Metaphorical Framing of Refugees, Asylum Seekers and Immigrants in UK's Left and Right-Wing Media

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Abstract

The metaphorical framing of refugees, asylum seekers, and immigrants (RASIM) has been widely explored in academia, but mainly through close analysis. The present research outlines a large-scale computational investigation of RASIM metaphors in UK's media discourse. We experiment with a method that facilitates automatic identification of RASIM metaphors in 21 years of RASIM-related news reports from eight popular UK newspapers. From the metaphors extracted, four overarching frames are identified. Further analysis reveals correlations between political bias and metaphor usage: overall, right-biased newspapers use RASIM metaphors more frequently than their left-biased counterparts. Within the metaphorical frames, water, disaster, and non-human metaphors are more prevalent in right-biased media. Additionally, diachronic analysis illustrates that the distinctions between left and right media have evolved over time. Water metaphors, for example, have become increasingly more representative of the political right in the past two decades.

1 Introduction

Issues regarding refugees, asylum seekers, and immigrants (henceforth RASIM) have been widely debated for their social, cultural, and economic implications. Metaphors, in particular, have received much scrutiny for their ability to link conceptualizations of immigration to personal and cultural experiences. As repositories of cultural understandings, they allow dominant ideologies and prejudices to be represented and reinforced in a transparent fashion, shaping public opinion without drawing attention to themselves (Ana, 1999; Cisneros, 2008).

Discussions concerning the metaphorical framing of immigrants, especially in political and media discourse, have primarily been carried out under the Critical Discourse Analysis (CDA) framework (Chilton, 2005; Hart, 2010, 2011; Hawkins,

2001; Cisneros, 2008; KhosraviNik, 2010; Musolff, 2015). Most of the metaphors identified and discussed so far represent dehumanizing or stigmatizing frames for immigrants and refugees, such as animals (Ana, 1999), diseases (Santa Ana et al., 1998), enemies and invaders (Parker, 2015), pollution (Cisneros, 2008), or other destructive forces like flood (Santa Ana et al., 1998; Charteris-Black, 2006). Another point of interest lies in how metaphors may be connected to the ideological compositions of texts (Charteris-Black, 2004, pp. 27-28). Charteris-Black (2006), for example, observes differences between UK's centre-right and far-right discourses in terms of their use of immigration metaphors, arguing that they contribute to the formation of legitimacy in right-wing political communication. However, this analysis does not cover data from left-wing media.

Partly due to the complexity of metaphorical language, most research in this field so far has relied on close analysis of small datasets. In this research, we conduct a large-scale computational investigation into the metaphorical framing of RASIM in British media. Our data comprises RASIM-related articles published in eight prominent UK newspapers over a span of 21 years from 2000 to 2020. From the text material, metaphorical expressions related to RASIM are automatically identified using both construction pattern matching and a fine-tuned RoBERTa model. The main research questions can be outlined as: (1) How have RASIM been metaphorically framed in the UK media? (2) Are distinctions among the newspapers' political stances reflected in their use of RASIM metaphors?

In summary, by incorporating computational methods in the analysis of RASIM metaphors, we aim to move beyond the limitations of small-scale studies, exploring how metaphors contribute to shaping public perceptions and investigating potential connections between metaphorical language and political stance.

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2 Related Work

Traditionally, analysis of metaphors in naturally occurring language has relied primarily on close examination of small datasets. With the development of corpus tools and the increasing accessibility of large corpora, corpus methods have been employed to extend such analysis to a greater scale (Charteris-Black, 2004; Deignan, 2005; Koller et al., 2008; Krennmayr, 2015; Musolff, 2015; Salahshour, 2016). Most research in this direction has taken a lexical approach by analyzing concordances of several specific search terms, defined either by drawing upon the researcher's knowledge of the source and target domains, or through close analysis of a sample of the corpus (Jaworska, 2017). However, this method has an inherent limitation – it confines the analysis to predetermined search strings, making it challenging to identify new metaphorical patterns (Koller et al., 2008).

A more sophisticated approach involves the use of WMatrix (Rayson, 2008), a corpus tool capable of assigning tokens to semantic domains based on the UCREL semantic annotation scheme (USAS). Initially put forward by Koller et al. (2008), this method builds upon the assumption that semantic tags allocated by WMatrix correspond to the source domains of metaphoric expressions. Instead of searching for specific word terms, this approach seeks domain tags, enabling the discovery of a broader spectrum of metaphors beyond predefined word lists. Demmen et al. (2015) start by identifying a list of metaphorical expressions from a small sample of the entire corpus, from which source domains and corresponding USAS tags are derived for query and analysis. Similarly, Jaworska (2017) follows a similar procedure to identify metaphors in promotional tourism discourse. However, since the USAS tagger itself cannot make predictions about metaphoricity, extensive human efforts are still required for disambiguating the candidate metaphors, which is not ideal for larger datasets.

