

Analysing Parliamentary Debate with Computer Assistance

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The analysis of parliamentary debates is at the confluence of a number of developments in political science. What light can automated and semi-automated techniques throw on such analysis? In this paper we compare two such approaches, one semi-automated (Hamlet) and the other fully automated (Alceste). We use both approaches to identify the prominent themes in debate and to assess how far speakers who favour different positions adopt a distinct pattern of discourse. We seek to assess how far the two approaches yield convergent or divergent analyses. Selecting a second reading debate from the UK House of Commons on a private member's bill on abortion in July 1966, we are able to show similarities of analysis despite the detailed differences between the two approaches. In particular, the analysis in Hamlet allows identification of the extent to which individual speakers employ one type of vocabulary rather than another. Alceste is able to provide a statistical basis for the different classes of vocabulary that occur in the debate.

KEYWORDS: Deliberative Democracy • Debate • Dimensionality • Computer Assisted Content Analysis • Parliamentary Discourse • Vocabularies

Introduction¹

The analysis of parliamentary debates is at the confluence of a number of developments in political science. The rise of theories of deliberative

¹ The authors are grateful to The Nuffield Foundation, UK, for financial support with this study. We would also like to thank Dr. Cheryl Schonhardt-Bailey of the London School of Economics and Bruno Hopp of the Central Archive for Empirical Social Research, at the University of Cologne, who both gave freely of their time in advising us on technical matters associated with relevant computer software. An earlier version of this paper was presented at the ECPR Joint Sessions, Workshop 23: Advanced Empirical Study of Deliberation, 7–12 May, 2007, Helsinki, Finland. We acknowledge with thanks the comments and suggestions provided by fellow members of the workshop and other colleagues who have contributed invaluable advice.

democracy (for example, Habermas 1996; Gutmann and Thompson 1996, 2004) has focused attention on the discursive elements of political interaction, including interaction among political representatives (Uhr 1998). If democratic politics involves the giving and exchange of reasons in public discussion, then the study of how reasons are given becomes important. In parliaments representatives offer arguments in support of positions they adopt and an important function of such arguments is to frame issues in certain ways. The empirical study of parliamentary discourse thus contributes to an understanding of how policy issues are framed. Studying parliamentary discourse can also be related to comparative assessments of the deliberative performance of different parliaments. For example, do parliaments based on adversarial principles deliberate well or badly by comparison with parliaments based on norms of consensus (cf. Steiner et al. 2004)? Finally, within the philosophy of social science, the legitimising role of discourse has been used to refute the claim that parliamentary debate is merely epiphenomenal to the motivation of real interests (see Skinner 1974, on the work of Namier 1957).

Alongside this interest in parliamentary discourse, there has been a development of new methods of text analysis, in particular computer-aided text analysis (CATA). Even when captured in party manifestos or legislative debates, political writing and talking generates a great deal of data, indeed data so voluminous in extent that no one researcher could expect to understand them alone or without mechanical aid of some kind. As Iain McLean (2006: 128) has written of the Comparative Manifesto Group material, it “begins with an unassimilable amount of primary data” and, as he goes on to point out, such data can only be handled in three ways: by unsystematic sampling, by systematic sampling or by some set of data reduction techniques. The same can be said of parliamentary debates. For example, six UK House of Commons debates about just one issue (abortion policy) amount to nearly 230'000 words. This figure leaves out debates in the House of Lords, committee proceedings and other parliamentary procedures, for example adjournment debates. In short, without something like CATA the data are simply too voluminous to be analysable in a systematic way.

Yet many people are suspicious of formalized techniques of text analysis, whether wholly or partially computerized. For these critics, texts have meaning and no computer can understand meaning. Moreover, speakers have intentions, and speech-act theory tells us that intentions are important (Austin 1976; Searle 1970; Skinner 1972). Yet, no computer can under-

stand intentions. We accept the premise of these criticisms. For the reasons that Searle (1984) has set out, there is no reason to think that artificial intelligence can replace human intelligence. However, to accept the premise is not to accept the conclusion. For to accept that CATA cannot replace human intelligence is not to show that it cannot aid human intelligence in the understanding of political debate.

