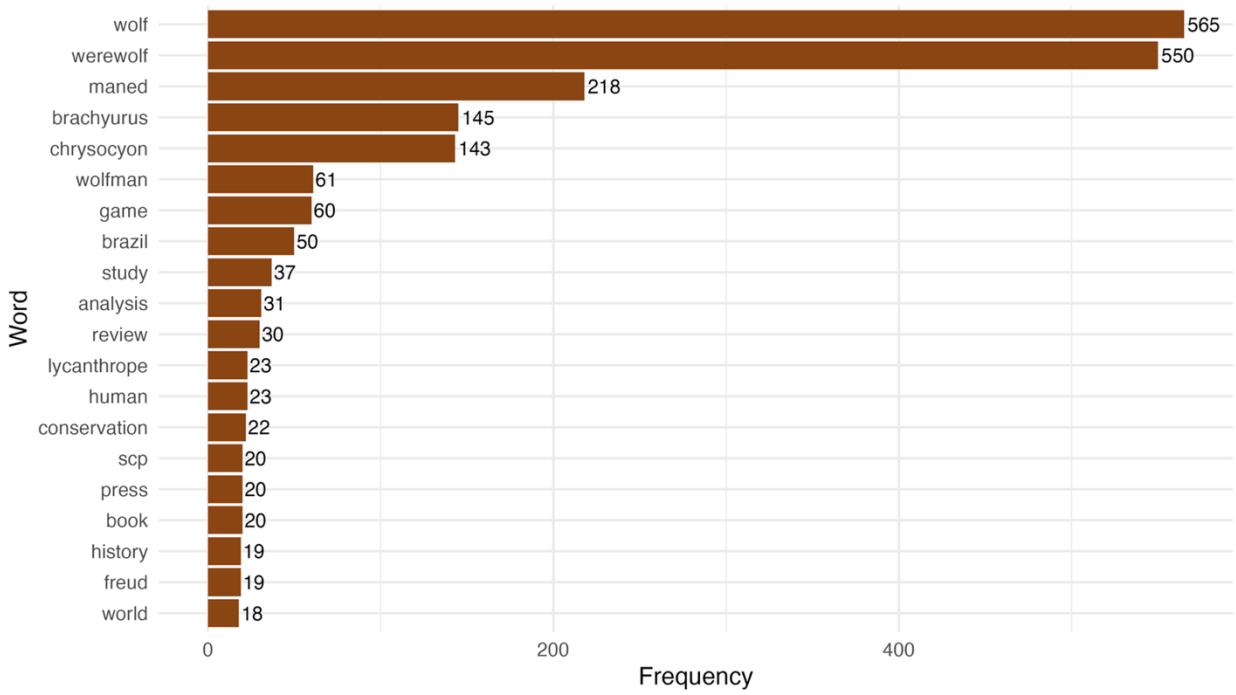

Figure 7. Top 20 title co-words in works related to werewolves.

The results for Frankenstein (Figure 8) are closely related to Shelley's *Frankenstein*, a popular cultural work. The top results reflect different variations of the author Mary Shelly's name. The terms "science", "gothic", and "life" all appear, naturally occurring as common themes of the book. "Prometheus" is the name of a Titan in Greek mythology, appearing as one of the more common co-words (150 occurrences) as the original title for Shelley's work is *Frankenstein; or The Modern Prometheus*. Some of the frequency of "Prometheus" as a co-word is because works use the full name of the novel in their reference to the work, but others directly discuss a comparison of the two figures Frankenstein's monster and Prometheus. An initially seemingly unconnected co-word is "Baghdad", referencing a popular literary novel published in 2013 by Ahmed Saawadi about a Frankenstein creature created from the bodies of the victims from the American invasion of Iraq in the 2000s.