Within computational linguistics, automatic identification and interpretation of metaphors have been a challenging and widely discussed topic (e.g., Choi et al., 2021; Dodge et al., 2015; Hong, 2016; Su et al., 2020). In recent years, efforts have been made to incorporate such advancements in the analysis of metaphorical framing in public discourse. Mendelsohn et al. (2020), for example, put forward a computational framework for investigating the dehumanization of LGBTQ people in the New York Times articles. Recognizing vermin metaphors as an important component of dehumanization, the authors use word embeddings to measure the metaphorical relationship between LGBTQ people and vermin. Specifically, a vermin concept vector is calculated by averaging the vectors of a predefined list of vermin terms. The intuition is that, the more closely a group is related to vermin through metaphors, the larger the cosine similarity will be between the group label vector and the vermin vector.

In a similar vein, Card et al. (2022) investigate how Republicans and Democrats frame immigrants differently using dehumanizing metaphors such as "animal" and "cargo". In order to detect implicit metaphorical language, mentions of immigrants and immigrant groups are masked from the sentences. A neural language model, BERT (Devlin et al., 2018), is then used to predict the mask words based on the surrounding contexts. From BERT's predictions, metaphoricity is calculated from the probabilities assigned to terms related to the predefined source domains. In this way, they essentially measure how much mentions of immigrants "sound like" particular types of dehumanizing metaphors.

In order to provide a comprehensive account of the metaphorical language related to RASIM, we hope that our identification system should be capable of unveiling novel metaphorical expressions, rather than relying on a fixed set of keywords or key domains. For this purpose, we experiment with a system based on finetuning RoBERTa, a Transformer-based language model capable of encoding nuanced contextual information. The setup is further introduced in Section 3.2.

3 Data and Method

3.1 Data Collection

In this study, the texts are collected from eight popular UK newspapers: *The Guardian*, *The Mirror*, *The Independent*, *The Times*, *The Telegraph*, *The Sun*, *The Daily Express*, and *The Daily Mail*. In general, within the relevant time frame, *The Guardian* and *The Mirror* are overall perceived as aligning with the Labour or the political left; on the other side, *The Times*, *The Telegraph*, *The Sun*, and *The Daily Express* are more often recognized as favourable to the Conservative or the political right; finally, *The Independent* is generally described as centre to centre-left (Forman and Baldwin, 2007).

While some level of consensus can be reached

regarding the overall political bias of a newspaper, there is no easy way to quantify such bias. As a rough point of reference, we refer to a survey conducted by YouGov in 2017 [1], which asked Britons about their perceptions of the eight newspapers' political biases. According to the survey results, *The Guardian* and *The Mirror* are perceived as predominantly left-wing, with a slightly higher percentage of people rating *The Guardian* as "very left-wing" than *The Mirror*. For *The Independent*, the majority of responses classify it as "centre", followed by "slightly left-of-centre". All the other five news media are predominantly conceived as right-wing. Ranked by the percentage of people who rate the newspaper as "very right-wing", *The Daily Mail* is considered to be the most right-biased, followed by *The Daily Express*, *The Sun*, *The Telegraph* and finally *The Times*.

To collect the data, we employ a procedure similar to the one adopted by Gabrielatos and Baker (2008). Using the news query interface provided by LexisNexis, we scrape all news articles that contain at least one of the RASIM terms, which are "immigrant", "migrant", "refugee", "asylum seeker" and all their inflections. The range of publication date is set between Jan. 1st, 2000 and Dec. 31st, 2020, spanning a total of 21 years. The sources of the articles are limited to the aforementioned eight newspapers. Altogether, over 570,000 articles are collected, amounting to over 380 million words after removing duplicate paragraphs. From these articles, approximately 638,000 mentions of RASIM terms are identified.

3.2 Identifying RASIM Metaphors

Lakoff and Johnson (1980) introduced the idea of conceptual metaphor mapping. In this framework, concepts originating from the source domain are employed figuratively to express aspects of the target domain. For example, consider the phrase "flow of immigrants", where the mapping IMMIGRANT IS WATER is instantiated. In this context, the term "flow" invokes associations with the source domain of WATER, which are then extended to the target domain of IMMIGRANT. This mapping allows immigrants to be discussed in relation to concepts and impressions drawn from the source domain, such as being mass in quantity and difficult to control.

Based on the conceptual metaphor theory, our goal can be summarized as follows: Given a sentence that contains a RASIM term (target word), the task is to identify all the words in the sentence (source words) capable of evoking a conceptual mapping to the RASIM domain. For a candidate source word to satisfy this requirement, both of the following conditions have to be satisfied:

First, it must be syntactically possible for the candidate word pair to form a linguistic metaphor. Previous research has illustrated that metaphors tend to be expressed in certain construction patterns (Sullivan, 2007, 2013), and certain syntactic relations can distinguish metaphorical uses from literal ones (Hovy et al., 2013). Drawing from these insights, we follow the procedure in Dodge et al. (2015), where a set of grammatical patterns are used to filter the word pairs before feeding them to a metaphoricity evaluation component. For each candidate word pair, we use the NLP package spaCy to extract the shortest dependency path (SDP) between the source and target words, and check whether the path is present in a predefined list (see Appendix A). Since the target words are limited to one of the RASIM terms, we only consider patterns where the target is a noun.

