






RESEARCH ARTICLE

Stakeholder discourse coalitions and polarisation in the hen harrier conservation debate in news media

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Abstract

1. Conservation conflicts are complex and can be deep-rooted, with stakeholders holding entrenched policy positions. The actors involved producing verbal interconnected interactions that form policy debates. Thus, conservation debates can be viewed as network phenomena with stakeholders forming coalitions in support of, or opposition to, certain policies and practices.
2. We used Discourse Network Analysis of print media to investigate the structure and dynamics of the stakeholder debate around the management of hen harriers *Circus cyaneus*, a bird of prey at the centre of a long-standing conservation conflict in the United Kingdom.
3. We aimed to determine whether the structure of discourse coalitions changed among the diverse aspects of the debate and whether the polarisation of the debate has changed through time. Our search and selection criteria led to the analysis of 737 statements within 131 newspaper articles published from August 1993 to December 2019.
4. We show that, while the discourse network of the overall debate is quite unstructured, actors formed divergent coalitions when defining the conservation problem and its solutions. In contrast, discourses converged around reactions with positive or negative emotions in relation to events and issues of hen harrier conservation. Polarisation among actors has increased over time and peaked in the second half of the 2010s, concurrent with the release of the species recovery plan.
5. Our study highlights the value of analysing discourse networks in conservation policy debates. Discourse networks reveal which aspects of any conservation problem cause stakeholders to converge or diverge and can identify periods of intensified debate that, ultimately, contribute to informing conflict mitigation and resolution processes.

KEYWORDS

conservation conflict, discourse coalitions, discourse network analysis, hen harrier, news media, polarisation, translocations

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1 | INTRODUCTION

Conservation conflicts are increasing in numbers and intensity (Redpath et al., 2015). These are disagreements between parties over conservation objectives in the context of perceived imbalance of stakeholder interests (Redpath et al., 2013). Conservation conflicts lie within unique and often complex socio-ecological contexts (Young et al., 2010) and are shaped by human–wildlife and human–human interactions (Redpath et al., 2013). Therefore, conservation scientists have explored drivers of conflict, mitigation measures and conflict resolution processes at different scales and in different contexts. Studies have focused on, for example, drivers of human tolerance towards large carnivores such as wolves *Canis lupus* and brown bears *Ursus arctos* in Italy (Marino et al., 2020), alert systems to reduce livestock losses to lion *Panthera leo* predation in Botswana (Weise et al., 2019), and conflict transformation in stakeholder conflicts about mountain lions *Puma concolor* in the United States and elephants in the African continent (Madden & McQuinn, 2014).

Conservation conflicts can influence global conservation policies, both as drivers of policy development and as challenges that can cause biodiversity loss (Carmen et al., 2015). Underpinning many conflicts are differences in conceptions of nature, such as its state and importance, which can contribute to differing policy narratives and discourses (Adams, 2015). These conflicts can also emerge as struggles for power where stakeholders attempt to establish the dominance of a certain discourse in policy arenas (Buchanan, 2013). Those lacking the power to influence formal decision-making processes may turn instead to other means (e.g. social media, protest), which could result in conflict escalation (Crowley et al., 2017). Stakeholders may seek to empower their positions across multiple media. This is done to support their respective political and policy interests by making strategic use of their discourses and diverse types of knowledge, for example, research-based and technical evidence, local and anecdotal, often to the detriment of opposing parties in decision-making processes (Buchanan, 2013; Hodgson et al., 2018, 2019). As a result, conservation conflicts can persist (Redpath et al., 2013) and evolve through escalation and de-escalation over time (Crowley et al., 2017). Media can also play an active role in the exacerbation of conflicts as, for example, journalists might seek to construct stories presenting opposition between sides (Fiorina et al., 2005). More recently, social media have increasingly played a similar role by facilitating political polarisation (Van Bavel et al., 2021). For these reasons, it is pivotal to investigate conservation conflicts in media arenas and in relation to their temporal scale.

In politics, actors such as legislators and interest groups produce verbal interactions about policies that form policy debates or political discourses (Leifeld, 2017). These interactions include public statements in support of, or opposition to, a given policy. Discourses are interdependent, potentially weighted and directional and, hence, can be characterised as networks (Leifeld, 2017).

Investigating these networks allows us to consider some of the mechanisms shaping policy debates in a joint and systematic way, such as coalition formation and framing (Leifeld, 2017). From a network perspective, these mechanisms address respectively the clustering of actors and content. Frames, in particular, are the repertoires of categories and concepts through which actors interpret phenomena (Buijs et al., 2011).

In policy debates, these frames consist of clusters of policy preferences, beliefs, or justifications, and can be associated with impasse and communication between actors (Keenan et al., 2020). Actors holding similar belief systems, reflected by preferences for policy instruments and lines of evidence, form coalitions that compete to achieve different policy designs (Sabatier, 1988). However, it is through their discourse that actors give meaning to phenomena and form discourse coalitions, where these are ‘the ensemble of a set of story lines, the actors that utter these story lines, and the practices that conform to these story lines, all organized around a discourse’ (Hajer, 1993, 1995). Discourse coalitions are thus the result of actors positioning through their statements, and function to provide arguments and narratives in support of, or opposition to, certain policies.

To gain insight into relational aspects of conservation issues, conservationists have used social network analysis (SNA), which provides a set of tools for the study of social structures and their relational characteristics (Scott, 2012). For example, SNA allowed the study of relations and communication between conservation stakeholders protecting a biota shared across different countries (Moshier et al., 2019) and combatting illegal wildlife trade (Gogaladze et al., 2020), and has been proposed to inform decision-making in systematic conservation planning (Mills et al., 2014). In relation to conservation conflicts, SNA has been used to disclose the high degree of polarisation between organisations in the conflict over hunting migratory birds in Malta (Verissimo & Campbell, 2015). However, to date, we have only a limited understanding of discourse as a network phenomenon in conservation conflicts and impasses related to management and policy-making.

The decade-long debate over the conservation and management of the hen harrier *Circus cyaneus* in the United Kingdom (Thirgood & Redpath, 2008) is a useful example to understand the role of actors and their discourses in shaping conservation conflicts over time. High-profile actors have likely perpetuated the conflict through their discourses in the media, possibly hindering mitigation processes and exacerbating polarisation (Hodgson et al., 2019). Hodgson et al. (2018, 2019) investigated elements of the debate in internet media using discourse analysis. These studies found divergent interpretations and use of research-based knowledge and differing storylines portraying other stakeholders and their role in illegal killing. These aspects, in turn, are likely the result of strategic efforts on the part of raptor conservation and shooting organisations to influence policy-making processes concerning land use and licensing of grouse shooting or raptor control.

Recognising that discourse is crucial in driving, shaping and potentially alleviating the hen harrier conservation conflict, our study aimed to investigate the structure and dynamics of stakeholder debate on hen harrier conservation and management. To this end, we used discourse network analysis (DNA), a methodology developed 'to describe the structure of political discourses and infer their generative processes' (Leifeld, 2017). DNA achieves this by addressing the configuration of actors along with the structure of the concepts in policy debates (e.g. policy beliefs, preferences, justifications) through a combination of content analysis and SNA. DNA operationalises the discourse coalitions of proponents and opponents of policy measures and highlights their structure and complexity. Most importantly, DNA allows the longitudinal and systematic study of policy debates and their mechanisms. This can reveal dynamics such as polarisation through time and also promote theory-building processes (Fisher & Leifeld, 2019; Leifeld, 2017). Therefore, we chose this methodology to provide valuable insight into enduring conservation conflicts such as the hen harrier case study.