In this paper we report on a pilot study using two different forms CATA. They have been chosen because they are designed to yield comparable, though not identical, statistical analyses on a body of text. However, they differ in one crucial respect. One, Hamlet, requires the analyst to prepare a dictionary of key terms with statistical analysis subsequently being performed on those key terms. The other, Alceste (*Analyse des Lexèmes Cooccurrents dans les Enoncés Simples d'un Texte*), dispenses with the need for such a dictionary. Instead, it operates on all meaningful content words within the text, where the meaningful content words are determined by reference to the programme's own internal dictionary (see Reinert 2005).

The prospect of not needing even to devise a dictionary by reference to which text is coded opens up considerable possibilities, some advantages of which have been stressed by Cheryl Schonhardt-Bailey in commenting upon Alceste:

"[...] it guards against researchers and coders infusing their own biases into the coding. Second, it can provide an impression of a voluminous data corpus within a very short space of time. Third, and following on from that, the issue of reliability which arises with human coding is no longer relevant. Fourth, because large amounts of text can be analysed quickly – which means that sampling may not be required – problems of sampling may also disappear" (Schonhardt-Bailey 2005: 703).

These are considerable claims. Yet, if one were sceptical about traditional forms of CATA, one might be inclined to be even more sceptical of that form that did not even require a human being to prepare a dictionary.

It may also be that fully automatic techniques of the sort used by Alceste do not have so great an advantage over semi-automatic techniques like Hamlet for a variety of reasons. Although "coder bias" is a potential problem in terms of manual coding, extensive reliability testing is able to minimise the risk to an extent (Klingemann et al. 2006: 90ff.) and this could be extended to category construction for semi-automated CATA. Many CATA programmes (including Alceste) often require considerable work on preparation of input documentation and interpretation and when this is taken account of, the actual time spent on a project may not vary as

greatly as suggested. Furthermore, the application of coding categories in semi-automated packages is carried out automatically so there is no reliability issue in this regard. Semi-automated CATA is a tried and tested method of evaluating *a priori* assumptions about policy, political commentary, political behaviour and many other applications. (See, *inter alia*, Bara 2001a, 2001b, 2006; Laver and Garry 1998, 1999; Benoit and Laver, 2006.) In the case of this study, it also allows us to integrate and test further assertions made by previous analysts of abortion debates (e.g. Lovenduski 1986) or of the nature of parliamentary deliberation (Steiner et al. 2004).

Although these operational points are important, our primary focus in this paper is on the relation of method to substantive analysis. As political scientists we seek to understand parliamentary debate in the light of substantive theories of deliberation and parliamentary advocacy. Fully and semi-automated techniques may well simply be different routes to the same end. Alternatively, it could be that the approach chosen fundamentally conditions the results that one finds. Our primary purpose in this paper is to adjudicate between these two possibilities. Would we understand parliamentary debates differently if we use one approach rather than another? To what extent are the approaches complementary? In what respects are they rival?

Case Study

To help answer these questions we examine one UK parliamentary debate on abortion. We have chosen a debate about abortion because it is an important issue in modern politics and because it is discussed within contemporary theories of deliberative democracy as a matter where there is unlikely to be consensus, and therefore as a question where ongoing debate and public discussion is likely (see in particular Gutmann and Thompson 1996, 2004). In the UK such issues are treated as matters of conscience and voting takes place without the constraint of the party whip. MPs speak freely in such debates, often supporting one another across party lines. In this respect, second reading debates on free votes in the House of Commons are as close as one finds to an unconstrained speech situation in the UK parliament – at least as far as elected representatives are concerned.

The particular debate we analyse is the 1966 second reading debate on the legislation proposed by the then David Steel (now Lord Steel), which led to the 1967 legislation that has set the framework for British law on

abortion ever since. It is a complex debate (as we seek to show in this paper) and involved twenty-two substantial speakers. (Two speakers making very short interruptions are excluded.) Its importance notwithstanding, this debate is only one from among some forty-five debates dealing primarily with abortion since the 1960s which are accessible from Hansard.² However, it has been chosen explicitly for the light it sheds on the methodological issues.