Second, the source word should be metaphorically used. That is, instead of conveying the literal sense, its meaning is context-specific and has to be interpreted in relation to the target domain. To capture the nuanced contextual information, we build upon a pretrained neural language model, RoBERTa (Liu et al., 2019), by finetuning it to classify the metaphoricity of a given token in a sentence. Concretely, taking a sentence as the input, RoBERTa encodes each (sub)token into a dense vector representation; a linear classification layer is then applied to the vector representation of the candidate source token to predict its metaphoricity. Despite its simplicity, this model architecture has served as a strong baseline in multiple metaphor identification tasks (Choi et al., 2021; Leong et al., 2020; Su et al., 2020).

For training, we use a free portion of the LCC metaphor dataset (Mohler et al., 2016), as it is close to the collected texts in terms of topic and style. The dataset contains around 7,500 sentences, each marked with a candidate source/target pair. For each candidate pair, its metaphoricity is annotated on a four-point scale from 0 to 3, where 0 stands for no metaphoricity, 1 for possible/weak metaphors, 2 for likely/conventional metaphors, and 3 for clear

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[1] https://yougov.co.uk/politics/articles/17715-how-left-or-right-wing-are-uks-newspapers

Label	P	R	F1
0	0.80	0.93	0.86
1	0.49	0.33	0.39
2	0.48	0.23	0.31
3	0.63	0.76	0.69
>=1	0.91	0.76	0.83

Table 1: Classification results for all labels.

metaphors. Our model is trained to predict the level of metaphoricity of the candidate source token in a given sentence. The dataset is randomly split into 80% for training, 10% for validation, and 10% for testing. On the test split, the finetuned RoBERTa model achieves around 71% accuracy when predicting the fine-grained levels of metaphoricity, and around 87% accuracy when results are aggregated to a binary classification between non-metaphor (0) and metaphor (1-3). Detailed results for different metaphoricity labels are shown in Table 1. Overall, while the model struggles to assert the exact metaphor strength, resulting in lower accuracy, the coarse classification between metaphorical and literal usage is more reliable.

In summary, to identify RASIM metaphors from our corpus, we first use construction patterns to select the word pairs syntactically capable of forming metaphors. The finetuned RoBERTa model then predicts the metaphoricity of each candidate source word. For each identified metaphor pair, the lemmas corresponding to the source and target words, the sentential context, along with other necessary meta-information are stored in a data frame to be queried and analyzed later. Based on this procedure, a total of 55,344 RASIM metaphors are identified.

3.3 Identifying Frames

To curate frames from the metaphors identified by the model, we employ a qualitative procedure where the lemmas are clustered into different groups based on the source domains they evoke. To rule out coincidental occurrences, only those which have appeared at least 30 times are considered. Originally, we weighted the raw frequencies with predicted metaphoricity to help elevate stronger metaphors. However, given the high level of confusion the model exhibits with different levels of metaphor strengths, it is decided that the weighting scheme may not be robust enough.

For each candidate lemma, 15 sentences are ran-

domly sampled where the corresponding word is predicted as a metaphor. A lemma is only considered a valid metaphor if it evokes a conceptual mapping to RASIM in at least half of the sentences. It is then allocated to the existing clusters based on resemblance to their members in terms of the source domain evoked; if no appropriate cluster exists, the lemma is assigned a new cluster. The general principle is that each cluster, representing a frame, should have a distinct focus shared by all members within.

3.4 Methodological Limitations

In this part, we review the potential inaccuracies and biases that may be involved in the research design, and discuss how these limitations may affect the validity of the results.

During data collection, eight newspapers are selected to represent the discourse of UK's left- and right-wing media. However, this may not be enough to sufficiently address some potential confounding factors such as the distinctions between broadsheet and tablet (Gabrielatos and Baker, 2008). Indeed, later analysis shows that the stylistic difference could be linked to the use of certain metaphors.

For metaphor identification, the model's ability to generalize knowledge from the training set to real-world data can be essential for the identification of novel metaphors. As a rough reference, among the 100 metaphors presented in Table 2, 56 of them have not appeared in the training split, including strong metaphors such as "magnet" and "dump". This suggests at least a certain level of ability to adapt to unseen data. However, a more rigorous evaluation, specifically regarding how many and what kind of metaphors may be missed, would require a manually annotated test set from the RASIM news reports.