DNA studies have explored a diverse range of policy debates in different domains, topics and arenas including debates in national newspapers regarding the German pension system (Leifeld, 2013) and, in the United Kingdom, the Soft Drinks Industry Levy (Buckton et al., 2019) and the Minimum Unit Price on alcohol (Fergie et al., 2019; Hilton et al., 2020). In the environmental domain, DNA studies have largely investigated climate change discourses in arenas such as sessions of the US Congress (Fisher et al., 2013; Fisher & Leifeld, 2019), verbatim reports of proceedings from the Italian parliament (Ghinoi & Steiner, 2020), testimonies on law proposals in Finland (Kukkonen & Ylä-Anttila, 2020), and stakeholder statements in Finnish and Canadian newspapers (Kukkonen et al., 2020). The potential of this methodology has yet to be realised in instances of conservation conflicts.

The aim of our study was to delve into the hen harrier debate due to the complex, entrenched nature of the conflict and its associated discourse. In particular, we sought to dissect the debate into its conceptual categories and study it through a longitudinal perspective as we expected to disclose dynamics that a coarser discourse analysis would not reveal. We did this by using the DNA methodology to analyse the coverage of the hen harrier conservation and management in the news media, one of the arenas of the debate. We tested two predictions: first, that discourse network clusters (or coalitions) and their dynamics vary with conceptual categories of discourse that structure the debate; second, that the level of polarisation between discourse coalitions has increased over time, where polarisation is the tendency of clusters to separate and not overlap in regard to key concepts.

Our application of the DNA focusses on revealing debate dynamics and attributes, such as highly polarised conceptual categories that could then be associated with the persistence of the conflict. This insight could inform both the design of mitigation and resolution strategies that target conflicting organisational discourses and, ultimately, benefit conservation programmes.

2 | RESEARCH CONTEXT: THE HEN HARRIER CONSERVATION CONFLICT IN THE UK

The hen harrier conservation conflict stems fundamentally from depredation by harriers of game birds, primarily red grouse *Lagopus l. scoticus*, and the illegal killing of harriers by people seeking to increase grouse populations for sport shooting (Etheridge et al., 1997). More specifically, those advocating for harrier protection have denounced grouse moor managers for the persistent illegal killing of harriers and have been reluctant to implement active forms of harrier management, while grouse moor managers have opposed stronger forms of legal protection for harriers (Thirgood & Redpath, 2008; Young et al., 2010). Evidence from the natural sciences, for example on the illegal killing of raptors, the impact of predation upon grouse populations, and the sustainability of current approaches to grouse shooting, has proven insufficient to identify or gather support for solutions given the entrenched positions of the main stakeholders (Thirgood & Redpath, 2008). Despite a long history of conservation measures (Thirgood & Redpath, 2008) and the recent decline of territorial pairs of harriers in Great Britain (Wotton et al., 2018), the hen harrier conflict appears to have worsened and become more polarised both in England and in Scotland (Hodgson et al., 2018; St John et al., 2019).

Current acute challenges have emerged from the launch of a campaign for the protection of upland harriers and a government-backed action plan for the recovery of harrier populations in England (DEFRA, 2016). In 2014, bird conservationists and activists launched Hen Harrier Day on the 12th of August, a date that in the game industry is known as the Glorious Twelfth and marks the start of the red grouse shooting season. Meanwhile, a stakeholder forum, including game and conservation representatives and led by the government Department for Environment, Food and Rural Affairs (DEFRA), developed a six-point action plan (hereafter HHAP) that was released in January 2016. The HHAP aims to ensure hen harrier conservation whilst accounting for the interests of different groups (DEFRA, 2016). This includes actions such as diversionary feeding, a brood management scheme on moorland, and a reintroduction in Southern England facilitated by the statutory nature conservation body Natural England. Diversionary feeding is the provision of an alternative food source to divert harriers' predation on game birds. Brood management consists of the translocation of chicks hatched on participating game estates to unoccupied habitats once a certain density of hen harriers is reached (density based on Elston et al., 2014). The reintroduction seeks to translocate birds from continental Europe to suitable habitats in Southern England to create a viable and self-sustaining population, which is then hoped to expand its range. However, support for these actions varies among and within stakeholder groups (St John et al., 2019). Some actors from the field sports community support brood management and the reintroduction. Some of the conservation communities focusing on the protection of birds oppose the brood management scheme and do not support the reintroduction. Similarly, brood management was also opposed by those protecting raptors specifically, while the reintroduction by those protecting birds apart from raptors (St John et al., 2019).

3 | METHODS

3.1 | Data sourcing

The first step to test our predictions and understand the debate in the news media was to conduct a qualitative content analysis of stakeholders' statements reported in news articles. Among print media, we considered newspapers as the most comprehensive form to investigate stakeholder discourse. Therefore, we sourced newspaper articles published in the United Kingdom from the online Nexis database (LexisNexis, 2021). The database provides news from several sources including UK national and regional newspapers as well as international newspapers and newswires. After a tentative search, the search terms used were 'hen harrier' W/10 (within 10 words) 'management', 'hen harrier' AND 'translocation' and 'hen harrier' AND 'reintroduction'. The first term, 'hen harrier' W/10 (within 10 words) 'management', was selected to reduce the number of newspaper articles mentioning the two terms but in different contexts, unrelated to the management of the species. As a result, these terms allowed coverage of the broader debate on the management of the species while focusing on the most divisive aspects of the HHAP, that is, the brood management scheme and the reintroduction to Southern England (St John et al., 2019). We obtained a complete longitudinal investigation of the debate by not setting a temporal frame for the selection of newspaper articles. Moreover, contrary to previous studies (Buckton et al., 2019; Fergie et al., 2019), we did not select a limited number of newspapers because of (1) the moderate scale of the debate in the newspaper arena (i.e. the number of statements published) and (2) the aim to detect all stakeholders involved (e.g. some might not be included in high-profile newspapers). Selection criteria for the articles were as follows: (1) the hen harrier and its conservation and/or management being addressed by the article, (2) the presence of at least one attributed stakeholder statement and (3) newspaper article as the type of document for sourcing statements. The latter criterion excluded letters and commentaries that certain stakeholders could have used to increase their activity in the media, and kept news reporting as the primary focus of the study. We considered stakeholders to comprise everyone contributing with statements who were potentially involved in managing hen harriers (e.g. via proposed conservation actions) and/or potentially affected by this (e.g. land owners and managers). We initially identified 747 articles. The application of the inclusion criteria and the removal of duplicates led to the selection and further analysis of 131 articles spanning from 21 August 1993 to 10 December 2019.

3.2 | Data coding

We exported the selected articles to the software Discourse Network Analyser (2.0 beta 25) (Leifeld, 2019). By default, the software allows coding statements for four variables: the *person* making a statement, the *organisation* to which the person is affiliated, the *concept* representing statement content and *agreement* over the concept (binary variable: yes/no). Additionally, we coded the *year* of publication and

geographical region referred to in the statements, that is, England or Scotland. When the region was not explicit, the first author (FM) inferred it from the context of the article. Inductive qualitative-content coding led to the development of a coding framework for *concept* structured into *categories* and sub-categories (Leifeld, 2017). Two researchers (FM and NAWF) independently double-coded a random 10% sample of newspaper articles and then discussed similarities and inconsistencies in the codes used. This step allowed to increase validity by reducing personal bias and the risk of missing concept and, ultimately, led to the development of a coding framework. The main author then conducted the coding of the news articles. During the process, the concepts and their categorisation were reviewed with the support of a third author (SLC). As a result, 737 statements were coded and three main conceptual categories were identified. We report the most common concepts per conceptual category in Table 1. Additionally, we report the coding framework in Table S1 (Appendix S1), a full list of the actors involved in the debate in Table S2 (Appendix S2), and a full breakdown of the statements coded in Table S5 (Appendix S2).

3.3 | Prediction testing, data analysis and visualisation

We imported the coded and structured data to the R software (R Core Team, 2019) for network development and analysis using the package *rDNA* (Leifeld & Henrichsen, 2019). We removed duplicated statements in the same article (e.g. an actor expressing repeated agreement/disagreement over the same concept) as the number of times a statement occurs in a newspaper could depend on a journal or journalist's agenda or reporting style rather than the actor's activity.