Our theoretical starting-point is the claim that political contestation can be understood in dimensional terms (compare Riker 1996). Any particular disagreement in politics involves a number of different considerations, and a large part of political competition involves stressing those considerations favourable to the political position one holds and down playing considerations that are less favourable. In the limit, this may involve partisans “talking past one another”, as is claimed to be the case in the Comparative Manifestos Project, where a saliency theory of issues gives rise to the claim that campaigning parties “own” some issues and concede other issues to their opponents (Budge et al. 2001).

It is of course an empirical question as to how far partisan polarisation on any one issue actually takes place. Issue ownership is best regarded as a variable rather than a constant. However, in order to establish the extent to which issue ownership takes place, one needs first to establish what range of arguments and considerations are advanced, and how the different arguments do or do not hang together in different categories. A debate – whether a formal parliamentary debate or the less structured “public debate” that takes place on various policy questions through the activities of civil society – can be thought of as having a number of themes. At any one time, only a sub-set of these themes will be in play, in the sense that political actors will be making arguments that relate to these themes. For example, in UK parliamentary debates on abortion, themes over the years have varied from the social grounds for liberalising abortion legislation, to the regulation of abortion clinics to the question of term limits (Weale, Bicquelet and Bara 2007). One reason why we conduct content analysis is to determine what the components are of the debate in the aggregate. What stock of arguments are potentially in play and available to speakers in the debate?

² Most of the debates required were only available in hard copy format as on-line transcription of debates by Hansard is only available for the period from December 1988. These hard copies were prepared professionally for use with the software.

The second focus of interest is the extent to which the arguments that are potentially in play are used to different degrees by one side rather than another. We might expect proponents of different positions to stress the themes that favour their position and to down play those themes that are less favourable. In particular, the more that issues can be thematised or framed in certain ways, the more likely one side is to gain advantage in the argument. McLean (2001) suggests some plausible examples of this process at work in the UK parliament. It becomes very difficult, for example, to see why the House of Lords, made up of landowners who benefited from agricultural tariffs, should have acceded to the repeal of the Corn Laws in 1846 unless its Conservative leader, Wellington, had been persuaded that it was not the free trade dimension that was important but its public order dimension. That the discursive framing of choice in legislatures is sometimes important is not a proposition that we can demonstrate here, but we take it as at least a plausible starting-point.

In summary, then, our task is to take stock of the range of themes that emerge in the debate and to assess how far speakers on different sides of the debate are distinctively associated with different themes. Methodologically, we are concerned to compare different ways of carrying out this stock-taking and make this assessment to see how substantially different are the results produced.

Hamlet and Semi-Automated CATA

Hamlet's main purpose is to allow the investigator to explore text for occurrence of words or to search for the degree to which designated vocabularies are present. It is carried out on the basis of designated coding units – in this case sentences delimited by the usual punctuation conventions. The dictionary used in this study is based on vocabularies and almost all the input words are derived from the text of the July 1966 debate.³

Hamlet's facility for allowing the transfer of terms directly from the debate text was another reason why Hamlet was chosen rather than other

³ Some additional words are also included since in the overall project the dictionary is applied to ten debates between 1965 and 2004 drawn from both Houses of Parliament and it is thus necessary to include names of speakers, constituency names, and specific terminology associated with the House of Lords in order to be able to assess consistency.

semi-automated content analysis software such as Textpack.⁴ As well as enabling the same input texts to be used for both Hamlet and Alceste operations, sub-texts relating to individual speakers within debates could be easily assembled to allow for comparison of language both within and between debates and speakers and for the construction of additional variables such as party, gender or voting pattern.