Another issue relates to the judgement of whether a metaphor is directed to RASIM, which is done by matching construction patterns. However, even when the syntactic requirements are satisfied, it does not necessarily guarantee the existence of a conceptual mapping. Initially, other than the frames outlined in Table 2, we also identified three frames which are victim (e.g., "abuse", "exploit"), protection (e.g., "shield", "harbour"), and traveller (e.g., "journey"). After more careful consideration, however, we recognized that while such expressions are metaphorical, they represent more gen-

Frame	Source domain lemmas	%
Water	flow, wave, flood, influx, surge, pour, tide, stream, inflow, fill, trickle, swell, pool, outflow, tsunami	44.1
Non-human	magnet, drive, cap, caravan, trap, push, control, draw, attract, flee, smuggle, backlog, swarm, curb, catch, spread, lure, lock, flock, hunt, cram, strip, throw, dump, traffic, horde, mass, track, trafficking, boat, wash, ground, flight, weed, smuggling, brake, column, boatload, herd, cling, bottleneck	22.7
Disaster	flood, swamp, burden, impact, swarm, pressure, spread, overrun, storm, threat, overwhelm, drain, boom, chaos, sweep, tsunami, crush	15.0
Enemy	crackdown, block, ban, attack, deter, touch, invasion, sneak, fight, curb, catch, backlash, lock, bar, storm, battle, army, gang, disperse, slip, drain, defence, clampdown, play, tackle, break, round, harbour, war, barrier, sweep, camp, mob, chase, assault, besiege, bash	18.2

Table 2: Metaphorical frames and the corresponding source domain lemmas, arranged by raw frequency in descending order.

eral conceptual relations rather than being directed to RASIM. For example, although "shield" as in "shield the immigrants" is a metaphor, the mapping is between the idea of a physical barrier and the abstract concept of protection; and while this expression frames immigrants as being protected, the effect is literal rather than metaphorical. More intricate methods are therefore needed to better address the complexity of conceptual mapping.

Finally, we have not been able to systematically evaluate whether the inaccuracies may be distributed unevenly in different publications. For example, it could be possible that some metaphors used predominantly by either side have not been detected, or that certain expressions carry mainly literal senses in one side but metaphorical ones in the other. In both cases, it may lead to bias in the estimation of metaphor distributions among left- and right-wing media. It should be noted therefore that the following quantitative analyses are based on the assumption of even distributions of errors in different publications.

4 Results and Discussions

4.1 Metaphorical Frames

Following the procedure outlined in the previous section, four main frames are identified, as presented in Table 2. Note that the categories are not mutually exclusive, as a few words, depending on the context, can be representative of more than one type of metaphors.

Among the seven categories, water or liquid metaphors are the most prominent in terms of overall frequency. Words in this category illustrate a diverse range of conceptualizations for varying aspects of RASIM. For example, words like "flood", "swamp", and "tsunami" describe RASIM as destructive natural forces, expressing strongly negative sentiments. On the other hand, words like "flow", "stream", and "trickle" serve as more affectively neutral ways to describe their movements at different scales. Additionally, words like "surge", "swell" and "tide" focus on the temporal changes in the numbers of RASIM, typically sudden increases over a short period. Despite such variations, the water metaphors are dehumanizing in general, expressing neutral to strongly negative sentiments.

The non-human frame is characterized by the portrayal of RASIM as animals or inanimate entities that are denied agency and subject to manipulation from others. It can be viewed as an abstraction over several dehumanizing metaphors, such as animals ("flock"), cargo ("boatload"), plants ("weed"), or other inanimate objects. Although less frequent than the water metaphors, the non-human metaphors are characterized by the most diverse vocabulary. Some of them represent images of RASIM, for example, the size of their groups and communities (e.g., dehumanizing quantifiers including "swarm", "flock" and "horde"), as well as their reactions towards outside disturbances (e.g., "magnet", "flee", "lure"). Others, on the other hand, represent images of actions imposed upon immigrants and refugees, which are commonly used in relation to non-human entities such as animals (e.g., "trap", "hunt", "catch", "herd") and cargo (e.g., "smuggle", "dump", "traffic").

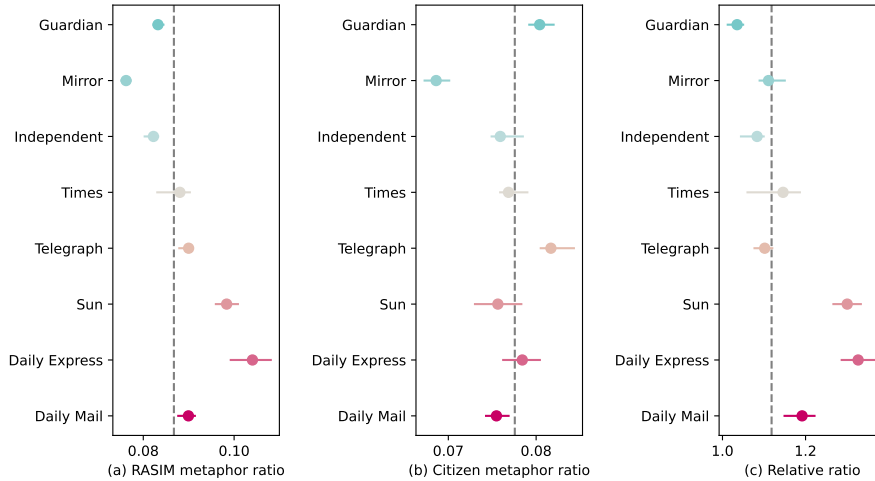The disaster metaphors generally depict RASIM