Discourse networks were based on weighted matrices with debate actors arranged in rows and columns and the matrix entries corresponding to the level of agreement or disagreement on the coded concepts.

The matrices were then visualised as networks: the nodes representing the actors and the weighted edges, that is, the links, representing the overall agreement between pairs of actors. Specifically, we applied the *subtract* network method (Leifeld, 2017) which measures stakeholder conceptual similarity. This involves the subtraction of a *conflict* matrix, where edge weight reflects the extent to which actors have opposing agreement patterns, from a *congruence* matrix, where edge weight reflects the extent to which actors have similar agreement patterns (either co-support or co-rejection of concepts). We produced networks for the whole debate and for each of the conceptual categories identified through the content analysis to test our prediction that coalitions would depend on structural categories within the wider hen harrier debate. In each subtract network, we normalised actors' activity through average activity normalisation (Leifeld, 2017). Average activity normalisation involved dividing edge weights by the average number of concepts stated by any pair of actors. Thus, we ensured that edge weights reflected only argumentative similarity while accounting for the statement rate of vocal actors, which are more likely to agree or disagree with other actors.

TABLE 1 Top five most frequent concepts in each conceptual category (Problems, Solutions and Reactions) in the debate over the management and conservation of the hen harrier in England and Scotland based on news articles published from August 1993 to December 2019. Frequent instances of both agreement and disagreement indicate the level of polarisation for each concept. * HH = Hen harrier

Concept categories and concepts	Agreement/disagreement
<i>Problems</i>	
Game is associated with illegal killing	30/3
Illegal persecution affects the survival of HH*/raptors and hampers their recovery	32/0
Grouse moors/grouse shooting deliver social/economic/ecological benefits	24/0
HHs are declining/on verge of extinction as breeding birds	19/1
HH should be more common than it is	12/0
<i>Solutions</i>	
Brood management should be implemented/licensed/trialled	22/9
Collaboration is needed to improve the context	24/0
Commitment to protect HH/solve conflict	22/0
Additional legislation and better enforcement are needed to tackle illegal killing	21/0
HHAP/HHAP publication to support HH recovery	12/2
<i>Reactions</i>	
Illegal killing is unacceptable	43/0
Negative emotions concerning HH disappearances/persecution and its persistence	17/0
Hoping for HH recovery/positive outcomes	9/0
Welcoming new measures to help HH/raptors and positive outcomes	5/0
Disappointment about the lack of communication on HH disappearance	2/0
Proud of conservation effort	2/0

To identify stakeholder coalitions, we analysed the modularity (Newman & Girvan, 2004) of the networks. Modularity is a measure of community structure representing the tendency of network nodes to group in different clusters (Newman & Girvan, 2004). By assessing modularity, we investigated the tendency of the network actors to fall into distinct discourse coalitions. Specifically, modularity measures the fraction of within-community edges minus the expected value of the fraction within the same community if edges were random. Modularity ranges between -0.5 and 1.0 , where high modularity >0.3 . Positive values suggest the existence of community structure (e.g. discourse coalitions), namely groups of closely connected nodes or vertices (e.g. stakeholders) with limited connection to other groups (Newman, 2006; Newman & Girvan, 2004). We did this using the software Visone (Visone Project Team, 2018) to which we imported networks also for visualisation. We used one-mode subtract networks, namely networks with a single type of node (i.e. actors), and retained only positive edge weights to focus on argumentative similarity. This was done to remove the bias for network visualisation due to the presence of negative ties (Leifeld, 2017). We used the Louvain community detection algorithm to highlight stakeholder coalitions in network diagrams.

We tested our second prediction on polarisation by analysing its levels and variation over time. The less the coalitions are bridged by intermediate actors, the higher the polarisation. To assess polarisation we relied on modularity. We used the function 'dna_multiclust' from the rDNA package. This maximises modularity by applying 14 clustering techniques to measure modularity and retaining the highest value of network modularity obtained. We did not pre-determine a specific

number of clusters. To assess its change over time we computed polarisation iteratively for a time window of 100 statements that shifted forward by one statement until the last statement of the debate was reached. We developed a time series diagram to visualise all polarisation values where time windows centre on the respective date. By fitting polarisation values, a Local Polynomial Regression (LOESS) smoother was used to highlight polarisation trends.

The analysis of discourse networks was repeated with respect to the period spanning from 01 August 2014 to 10 December 2019 to examine in greater depth the results of the initial analysis concerning statement frequency and polarisation of the debate.

3.4 | Ethical statement

The project received ethical approval from the University of Exeter College of Life and Environmental Sciences Penryn Ethics Committee (eCORN002034 v3.3).

4 | RESULTS

4.1 | Conceptual structure of the debate

The debate over the conservation of the hen harrier and its management was based upon three main conceptual categories: *Problems*, *Solutions*, and *Reactions* (Table 1 and Table S1). Concepts associated

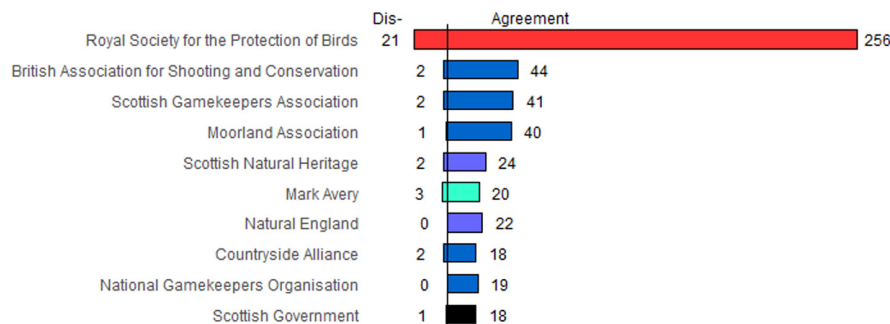


FIGURE 1 Top 10 most-active contributors. Agreement and disagreement bars show the number of times actors supported and/or rejected concepts within their statements over the management and conservation of the hen harrier in newspaper articles from August 1993 to December 2019. Bar colours refer to the typology of actors, where black = government, blue = professional/industry association, violet = advisory body, aquamarine = conservation advocacy group/individual and red = charitable organisation (full classification in Table S2).

with these categories were coded respectively in 382, 272 and 83 statements. The first category, Problems, featured concepts defining the hen harrier conservation problem and its components. These emerged through sub-categories based on the following themes: stakeholder conflict, including its drivers (e.g. agendas, trust, roles and evidence) and stakeholder relationships; grouse moor/game and its perceived benefits, issues, etc.; hen harrier (e.g. benefits/values, status, threat) and illegal killing and its drivers. The second category, Solutions, included concepts describing stakeholders' aims to navigate towards solutions (e.g. commitment to a certain action); the recommended factors to have in place; the solutions (implemented and not) needed to solve or improve the conservation of the species and the conflict and finally the resulting or expected effects. The last category, Reactions, included all those statements reporting an affective response to a certain event or topic related to hen harrier conservation, such as negative emotions associated with episodes of illegal persecution, or positive ones such as hope for certain conservation outcomes.

4.2 | Actors and concepts composition

Over the years, a wide range of actors has participated in the conservation debate (Table S2). These included charities involved in the conservation of birds, game and wildlife more broadly; professional associations related to game and countryside; advocacy groups (or individuals) of conservation and animal rights; research study groups and academics; advisory bodies; protected area managers and a food retailer. Furthermore, as the debate concerned policymaking, law enforcement and law-making, other actors were members of political parties in parliaments and governments, law enforcement groups and a law firm company.