As is the case with all software applications dealing with classification of data based on words and phrases, whether defined according to *a priori* criteria or not, it is not possible to attach specific meanings to words which may be used in different ways by different speakers. Take the word “choice” which assumes a very different meaning if you are a social democrat as opposed to a neo-liberal. Some words genuinely mean different things in different contexts, such as “drugs” which might connote medical or criminal associations. Other than offering a time-consuming “keyword in context” (KWIC) facility which can act as a check, no software has yet been able to overcome such contextual problems. Since a number of abortion debates are over 35’000 words in length, even identifying those words comprising the dictionary “signifiers” would create significant overload. In the event, sampling of particularly strategic words was subjected to a KWIC procedure. For example, it was found that language associated with “sanctity of life” emerged as discriminating between those with a “liberal” outlook on abortion reform and those who adopted the opposite position— which we designate as a “restrictionist” view. But “sanctity” appears only in 1966, where a KWIC investigation showed nine hits, all of which related to “sanctity of life” and all of which were in the text of “restrictionist” speakers.

We also need to be aware that there are many words included in any text which might appear to be largely meaningless, such as definite and indefinite articles, words used as connectors such as “and”, certain prepositions. Yet, we should take care not to disregard these as there may be occasions when common prepositions may be highly relevant. Fairclough (2000) found, for example, that the word “we” figures prominently in the rhetoric of New Labour and suggests a particular interpretation of policy intention. Context again is the key.

⁴ Textpack was developed by Peter Mohler, Cornelia Zuell and colleagues at ZUMA, University of Mannheim. The first version was tested in the early nineteen seventies. It is currently in version 7.5.

The Hamlet *a priori* dictionary used in this study was constructed by one of the authors (Bara) so as to identify areas of major significance in the July 1966 debate on abortion. This is also designed to investigate whether these areas remain pertinent across the other abortion debates. It is made up of six categories which comprise eight hundred and seventeen words collectively (see documentation at <http://www.essex.ac.uk/government/staff/academic/wealea.shtm/parliamentarydebate/>). This was chosen as the key debate because it was crucial to the changes in the law and also represented the focus for change by all subsequent debates. One aim of the larger project as far as use of semi-automated coding is concerned is to assess how far all of these major debates rely on the same type of vocabulary and argument. There are three types of category. “Substantive”, of which there are four, reflects specific vocabularies which deal with cognate areas – medical, moral, legal and social. “Rhetoric of debate”, of which there is one, reflects vocabulary related to the way in which debate is conducted in parliament. The final type is labelled as “advocacy” and relates to the deliberative element of the debate in terms of reflecting attempts at persuasion. The words comprising this vocabulary reflect persuasive rhetoric, such as “commend” or “support” as well as attempts to support argument positively (e.g. “sympathy” or “fairness”) or negatively (e.g. “back-street” or “abhorrent”). In the event, results of preliminary investigation suggested – correctly as it has turned out – that it would be unwise to use lemma to designate word “families” as it was likely that specific forms of words might help to designate differential vocabulary usage between particular groups of speakers.

The choice of the six vocabularies was informed by four factors. Firstly, the work of Marsh and Read (1988) and Lovenduski (1986) suggested that there were clearly identifiable substantive arguments which could be seen as the dimensions of abortion debates from 1965 to 1980 and this could be tested empirically. Secondly, repeated reading of the debate suggested that these dimensions could be represented as categories to apply to speeches of individual participants for purposes of comparison. Thirdly, Steiner et al. (2004), *inter alia*, propose that parliamentary debates comprise a balance between procedural and substantive elements. Finally, since this project relates to the empirical study of deliberation, it is desirable to test for at least one dimension which reflects, if not deliberative argument, at least advocacy.