Figure 1: (a) Frequency of RASIM metaphors; (b) Frequency of "citizen" metaphors; (c) Relative frequency ratio between RASIM and "citizen" metaphors. In plots (a) and (b), farther to the left represents less frequent metaphor use. In plot (c), the closer to 1.0, the greater "similarity" there is between RASIM and citizens in terms of metaphor frequency. The grey dashed vertical lines represent the global averages calculated from the entire corpus. To ensure that the findings do not over-represent data from a short period of time, we leave out every two consecutive years in turn, and the full range of possible values obtained are shown using the horizontal lines.

as destructive forces such as flood (e.g., "swamp", "flood", "tsunami"), disease (e.g., "spread") or parasites (e.g., "swarm"). In addition to these words that directly frame RASIM to natural or man-made disasters, some words focus on representing the negative effects they bring to their destinations, for instance, imposing "burden(s)" upon citizens, "drain(ing)" the resources, and "overwhelm(ing)" the social and economic systems. In general, these metaphors emphasize how RASIM may disrupt life in the countries that they migrate to.

The enemy metaphors, likewise, can be further categorized into smaller groups concerned with different aspects of RASIM: First, their large quantities (e.g., "army", "gang" and "mob"); second, their hostile or illegal actions and the undesirable consequences (e.g., "invasion", "sneak", "storm", "drain"); finally, the government's actions in response to their "invasions" and "attacks", for instance fighting back ("crackdown", "battle", "war", "defend"), keeping them out ("block", "bar", "barrier") or containing them ("catch", "lock", "camp"). Overall, metaphors in this frame represent stigmatizing conceptualizations of RASIM, characterized by a strong sense of hostility.

Other than these four main frames, we also identify a small group of metaphors that do not fit into these categories. "Scapegoat" and "exodus", for example, frame RASIM under certain religious contexts (Ana, 1999). Given the relatively small

number of occurrences, these metaphors are not included in the following quantitative analysis.

4.2 Political Bias and RASIM Metaphors

4.2.1 Overall Metaphor Frequency

To quantitatively assess the use of metaphors, a simple yet informative metric is their frequency. Figure 1(a) illustrates how often RASIM terms are accompanied by metaphors in each of the eight newspapers. A strong correlation is observed between political bias and metaphor frequency. Calculating the Pearson correlation coefficient yields r=.77, p=.02. Specifically, all three left-leaning newspapers—*The Guardian*, *The Mirror*, and *The Independent*—exhibit frequencies below the global average (indicated by the grey dashed line), while the five right-leaning newspapers consistently surpass this average. Among all eight publications, *The Daily Express* is the most frequent user of RASIM metaphors, with over one metaphor for every ten RASIM mentions. Conversely, *The Mirror* employs RASIM metaphors with the lowest frequency.

It could be argued though that this correlation might be influenced by other confounding factors, such as how inclined a newspaper is to use rhetorical devices. To explore this alternative hypothesis, we employ "citizen(s)" as a contrasting term and calculate the frequency with which it is accompanied by metaphors. This choice is informed by Ana
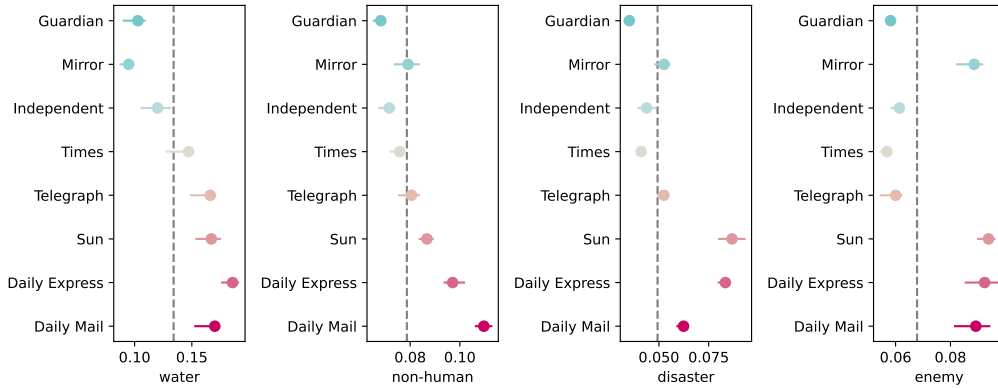
Figure 2: Frequency of each frame among all identified metaphors in each newspaper. The grey dashed vertical lines represent the global averages calculated from the entire corpus. Horizontal lines represent all possible values obtained by leaving out every two consecutive years. Farther to the right indicates higher frequency.

(1999) who observed different narratives between immigrants and citizens marked by the use of animal metaphors. The result is shown in Figure 1(b), and the correlation is no longer present.