In our analysis, we considered the number of statements as a proxy of actors' activity. Actors were involved in the debate to a diverse extent with some organisations being particularly engaged (Figure 1). The Royal Society for the Protection of Birds (hereafter RSPB) was

the organisation with by far the highest number of stated positions. Among the 10 most active organisations, RSPB was followed by five professional organisations associated with countryside and game, the two statutory advisory bodies for England and Scotland, an individual conservation activist, and the Scottish Government. Full breakdowns of the number of statements coded per actor and type of actors are shown in Tables S3 and S4 (Appendix S2).

The most frequently expressed concepts of the debate fell within each of the conceptual categories, Problems, Solutions and Reactions (Table 1). Problems and Solutions were the most divisive categories and exhibited higher levels of disagreement over their concepts (Table 1) though they also shared a greater number of concepts (see Supporting Information). 'Illegal killing is unacceptable' was the most frequently voiced concept overall and, thus among Reactions. Often stated in response to episodes of raptor persecution, this Reaction consisted of the ubiquitous condemnation of illegal killing by diverse actors. This reaction was frequently found within an accusation/defence dynamic between some conservation and game organisations, where the former highlighted the connection between game and persecution, and the latter confirmed their commitment to collaborate to protect the species and to help investigations and prosecution. The association, factual or alleged, of the game industry (specifically, driven grouse shooting and grouse management) with illegal killing was the second most frequently expressed concept and saw a slight disagreement. Of the most frequently mentioned concepts, the most polarising was the Solution 'Brood management should be implemented/licensed/trialled', highlighting this translocation measure as the most divisive action of the HHAP.

Variation within the debate over time and between countries was apparent. In recent years, the frequency of statements and their concepts increased (Figure 2). Moreover, between August 1993 and December 2019, the debate appeared to have shifted geographically from Scotland to England as shown by an increase in statements referring to the conservation and management of the English hen harrier population.

4.3 | Discourse networks of the debate and differences

Network structures differed, and were more defined, in the discourse sub-networks rather than in the overall discourse network. Actors clustered in more defined coalitions, shown by Louvain modularity values, and clustered differently depending on the conceptual category (Figure 3).

In the overall debate, characterised over the whole period and both countries, the discourse network was not clearly polarised. Four clusters overlapped by sharing positive-weighted edges, which reflected a level of agreement over different concepts, and did not indicate defined discourse coalitions (Figure 3a). Central to the network was the conservation charity RSPB, along with the statutory environmental bodies, Natural England and Scottish Natural Heritage (now NatureScot), and game-related organisations such as the National Gamekeepers Organisation (NGO) and Scottish Gamekeepers Association (SGA). Other actors such as individual academics and universities, game estates, and law enforcement groups were marginal in the network and played only a limited role in the debate. Although the network did not show a clear divide between stakeholders, some professional organisations, private estates and charities associated with game and countryside matters appeared more connected towards one side of the network and, thus, more distant from actors such as bird and conservation advocacy groups and charities and political parties.

Discourse coalitions were instead more distinct in the sub-networks built on categories of concepts. Their composition differed, showing that actors who were in agreement over a certain conceptual category did not necessarily cluster with the same actors in another category. In the Problems sub-network, three clusters emerged. However, two clusters overlapped thus suggesting the presence of two main coalitions (Figure 3b). The first consisted of countryside organisations and estates along with the Scottish Government, English Nature (the precursor organisation to Natural England), and two law enforcement groups. This was opposed to a

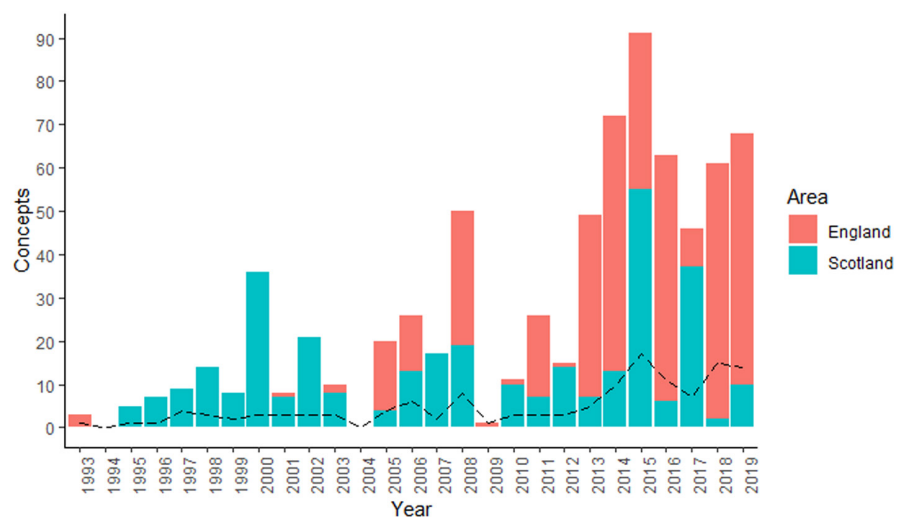
broad coalition of the two overlapping clusters comprising most of wildlife conservation actors, raptor research groups, universities and police groups as well as NGO, GWCT and Natural England.

The Solutions sub-network showed four clusters (Figure 3c) that hinted at the presence of two main coalitions. These were in part similar to the Problems sub-network but also exhibited some noticeable actor shifts. The coalition with interests mainly in wildlife conservation from the Problems sub-network appeared again in the form of two overlapping clusters, which in this case also included the Scottish government. The second coalition consisted of countryside and game organisations or estates. In contrast to the Problems sub-network, NGO, GWCT and Natural England were associated with these actors rather than with most wildlife and raptor conservation actors. Therefore, these organisations shared agreement over Solutions with different actors from those with which they agreed over Problems. Compared with the other sub-networks, the Reactions network featured a high density of positive-weighted edges reflecting the similar affective responses from organisations in relation to specific events or topics (Figure 3d). Overall, the difference among sub-networks highlighted the extent to which actors converged in sharing stated Reactions but diverged in defining Problems and Solutions.

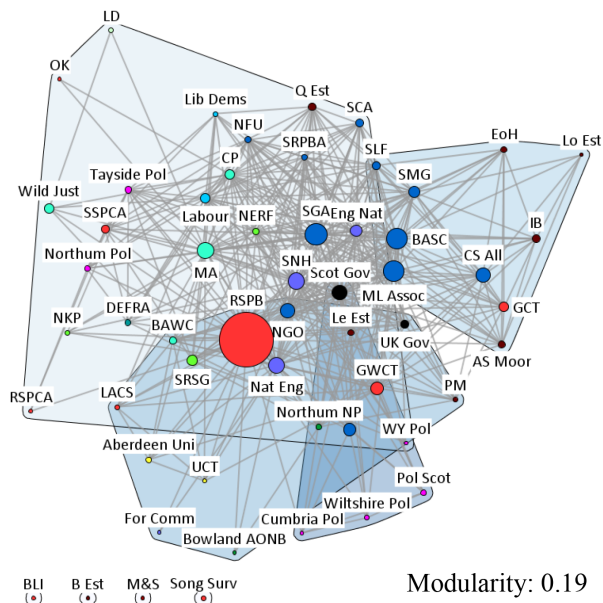
4.4 | Polarisation

Modularity of the discourse network varied during this multi-decade debate, reflecting increases and decreases in polarisation among actors. Polarisation increased overall and peaked in the second half of the 2010s (Figure 4a), substantially reversing a decline that started in the early 2000s and reached a low point before the upsurge in polarisation. We found similar polarisation patterns in the two main concept categories, Problems and Solutions, with the peak of polarisation in the second half of the 2010s (peak modularity ≈ 0.5) (Figure 4b,c). Following this peak, all the temporal analyses showed a subsequent decline in polarisation. The smaller number of Reactions