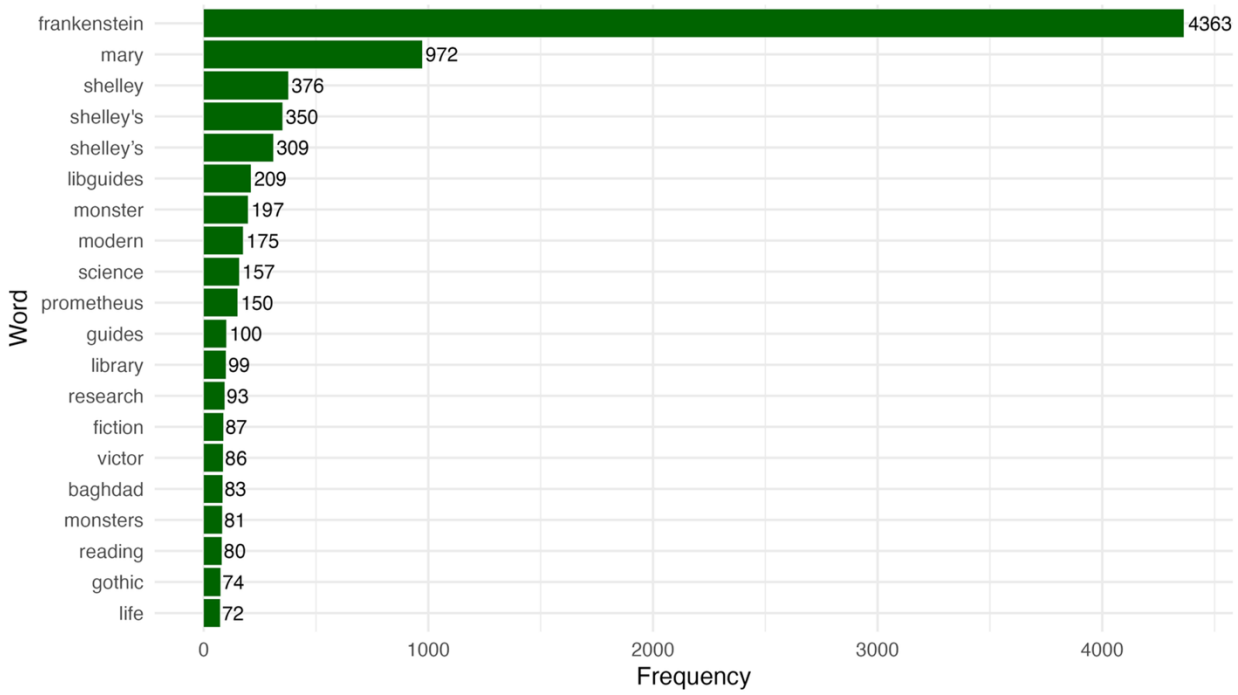

Figure 8. Top 20 title co-words in works related to Frankenstein

4. Conclusion and limitations

This analysis mapped scholarly works relating to vampires, werewolves, Frankenstein's monster, and zombies, four monsters widely recognized from the hit 1960s song "The Monster Mash". Bibliometric mapping can highlight where and how monsters persist in academic work. We used OpenAlex to retrieve 18,133 distinct works from 1900-2024. We descriptively analyzed this work (counts, document types, venues, institutions, countries) and performed a title co-word analysis to identify key topics within the corpus.

Vampire-related works comprise almost half of all works, followed by zombies (surpassing Frankenstein after 2010) and Frankenstein-related works (spiking around the year 2018), while werewolf-related scholarship was the least studied with occasional spikes mid-20th century. Articles accounted for the most common document types, followed by book chapters, books, preprints, and LibGuides. The high presence of LibGuides suggests monsters' use in pedagogy and research. The venues in which monster works are published indicate the cross-disciplinary reach of monsters: literary studies, the natural sciences, psychology, and AI research are just a few of the fields into which this scholarship extends.

Top global producers of monster research include The Ohio State University, Cornell University, University of Glasgow, Smithsonian Tropical Research Institute, and University of Cambridge. Top Canadian institutions are the University of British Columbia, the University of Toronto, Western University, the University of Alberta, and McMaster University. Collaboration patterns

show higher collaboration rates in vampire and werewolf works. The geographic distribution of work shows that the top countries producing monster research are the United States, the United Kingdom, France, Australia, and Canada. Latin America is notable for vampire bat ecology studies. English dominates (over 14,000 works), followed by French, German, and Spanish.

Topical insights show common co-words linking monsters to cultural, political, and scientific, such as taxonomic names of species of bats and wolves, references to famous case studies in psychology, and political terms. These topics indicate how monster scholarship extends into the broader societal imagination and disciplinary minds, where allusions to monsters are used as metaphors, symbols, and connotations of certain traits of the original monsters. Top co-words also indicate a focused study of original works related to monsters (e.g., Shelley's Frankenstein, Stoker's Dracula), which are popular in the fields of literature, cultural studies, gender studies, and film and media studies.

Thus, monsters serve as epistemic objects across disciplines. Scholarship related to monsters reveals topics of interest to popular culture, societal beliefs, anxieties, and reflections, as well as our scientific priorities. Monster-related research is indeed interdisciplinary, spanning literature, film, cultural studies, and the natural sciences. Bibliometrics allows a quantitative view of how monsters circulate in scholarly discourse; this analysis shows that monsters may not lurk in the shadows of scholarly discourse, but indeed themselves be the object of scholarly inquiry, as well as play a powerful role in how we understand the broader scientific world.

Future work could consider expanding the analysis to broader lexicons, analyzing citation contexts, and incorporating Arts and Humanities databases to better represent research fields in these disciplines.

4.1 Limitations

Our search query naturally introduces limitations to the focus of this analysis. Keywords and associated synonyms were selected to capture a focused body of literature on four specific monsters. We did not include certain related terms that introduced too broad a range of literature (e.g., "undead" for vampire or zombies) or terms that captured unrelated literature (e.g., "living dead" retrieved works with sentences such as "living, dead…").

While the study of monsters began before 1900, we introduced this time period restriction to remove a long tail of works from previous centuries, which may suffer from incomplete metadata.

Overall numbers may be low due to the underrepresentation of works in the Arts & Humanities. Journals in this domain have historically had low coverage in bibliographic indexes and databases, as have books, in general. Where books and book chapters are present, they often lack affiliation links to institutions.

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Conflict of interest

The authors have no conflicts of interest to report.

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