Figure 1(c) offers insight into the relative ratio between the frequencies of RASIM metaphors and citizen metaphors, which can be interpreted as the "distance" between citizens and RASIM in terms of metaphor usage. For all newspapers, the relative ratios exceed 1.0, suggesting that RASIM terms are generally more likely to be depicted using metaphors in comparison to citizens. Notably, the correlation with political bias remains discernible, with a particularly pronounced effect observed among far-right newspapers, specifically, *The Sun*, *The Daily Express*, and *The Daily Mail*. Conversely, in *The Guardian*, RASIM and citizens are approximately equally likely to be accompanied by metaphors, with the relative ratio only slightly exceeding 1.0.

In summary, Figure 1 underscores two key findings: first, in comparison to citizens, RASIM are more likely to be subjects of metaphorical discourse; second, this distinction is notably more conspicuous within right-biased newspapers. A plausible explanation can be drawn from Dann's (1996) proposition that metaphor usage tends to increase when dealing with greater cultural distance as an attempt to mitigate the effect of strangeness. This claim has been supported by empirical evidence from Jaworska (2017), which shows that descriptions of faraway tourist locations are significantly more loaded with metaphors than those of "home" destinations. Although originating from the rhetorical language of tourism, this argument

presents a reasonable rationale for our findings regarding the language of immigration. The higher frequency of RASIM metaphors may be interpreted as a reflection of the strangeness surrounding the images of immigrants and refugees, who are often portrayed as the social and cultural "other", subject to an alienating discourse. Consequently, the higher occurrence of RASIM metaphors in right-biased newspapers could be indicative of a heightened sense of cultural distance or unfamiliarity, contributing to a discourse that accentuates the perceived "otherness" of immigrants and refugees.

4.2.2 Frame Frequency

After investigating the overall metaphor frequencies, we turn our focus to whether newspapers with different political stances may show different "preferences" towards specific metaphorical frames. For each frame, we calculate its relative frequency against all metaphors identified in each newspaper. The results are shown in Figure 2. Clear correlations between political bias and metaphor frequency can be observed for water, disaster, and non-human metaphors: generally, right-biased newspapers are more likely to employ these types of metaphors. Such divergence in the use of dehumanizing metaphors may find its root in the broader ideological stance on immigration: right-leaning outlets may be inclined to present them as potential threats or crises, which resonates with narratives emphasizing security and stricter immigration measures.

Interestingly, for the enemy metaphors, their relative frequencies seem to be more closely connected to style (broadsheet vs. tabloid) rather than polit-
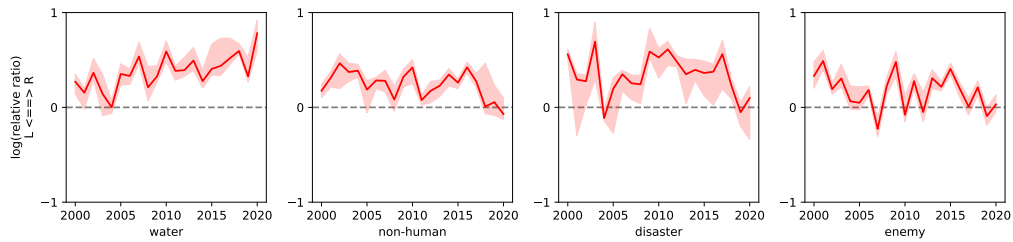
Figure 3: Logarithm of the relative usage frequency for each type of metaphors by left- and right-biased newspapers. For each subplot, greater values represent more frequent usage by right-biased newspapers and vice-versa. 0 represents equal frequency from both sides. Shaded areas represent all possible values obtained by leaving out each word in turn to ensure that the patterns are not overly influenced by single terms.

ical bias, with all four tabloids (*The Mirror*, *The Sun*, *The Daily Express* and *The Daily Mail*) well above the average, and all four broadsheets (*The Guardian*, *The Independent*, *The Times* and *The Telegraph*) below the average. However, more data are required to determine whether this correlation is statistically significant or merely due to chance.

Figure 3 illustrates how the partisan preference for each frame has evolved over time. Throughout the 21-year period, water metaphors have become increasingly more prominent in right-biased newspapers compared to their left-biased counterparts. On the other hand, disaster, non-human, and enemy metaphors have also shown higher frequencies in right-leaning publications, but their temporal trends show a tendency to move towards a more "neutral" position. These findings further demonstrate that the links between political bias and the use of RASIM metaphors are not static, but instead dynamic and subject to change over time.

5 Conclusions

In this research, we utilized a computational approach to analyze 21 years of UK news reports on refugees, asylum seekers, and immigrants (RASIM), revealing four key metaphorical frames: water, disaster, non-human, and enemy. Overall, the metaphorical representation of RASIM in British media has been predominantly stigmatizing and dehumanizing. Further analysis shows a correlation between political bias and RASIM metaphors: while both left- and right-wing newspapers exhibit increased metaphorical language when discussing RASIM compared to "citizen", this difference is more pronounced in right-wing discourse. Investigations of individual frames reveal that the dehumanizing frames are generally more common in right-biased media. Additionally, such connec-

tions have changed over time. Water metaphors, for example, have become increasingly more representative of the political right in the past two decades. Such divergences can be illustrative of the broad ideological stances on immigration.