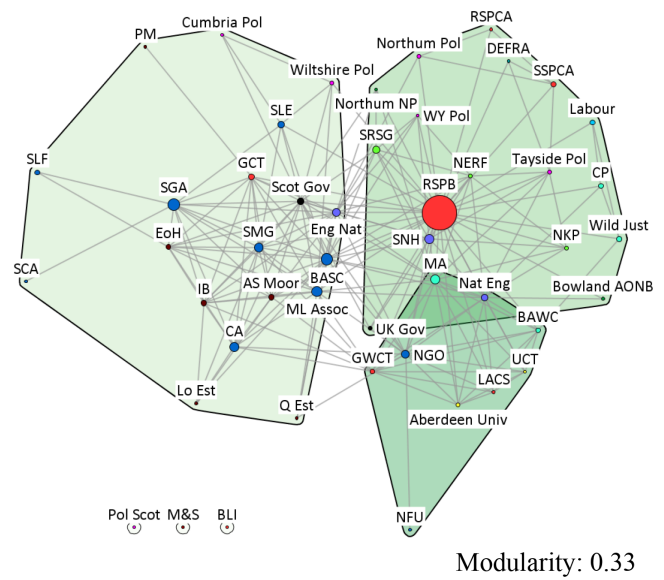
FIGURE 2 Frequency of statements within the debate about hen harrier management and conservation in England and Scotland. Concepts represent the content of the statements and their frequency, as the number of statements/year, is based on 137 news articles published from August 1993 to December 2019. Column colour highlights the geographical area referred to by the concepts. The long-dashed line shows the number of news articles sourced for each year of the time frame.



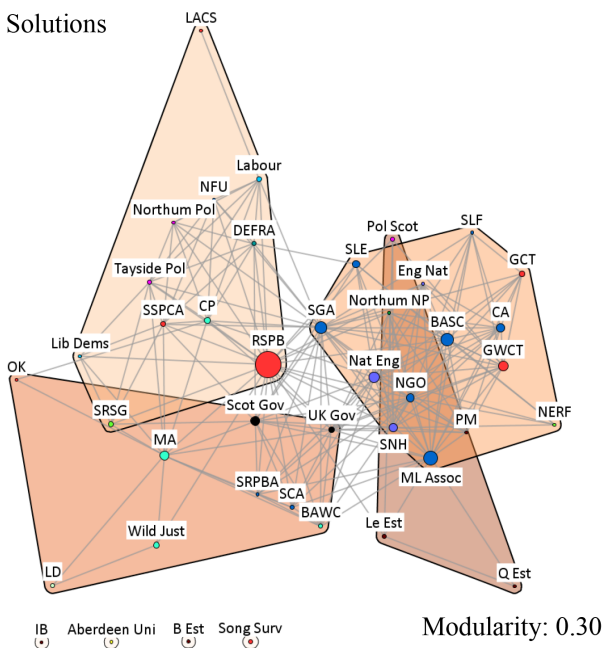
(a) Overall



(b) Problems



(c) Solutions



(d) Reactions

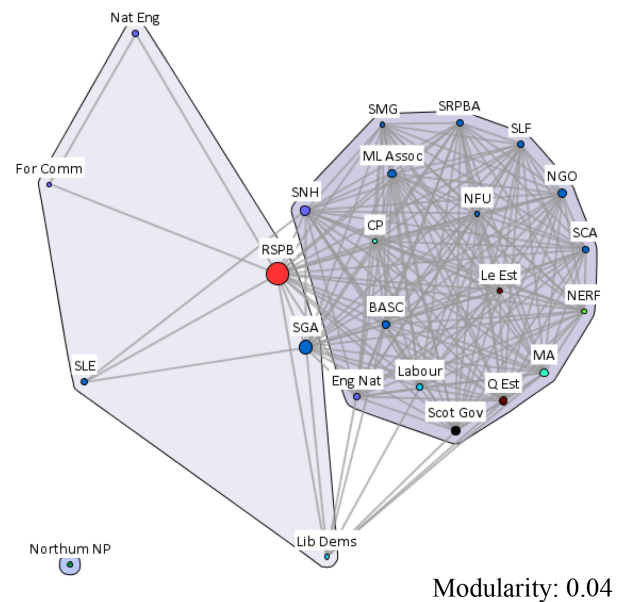


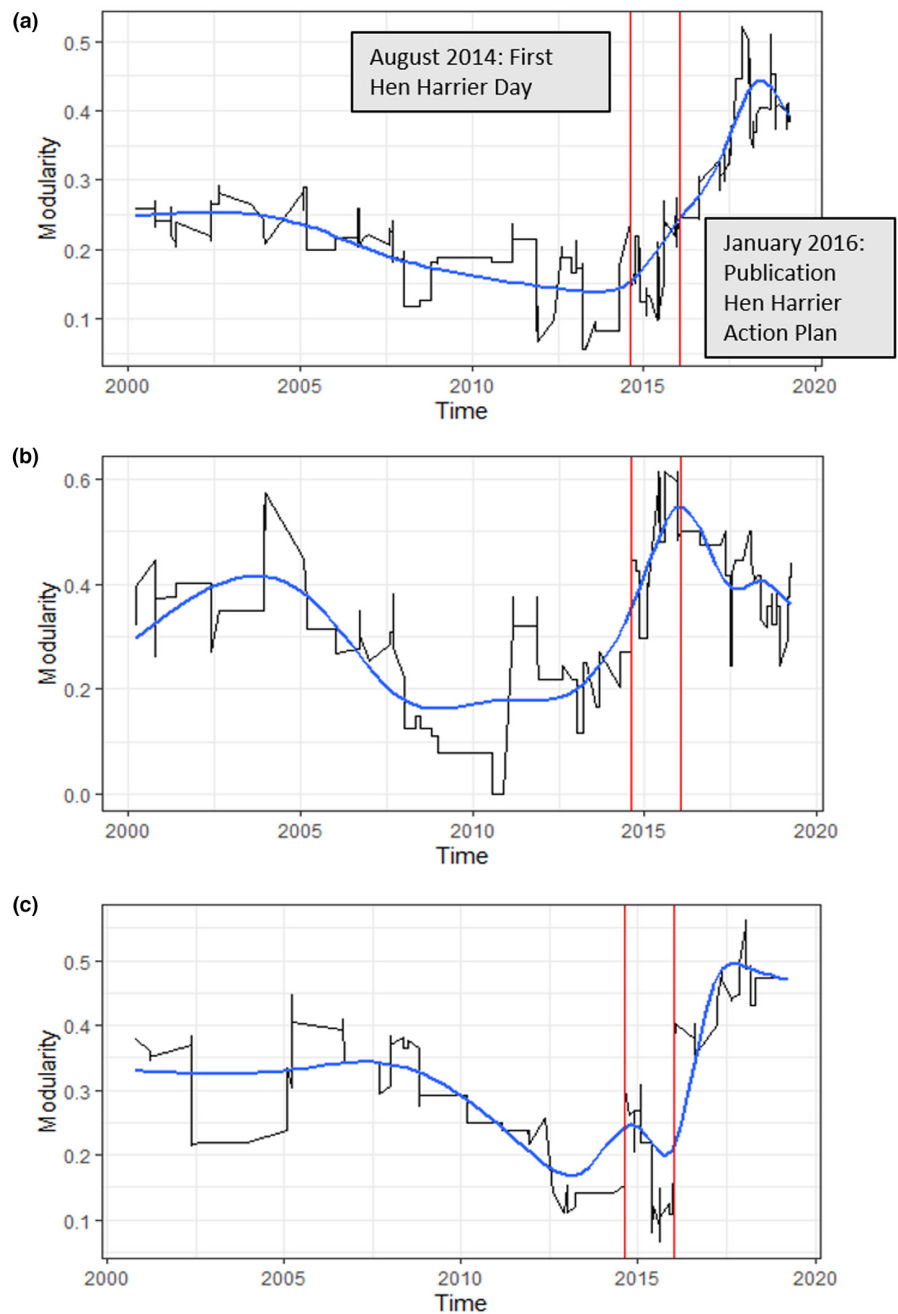
FIGURE 3 Discourse networks of the debate over the management and conservation of the hen harrier in England and Scotland based on news articles published from August 1993 to December 2019: (a) overall debate, (b) Problems category, (c) Solutions category and (d) Reactions category. Coloured hyperplanes highlight coalitions identified through the Louvain community detection algorithm. Node sizes reflect the level of activity of actors (i.e. number of concepts stated). Node colours represent the types of actors. Edges show overall agreement between pairs of actors. See [Table S2](#) for the list of types of actors and full names.

statements did not allow us to check polarisation over time for this conceptual category.