Hamlet provides two general means of depicting the usage of the vocabularies contained within the established dictionary – as a percentage of total

Table 1: Vocabularies as % of total contribution to Hamlet dictionary, July 1966 Second Reading debate

Advocacy vocabulary	Legal vocabulary	Medical vocabulary	Moral vocabulary	Rhetoric of debate vocabulary	Social vocabulary
13.67	7.94	20.17	4.94	33.56	19.72

debate and how much each of the six distinct vocabularies contributes to the total dictionary found within the debate. The latter is especially useful when comparing and contrasting contributions by individual speakers. In both cases the measurement is based on words within sentences. Taking the 1966 debate in full, Table 1 shows the contribution of the vocabularies. It should be stressed that all discussion which follows in relation to the vocabularies is based on figures depicting *vocabularies as percentages of total dictionary present in the debates*. In general terms results of the semi-automated analysis clearly reflect the procedural-substantive dimensions to parliamentary debate suggested by Steiner et al. (2004) as well as highlighting specific substantive and advocacy aspects of the general discussions surrounding the issue, both inside and outside Parliament, as pointed out by Lovenduski and Outshoorn (1986: 2–3).

The first thing to note is that the dictionary only accounts for between thirteen and fourteen per cent of the total words used in the debate. This is unsurprising given the extensive usage of “general” terminology and indeed quite modest proportions of our dictionary terms may signify quite important patterns of speech behaviour by protagonists (cf. Bara 2005).

It is clear that the most extensively used vocabulary is the rhetoric of debate, hardly surprising given the context and its complex rules of behaviour incumbent upon Members of Parliament. Of the substantive vocabularies, the medical is the most widely used, followed by the social.⁵ The advocacy vocabulary emerges as reasonably robust but there is poor reflection of the moral vocabulary. This may not be as surprising as our expectations might suggest since, as shown both by the overall tenor of the debate and in the *Alceste* analysis, the argument is directed towards enacting legislation based on essentially medical and social rationales. We get a more refined picture if we look at some specific elements of the 1966

⁵ It is worth noting that analysis for the ten debates covered in the broader study there is also a significant bivariate correlation between these two vocabularies at a 0.001 level, and both are also significantly correlated with the rhetoric of debate vocabulary.

Table 2: Vocabulary usage as % Hamlet dictionary by individual speakers, July 1966 Second Reading debate

Speaker	Advocacy	Legal	Medical	Moral	Rhetoric of debate	Social
Steel	13.61	12.62	20.91	9.51	27.76	15.59
Wells	16.06	8.03	21.24	5.96	35.49	13.21
E Lyons	8.33	8.33	31.67	3.33	25.00	23.33
J Dunwoody	14.19	7.92	22.11	2.97	29.37	23.43
Knight	15.38	8.83	22.22	6.27	19.94	27.35
Vickers	12.98	4.13	22.71	1.77	31.86	26.55
Owen	16.09	2.30	28.35	6.13	26.82	20.31
Maude	13.52	4.98	16.73	8.19	35.94	20.64
McNamara	15.52	10.34	25.86	2.37	29.09	16.81
Hobson	10.26	6.27	19.09	2.56	41.31	20.51
Jenkins	13.36	9.12	16.61	2.93	46.58	11.40
St John Stevas	17.41	7.05	16.07	6.79	36.79	15.89
Abse	16.04	4.78	16.04	4.10	35.49	23.55
R Short	7.56	14.86	24.32	1.62	28.92	22.70
A Lyon	16.67	33.33	33.33	16.67	0.00	0.00
Pannell	14.71	0.00	20.59	0.00	47.06	17.65
Deedes	18.32	5.45	13.86	6.93	43.07	12.38
Legge-Bourke	4.17	0.00	20.83	0.00	45.83	29.17
Winstanley	16.67	33.33	0.00	0.00	50.00	0.00
S Silkin	0.00	0.00	0.00	14.29	85.71	0.00
G Dunwoody	7.69	0.00	0.00	0.00	38.46	53.85
P Mahon	7.69	0.00	7.69	7.69	61.54	15.38

Table 3: Mean percentage vocabulary* use by 14 major speakers, July 1966 Second Reading debate

	Advocacy vocabulary	Legal vocabulary	Medical vocabulary	Moral vocabulary	Rhetoric of debate vocabulary	Social vocabulary
Mean	13.59	7.82	21.71	4.61	32.17	20.09
Standard deviation	2.98	3.36	4.73	2.51	6.94	4.86

Note: *as % total dictionary present.

debate concerning individual speakers (Table 2). All of the minor speakers apart from one (Deedes) fail to reflect the full range of vocabularies, which skews the summary statistics. Concentrating on the 14 major speakers, Table 3 shows the overall predominance of the rhetoric of debate vocabulary and lack of prominence of the moral vocabulary, with the possible exception of Steel's contribution (9.51%).