With the help of computational modelling, we were able to extend the analysis of metaphorical framing to a large dataset, enabling a broader account of the interplay between language and ideology. This scaling-up, however, comes with trade-offs. First, we had to restrict ourselves to a closed set of syntactic structures, which is far from enough to fully address the richness and flexibility of metaphorical expressions in real life. How to strike a balance between the need for formalization and the high variability of real-world language can be a challenge for similar research. Second, to better understand how the use of metaphors relates and contributes to the sociopolitical environment, it can be important to examine the specific contexts, such as the event being described or the attitude of the authors. However, as we have only focused on individual metaphorical words, such contextual information has not been taken into consideration. Future research can therefore seek to establish links between text and context for a more nuanced analysis of language as a social practice.

References

Otto Santa Ana. 1999. 'like an animal i was treated': Anti-immigrant metaphor in us public discourse. *Discourse & Society*, 10(2):191–224.

Dallas Card, Serina Chang, Chris Becker, Julia Mendelsohn, Rob Voigt, Leah Boustan, Ran Abramitzky, and Dan Jurafsky. 2022. Computational analysis of 140 years of us political speeches reveals more positive but increasingly polarized framing of immigration. *Proceedings of the National Academy of Sciences*, 119(31):e2120510119.

Jonathan Charteris-Black. 2004. *Corpus Approaches to Critical Metaphor Analysis*. Palgrave Macmillan UK, London. DOI: 10.1057/9780230000612.

Jonathan Charteris-Black. 2006. Britain as a container: immigration metaphors in the 2005 election campaign. *Discourse & Society*, 17(5):563–581.

Paul A Chilton. 2005. Manipulation, memes and metaphors. *Manipulation and ideologies in the twentieth century*, page 15–43. Publisher: John Benjamins Amsterdam.

Minjin Choi, Sunkyung Lee, Eunseong Choi, Heesoo Park, Junhyuk Lee, Dongwon Lee, and Jongwuk Lee. 2021. MelBERT: Metaphor detection via contextualized late interaction using metaphorical identification theories. In *Proceedings of the 2021 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies*, pages 1763–1773, Online. Association for Computational Linguistics.

J. David Cisneros. 2008. Contaminated communities: The metaphor of "immigrant as pollutant" in media representations of immigration. *Rhetoric & Public Affairs*, 11(4):569–601.

G. Dann. 1996. *The Language of Tourism: A Sociolinguistic Perspective*. A CAB International Publication. CAB International. LCCN: lc96206040.

Alice Deignan. 2005. *Metaphor and Corpus Linguistics*. John Benjamins Publishing. Google-Books-ID: bp3dHiJEUNQC.

Jane Demmen, Elena Semino, Zsófia Demjén, Veronika Koller, Andrew Hardie, Paul Rayson, and Sheila Payne. 2015. A computer-assisted study of the use of violence metaphors for cancer and end of life by patients, family carers and health professionals. *International Journal of Corpus Linguistics*, pages 205–231.

Jacob Devlin, Ming-Wei Chang, Kenton Lee, and Kristina Toutanova. 2018. Bert: Pre-training of deep bidirectional transformers for language understanding. *arXiv preprint arXiv:1810.04805*.

Ellen Dodge, Jisup Hong, and Elise Stickles. 2015. MetaNet: Deep semantic automatic metaphor analysis. In *Proceedings of the Third Workshop on Metaphor in NLP*, pages 40–49, Denver, Colorado. Association for Computational Linguistics.

Francis Nigel Forman and Nicholas Baldwin. 2007. *Mastering British Politics*. Bloomsbury Publishing.

Costas Gabrielatos and Paul Baker. 2008. Fleeing, sneaking, flooding: A corpus analysis of discursive constructions of refugees and asylum seekers in the uk press, 1996-2005. *Journal of English Linguistics*, 36(1):5–38.

C. Hart. 2010. *Critical Discourse Analysis and Cognitive Science: New Perspectives on Immigration Discourse*. Springer.

Christopher Hart. 2011. Force-interactive patterns in immigration discourse: A cognitive linguistic approach to cda. *Discourse & Society*, 22(3):269–286. Publisher: SAGE Publications Sage UK: London, England.

Bruce Hawkins. 2001. Ideology, metaphor and iconographic reference. *AMSTERDAM STUDIES IN THE THEORY AND HISTORY OF LINGUISTIC SCIENCE SERIES 4*, page 27–50. Publisher: Amsterdam; Philadelphia; J. Benjamins Pub. Co; 1999.

Jisup Hong. 2016. Automatic metaphor detection using constructions and frames. *Constructions and Frames*, 8(2):295–322.

Dirk Hovy, Shashank Srivastava, Sujay Kumar Jauhar, Mrinmaya Sachan, Kartik Goyal, Huying Li, Whitney Sanders, and Eduard Hovy. 2013. Identifying metaphorical word use with tree kernels. In *Proceedings of the First Workshop on Metaphor in NLP*, pages 52–57.