The polarisation trend was likely associated with specific events. Its increase, which started around 2014, appeared in conjunction with the launch of the Hen Harrier Day campaign and discussion of the HHAP in the media. From content analysis, we found that the game industry started calling for the release of the plan in 2014,

while RSPB requested certain conditions on its conservation actions. Polarisation continued to increase in the following year, when most of the debate focused on episodes of illegal killing, and in 2016 when the HHAP was released. Polarisation was particularly prominent over one of the HHAP's six actions, where we found a marked divide between supporters and opponents of the brood management scheme ([Figure 5](#)).

FIGURE 4 Temporal analysis of modularity in the discourse networks, as a measure of the polarisation of the debate over the management and conservation of hen harrier in England and Scotland based on news articles published from August 1993 to December 2019. As polarisation increases, measured by modularity, stakeholders tend to fall into more distinct coalitions. Trends are shown for (a) the overall debate, (b) the Problems category and (c) the Solutions category. The smaller number of Reactions statements did not allow us to check modularity for this category.



4.5 | Recent developments

Our further investigation of discourse networks during the period 2014–2019 showed that the modularity of the discourse networks was on average higher in recent years than in the entire study period (Figure 6). This was especially the case for the Problems category where modularity increased from 0.33 to 0.45. Discourse coalitions appeared more defined than for the entire debate (August 1993 to December 2019), even when accounting for all conceptual categories (Figure 6a). Once again, the analysis of the two most frequent conceptual categories, Problems and Solutions, showed more defined coalitions and changes in coalition composition depending on the category (Figure 6b,c). The Reactions sub-network was again the least polarised, highlighting that most actors were similar in their affective reactions.

5 | DISCUSSION

Understanding stakeholder discourses related to conservation policy and practice is crucial to navigate towards conflict mitigation and effective conservation actions. We investigated stakeholder discourses surrounding the conservation and management of hen harriers in England and Scotland with a DNA of the newspaper media. We confirmed our predictions that discourse networks and their coalitions differed depending on the conceptual categories that constitute the debate. Specifically, the discourse was more polarised into coalitions when addressing the conservation problem and its solutions, rather than when delivering affective reactions, which many actors shared. We highlighted that coalitions have become more pronounced and the discourse more

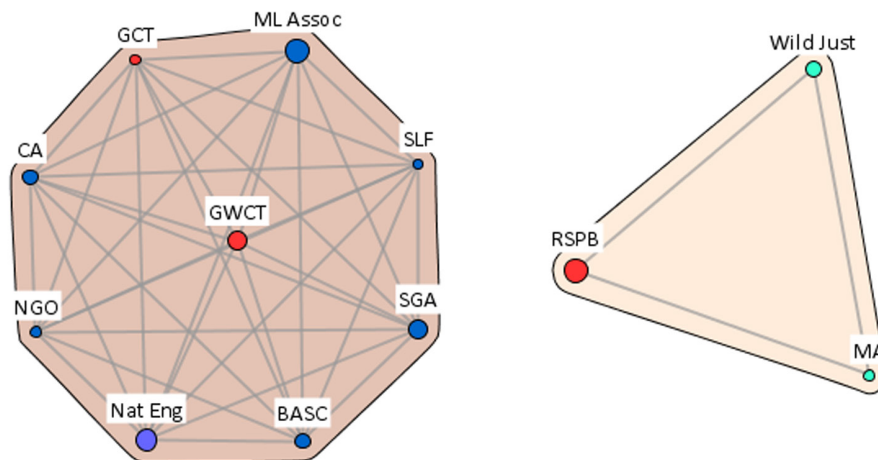


FIGURE 5 Discourse network based on the single Solutions concept of 'Brood management should be implemented/licensed/trialed'. On the left are the supporters, and on the right are the opponents of the brood management Solution, which is one of six actions of the Hen Harrier Action Plan. Node sizes reflect the number of times actors referred to the concept; node colours represent the types of actors, and edges show agreement between actors on the concept (see [Table S2](#) for a list of types of actors and full names).

polarised over time, especially in the second half of the 2010s, concurrent with the release of the hen harrier action plan for England. Here, we discuss these dynamics and their potential drivers as well as other internal and external factors (e.g. stakeholder actions, events and debate arenas) that contribute to shaping conservation policy debates.

5.1 | The debate

A multitude of actors has contributed to the hen harrier debate. However, only a subset was regularly engaged in the print media over time. A major conservation charity, the RSPB, was by far the most vocal actor consistently holding a central position in the networks and the one expressing the highest levels of agreement and disagreement over concepts of the debate. Notably, five of the 10 most active actors were associated with interests in game and countryside, for example, British Association for Shooting and Conservation, Scottish Gamekeepers Association, Moorland Association. Still, the level of their activities was substantially lower than RSPB's contribution, even when they were grouped together. The presence of the RSPB, the Scottish Gamekeepers Association and Scottish Natural Heritage among the most active actors was in line with their key roles in the Scottish debate over grouse shooting and raptor conservation in internet media (Hodgson et al., 2018, 2019). Our study supports previous research, suggesting that focal organisations such as RSPB can institutionalise their views, meaning these become rooted in institutions as practices and ways of thinking (Hajer, 1993), and ultimately influence policy-making (Hodgson et al., 2018). Moreover, it hints at a shared effort from the game and countryside industry to counteract such a drive as shown by the discourse coalition that pro-shooting actors formed, and which remained almost unchanged, in all Problems and Solutions sub-networks.

The debate was also characterised by a geographical shift during the study period with an increase of statements referring to the conservation and management of hen harriers in England rather than Scotland. This could be the result of the persisting critical status of the hen harrier in England and, consequently, a shift in the focus of discourses. Despite an overall decline, most hen harriers in the United Kingdom (76%–80%) have been regularly found in Scotland (Hayhow et al., 2013; Sim et al., 2007; Wotton et al., 2018). In England, instead, the species almost disappeared with the number of territorial pairs decreasing from 19 in 1998 to 4 in 2016 (Hayhow et al., 2013; Sim et al., 2007; Wotton et al., 2018).

5.2 | Discourse network dynamics

Supporting our first prediction, discourse networks based on conceptual categories differed in terms of both their polarisation and the composition of coalitions. The divisiveness associated with defining the conservation problem and its solutions did not appear in the overall debate. Instead, it became evident only when these two categories were isolated from the discursive similarity of the affective reactions. This might suggest the presence of a debate dynamic where part of discourse concepts counterbalance the divisiveness of other concepts. Moreover, some of the most relevant and active stakeholders (e.g. Game and Wildlife Conservation Trust, National Gamekeepers Organisation, Scottish Natural Heritage and Natural England) shifted and clustered differently in the Problems and Solutions sub-networks.

The substantial consistency of affective reactions, such as the widespread agreement over the concept 'Illegal killing is unacceptable', and the shifting composition of coalitions might suggest the presence of common ground between opposed coalitions. This partial similarity might confirm the presence of shared narratives, which can bear the potential to build dialogue and mitigate conflict

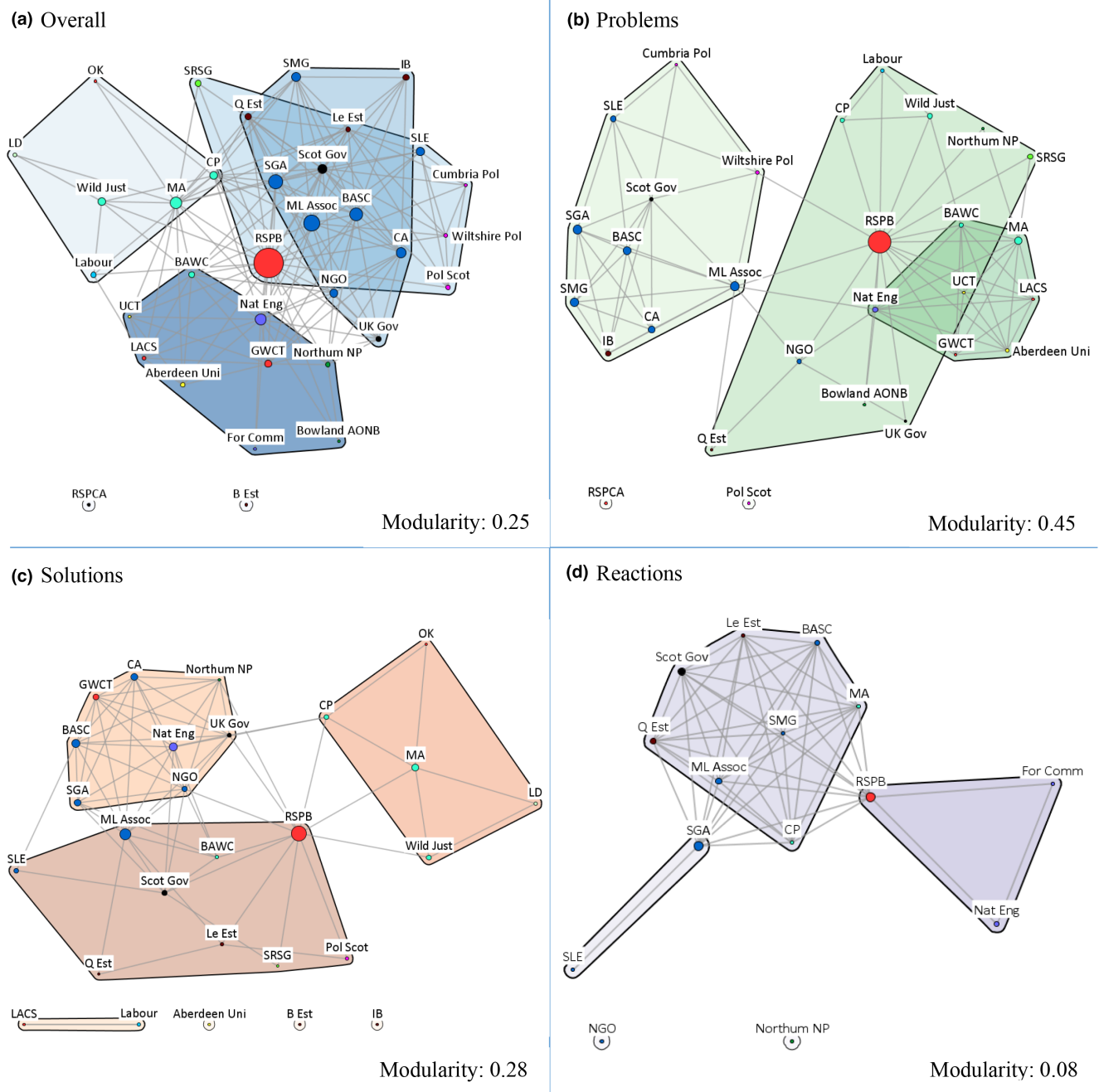


FIGURE 6 Discourse networks of the debate over the management and conservation of the hen harrier in England and Scotland based on news articles published in recent years from August 2014 to December 2019: (a) overall debate, (b) Problems category, (c) Solutions category and (d) Reactions category. Coalitions identified through the Louvain community detection algorithm are highlighted by coloured hyperplanes. Node sizes reflect the level of activity of actors (i.e. number of concepts stated), node colours represent the types of actors and edges show overall agreement between actors (see [Table S2](#) for a list of types of actors and full names).

(Hodgson et al., 2018). However, this could be the result of the general adoption, including by game and countryside organisations, of a conservation-driven discourse. Similar convergence dynamics have occurred in global news media surrounding climate change mitigation, where political and business elites have increasingly embraced ecological ideas and ‘greener argumentation’ (Ylä-Anttila et al., 2018). We believe two different strategies could explain this argumentation dynamic. First, some actors might try to take on a

brokering role between more opposed actors within the debate. This could be the case for actors involved in the Scottish upland conflict such as GWCT and SNH attempting to be ‘middle-ground’ groups (Hodgson et al., 2018). These actors were invisible in internet media as they did not contribute to narratives over specific themes (i.e. actions and statements of other actors, and illegal killing) in their organisational websites (Hodgson et al., 2018). Instead, in our study of print media they were visible but appeared in various coalitions

depending on the conceptual category. Second, actors might 'reinvent' themselves. In the policy debate over renewable energies in the United Kingdom, reinvention is a strategy adopted to reframe 'an old or polluting technology as new or innovative' (Johnstone et al., 2017). Actors associated with the natural gas industry actively reframed a non-renewable gas resource as a low-carbon and sustainable energy option. In this context, reinvention might have occurred across conceptual categories. For example, within Problems, some game and countryside organisations frequently claimed that the benefits associated with grouse shooting were not only socio-economic but also ecological. This was a common concept in the debate and might have served to balance against the concept 'Game is associated with illegal killing', which was the most frequent Problems concept. The same reinvention could explain why a large majority of actors grouped in a single cluster in the affective discourse of the Reaction category. Through this strategy, actors might try to reduce or avoid conflict with other organisations, meanwhile engaging the public and policy-makers to shape their opinions thus supporting certain directions in policymaking.

5.3 | Polarisation

Confirming our second prediction, the degree of polarisation in the debate has increased over time and peaked in the second half of the 2010s. This means that actors holding similar positions and policy beliefs—conveyed through statement concepts—have clustered together while distancing from other actors with different beliefs. Clustering per se does not imply conflict (i.e. polarisation) as it can reflect adherence to different policy paradigms without antagonism (i.e. segregation; Leifeld, 2020). However, given the acknowledged entrenched nature of the hen harrier conflict (Thirgood & Redpath, 2008), we believe that increased polarisation reflects increased antagonism. To some extent, the polarisation trend reflects the conflict curve common to social (and conservation) conflicts, where conflict can escalate due to the growth of iterative claiming and counter-claiming of those entangled in the debate (Crowley et al., 2017). Our result reinforces the suggestion that this stakeholder conflict was schismogenetic (Hodgson et al., 2018), where schismogenesis (*sensu* Brox, 2000 based on Bateson, 1935) is the process by which conflict is escalated through expressive competition that produces a recursive and escalating confrontation. This can originate when people sharing values and seeking different goals recur to political confrontation (Brox, 2000) but also when a lack of institutional protection of basic human rights characterises political negotiation (Harrison & Loring, 2014).

The polarisation of the hen harrier conservation debate is rooted, at least in part, in divergent values and value systems of the major actors involved (Hodgson et al., 2018, 2019; St John et al., 2019). Wildlife value orientations range from mutualism (individuals viewing wildlife as deserving of rights and welfare similarly to humans) to utilitarianism/domination (individuals prioritising human mastery over wildlife and human well-being; Kellert, 1984; Manfredo

et al., 2009). A substantial divergence of these orientations could be exemplified by the divisiveness of the brood management translocation scheme and the spike of polarisation that concurred with events such as the establishment of Hen Harrier Day and, particularly, the publication of the HHAP in England. Through Hen Harrier Day, the 12th of August has become even a more symbolic and confrontational date for the conservation of hen harriers. As for the HHAP, some actors had supported its publication since 2014 and brood management became by far the most discussed solution of the whole debate. We argue that the aim of the scheme to ensure hen harrier conservation, mitigate raptor predation and allow sustainable grouse shooting, has revealed underlying differences in actors' value systems in a context of unresolved conflict. As a result, a group of bird conservationists and activists disagree with the HHAP, in opposition to the key countryside and game actors, as well as the statutory body Natural England. Their opposition is based on claims that the HHAP is detrimental to biodiversity and hen harriers, accommodates the interests of those believed to perpetrate retaliatory persecution and is itself illegal. This stance is consistent with the findings that, in Scotland, field sport and non-raptor conservation organisations share utilitarian value orientations, in contrast to pro-raptor and pro-bird organisations, which hold mutualistic orientations and are not supportive of more invasive measures such as brood management (St John et al., 2019). Therefore, the geographical shift of the debate, the conservation of hen harriers in England and, in particular, the HHAP still appear entangled with the underlying differences that characterised the ongoing conflict in the uplands.