Sylvia Jaworska. 2017. Metaphors we travel by: A corpus-assisted study of metaphors in promotional tourism discourse. *Metaphor and Symbol*, 32(3):161–177.

Majid KhosraviNik. 2010. The representation of refugees, asylum seekers and immigrants in british newspapers: A critical discourse analysis. *Journal of Language and Politics*, 9(1):1–28.

Veronika Koller, Andrew Hardie, Paul Rayson, and Elena Semino. 2008. Using a semantic annotation tool for the analysis of metaphor in discourse. *Metaphorik. de*, 15(1):141–160.

Tina Krennmayr. 2015. What corpus linguistics can tell us about metaphor use in newspaper texts. *Journalism Studies*, 16(4):530–546.

George Lakoff and Mark Johnson. 1980. *Metaphors We Live By*. University of Chicago Press. Google-Books-ID: iyZgQgAACAAJ.

Chee Wee (Ben) Leong, Beata Beigman Klebanov, Chris Hamill, Egon Stemle, Rutuja Ubale, and Xianyang Chen. 2020. A report on the 2020 VUA and TOEFL metaphor detection shared task. In *Proceedings of the Second Workshop on Figurative Language Processing*, pages 18–29, Online. Association for Computational Linguistics.

Yinhan Liu, Myle Ott, Naman Goyal, Jingfei Du, Mandar Joshi, Danqi Chen, Omer Levy, Mike Lewis, Luke Zettlemoyer, and Veselin Stoyanov. 2019. Roberta: A robustly optimized bert pretraining approach. *arXiv preprint arXiv:1907.11692*.

Julia Mendelsohn, Yulia Tsvetkov, and Dan Jurafsky. 2020. A framework for the computational linguistic analysis of dehumanization. *Frontiers in Artificial Intelligence*, 3:55.

Michael Mohler, Mary Brunson, Bryan Rink, and Marc Tomlinson. 2016. Introducing the lcc metaphor datasets. In *Proceedings of the Tenth International Conference on Language Resources and Evaluation (LREC'16)*, pages 4221–4227.

Andreas Musolff. 2015. Dehumanizing metaphors in uk immigrant debates in press and online media. *Journal of Language Aggression and Conflict*, 3(1):41–56.

Samuel Parker. 2015. 'unwanted invaders': The representation of refugees and asylum seekers in the uk and australian print media. *ESharp*, 23(1):1–21.

Paul Rayson. 2008. From key words to key semantic domains. *International Journal of Corpus Linguistics*, 13(4):519–549.

Neda Salahshour. 2016. Liquid metaphors as positive evaluations: A corpus-assisted discourse analysis of the representation of migrants in a daily new zealand newspaper. *Discourse, Context & Media*, 13:73–81.

Otto Santa Ana, Juan Moran, and Cynthia Sanchez. 1998. Awash under a brown tide: Immigration metaphors in california public and print media discourse. *Aztlán: A Journal of Chicano Studies*, 23(2):137–176.

Chuandong Su, Fumiyo Fukumoto, Xiaoxi Huang, Jiyi Li, Rongbo Wang, and Zhiqun Chen. 2020. DeepMet: A reading comprehension paradigm for token-level metaphor detection. In *Proceedings of the Second Workshop on Figurative Language Processing*, pages 30–39, Online. Association for Computational Linguistics.

Karen Sullivan. 2007. *Grammar in metaphor: A construction grammar account of metaphoric language*. dissertation, University of California, Berkeley.

Karen Sullivan. 2013. Frames and constructions in metaphoric language. *Frames and Constructions in Metaphoric Language*, page 1–192. Publisher: John Benjamins Publishing Company.

A Construction Patterns

The LCC dataset is utilized for the compilation of this construction pattern list. Concretely, the LCC dataset provides samples where the candidate source/target word pairs are syntactically impossible to form metaphors. Such samples are labeled with score -1. We start from a list complete with all construction patterns extracted from the positive samples, i.e. those with score greater than -1. Then, we iteratively remove patterns which, after removal, improve F1 on the entire dataset. Finally, we remove infrequent patterns as well as those which are results of parse errors. The final list of patterns recovers 90% of the positive sentences from the dataset.

Construction patterns
S_NOUN-prep-ADP-pobj-T_NOUN
S_VERB-dobj-T_NOUN
T_NOUN-nsubj-S_VERB
T_NOUN-compound-S_NOUN
S_ADJ-amod-T_NOUN
T_NOUN-nsubj-AUX-attr-S_NOUN
S_VERB-agent-ADP-pobj-T_NOUN
S_VERB-amod-T_NOUN
S_NOUN-compound-T_NOUN
T_NOUN-nsubjpass-S_VERB
T_NOUN-nsubj-AUX-acomp-S_ADJ
T_NOUN-poss-S_NOUN

Table 3: Construction patterns for the initial selection of metaphor candidates.