Based on a framework designed to support the identification and management of different levels of human-wildlife conflict (Zimmermann et al., 2020), we confirm that the hen harrier conflict is a deep-rooted conflict, defined by clashes between values, beliefs and social identities. Working with this type of conflict requires balancing power and ownership in dialogue processes and decision-making (Zimmermann et al., 2020). To this end, the incorporation of a larger diversity of values in any proposed management process might enable the development of new solutions and improved communication (Hodgson et al., 2019). The variety of actor categories and the plurality of clusters in discourse networks suggest that there is potential for new actors to change the dynamics of the debate, and hence of the conflict. Supporting this there is theoretical and empirical research on polycentric governance showing that the participation of a multitude of actors at different levels can facilitate policy innovation and overcome blockage (Cole, 2015; Ostrom, 2010). Still, it is important to acknowledge that in certain policy debates, polycentricity can be used to produce policy blockage (Fisher & Leifeld, 2019).

Further, some of the most active organisations involved in the debate still interact and collaborate in other contexts, for example, GWCT, Natural England and RSPB in the Curlew Recovery Partnership (Curlew Recovery Partnership, 2021), suggesting that arguments about harriers have not compromised their relationships entirely. Overall, we argue that our analysis of the debate in its concepts can help design reconciliation or mitigation processes that

target conceptual common ground and address criticalities such as divergent discourse elements and the roles of actors in the debates.

5.4 | Factors shaping conservation debates

Despite the fundamental role of value systems in driving convergence and divergence in argument, conservation discourse networks and their characteristics are the results of intertwined internal and external factors. An example here appears to be the minor role of academics and universities in the debate in print media. The debate focused on evidence relating to hen harriers, biodiversity and conservation measures and criticism by game shooting organisations of the evidence published by RSPB on hen harriers and illegal killing. Still, academics were not central actors in our study. This limited role was in contrast with other environmental policy debates, such as those on climate change in Canadian and Finnish media (Kukkonen et al., 2020) or in the US Congress (Fisher et al., 2013; Fisher & Leifeld, 2019). Internal factors concerning the actors themselves and their discursive contribution to the debate could explain this. Academics might intentionally focus on providing research results that could ease the conservation conflict rather than actively engaging in a confrontational debate. This might be the case given that the mitigation of the hen harrier conflict has been historically slow despite some substantial scientific (Thirgood & Redpath, 2008). Yet, this might hint at the recognised disconnect between academic and public debate (Lester & Foxwell-Norton, 2020). It is also important to consider that actors' roles can vary across arenas. Coalitions almost absent in a news media arena might be more prominent in non-media ones (Kukkonen & Ylä-Anttila, 2020). For example, actors might intentionally go 'invisible' in the media, especially with entrenched divisions (Lester & Hutchins, 2012), opting instead to influence policy-makers through direct contact, that is, inside lobbying (Vesa et al., 2020).

External factors, originating from other actors, policy-making processes and policy arenas can also influence the role of actors and the debate itself. In the debate over climate change in the US congress, the failure of the cap-and-trade bill legislation (i.e. market-based approach to control emissions) likely led to a vacuum of policy mechanisms, a lower involvement of congress members and, ultimately, an increased demand for scientist participation (Fisher et al., 2013; Fisher & Leifeld, 2019). In our study, the absence of a similar vacuum could have influenced the role of academics since other actors addressed a wide range of aspects of the conservation issue and potential solutions (e.g. HHAP).

Lastly, debate arenas are not independent and other arenas have likely contributed to shape the debate in news media and its polarisation. Social media, for example, facilitate the spreading of sensationalistic content from news media covering species such as large carnivores (Nanni et al., 2020) and spiders (Mammola et al., 2020), with the potential of affecting people's emotions, perceptions of risks, and attitudes towards these species. Similarly, in our study, social media platforms could have influenced both the actors involved

and the journalists, thus reiterating the production and selection of conflictual discourses and concepts.

5.5 | Limitations and future directions

Our study contributes to a better understanding of conservation policy debates and conflicts. Nevertheless, it comes with limitations due to the scope of the analysis and the media source used. First, our DNA covered only part of the debate over hen harrier conservation by focusing on one of its arenas, that is, newspaper media. In other arenas such as social media platforms, discourse networks and their polarisation could be different as a result of different actors, concepts and agreement (Kukkonen & Ylä-Anttila, 2020). Second, the targeted newspaper arena could be intrinsically biased as news media might offer only a skewed representation of conservation issues by favouring conflictual themes (Hughes et al., 2020; Niemiec et al., 2020). This is consistent with the known trends in news media of journalists relying on powerful sources (*official dominance*) and news being increasingly 'negative, dramatized, fragmented, and personalized' (*information biases*) (Korthagen, 2013). Therefore, it is crucial to distinguish between real and media-exaggerated conflicts and coalitions.

Future discourse network analyses represent an opportunity not only to tackle these limitations and improve our understanding of conservation conflicts and their dynamics but also to expand understanding and application of DNA (Leifeld, 2020). Comparative studies of discourse networks across different arenas could contribute to a better understanding of the role of actors and their discourses, the biases of arenas and, hence, of the hen harrier debate as a whole. For example, it would be important to investigate the actual power of dynamic coalitions and their influence on decision-making. The reason is that power and influence can vary in strength across different arenas (Kukkonen & Ylä-Anttila, 2020) and actors can shape public behaviour towards policy based on their position of power (Rinscheid, 2020). Future research should also broaden its scope by targeting debates over the management of different species, hence across similar policy domains, and incorporating inferential analysis (Brandenberger, 2019; Leifeld & Brandenberger, 2019). Developments in this area should lead to an integrated study of value systems and DNA that could help understand the generative processes underlying discourse network dynamics in conservation conflicts. Systematic implementations of DNA could also provide an important monitoring tool. Research in the conservation domain can thus contribute to the need for prediction and systematic comparisons of discourse networks, which relies on a better understanding of mechanisms behind policy debates as dynamic networks (Leifeld, 2020).

AUTHOR CONTRIBUTIONS

Filippo Marino conceived the project and designed it with the contribution of Sarah L. Crowley, Robbie A. McDonald and Dave J. Hodgson. Filippo Marino collected and analysed the data, and led the writing of

the manuscript along with Dave J. Hodgson. Nell A. Williams Foley and Sarah L. Crowley contributed to qualitative analysis.

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CONFLICT OF INTEREST

None of the authors is affiliated or involved with any of the actors, either individuals or organisations, with any interest in the policy debate discussed in this study. However, the study has received financial support from Natural England as stated in the acknowledgements. Natural England has supported but not influenced the outcomes of this research. Sarah L. Crowley is an Associate Editor for People and Nature but was not involved in the peer review and decision-making process.

DATA AVAILABILITY STATEMENT

All the relevant data are available in the Nexis UK news online database.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Appendix S1. Coding framework.

Appendix S2. Details on stakeholders and statements coded.

Appendix S3. Qualitative examples of the types of articles sourced from the Nexis database and used for the Discourse Network Analysis.

Appendix S4. Reflexivity Statement and Observational Standpoint

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