The legal vocabulary figures more prominently than is generally the case for three speakers (Steel, McNamara and Renee Short). In substantive terms the medical and social vocabularies are clearly important to most speakers, reflecting the overall tenor of the debate as set essentially by Steel's introductory speech.

Use of rhetoric of debate vocabulary also often reflects indications of support/opposition and advocacy indirectly, for example in phrases evident from the following short extract from an intervention by Dame Joan Vickers, a supporter of the Bill, who commenced her main contribution in the following way:

"I have *pleasure* in *supporting* the **Bill**, and I *congratulate* the **hon. Member for Roxburgh, Selkirk and Peebles (Mr. David Steel)** on the way in which he introduced it. I should like the **House** to take particular notice of what was said by the **hon. Member for Falmouth and Camborne (Dr. John Dunwoody)**, because on this matter he has more *experience* than anybody in the **House**, and I thought that he put his points extremely *fairly* and *reasonably*. I realize the *sincerity* with which she spoke, but I *regret* that my **hon. Friend the Member for Birmingham, Edgbaston (Mrs. Knight)** made some of the remarks that she did. I think that my **hon. Friend** rather *exaggerated* when, with regard to **subsection (1, c)**, she talked about *abortion on demand*, because it refers specifically to abortion when a mother 'will be *severely overstrained* by the care of a child or of another child as the case may be'" (22 July 1966 HC 1107, authors' emboldening of rhetoric of debate vocabulary and additional italicisation of support/opposition/advocacy).

We might well ask therefore whether the Hamlet analysis suggests that “liberals” project different vocabulary patterns from “restrictionists”. By creating a categorical variable, based on the method utilised by Marsh et al. (1981, 1988) in terms of selecting key votes based on voting records of MPs in Hansard, comparisons can be made between “liberals” (i.e. those voting for 1966 Bill and against all others), as opposed to “restrictionists” who voted against the 1966 bill and in favour of the others. Of the 22 speakers in 1966 debate included in the overall analysis, 15 adopted a liberal position, five a restrictionist position and two abstained. The only speaker to change position later was Abse – and his input into the July 1966 debate suggests that his vote was finely balanced even then. By examining differences between mean “scores” for vocabularies and identifying whether either camp can claim ownership of particular terms we may obtain a more detailed view.

The overall impression from Table 4 is that there seems to be little difference in the use of vocabularies by the two camps but, once again, we need to be careful in attributing too much emphasis to these figures, given the substantial range of positions on all vocabularies among individual speakers. These figures suggest that there appears to be a tendency among liberals to make greater use of substantive vocabularies whereas restrictionists place more emphasis on advocacy and rhetoric of debate. This can be illustrated by reference to the profiles of some prominent speakers in each camp such as Steel and St John Stevas (Table 2) and may be corroborated by examining differences in means. In general restrictionists use both advocacy and moral vocabularies more than liberals. This again reflects the fact that Steel was at great pains to ensure that the debate was framed mainly according to medical and social arguments, and those opposing him took up some of his vocabulary. Overall, the range of differences was around 5%⁶ which suggests that in addition to each camp having (even a small) dedicated set of vocabularies, the debate itself generated a language of its own.

Looking below the general level of dictionary uptake by the liberal and restrictionist camps, we can identify words which are used markedly more by one camp than the other. This is based on Hamlet comparison of word lists for the debate where usage of individual words by one camp is twice

⁶ The mean differences between liberals and restrictionists were subjected to ANOVA testing, the results of which bear out the suggestions that in the case of 1966 the differences were generally slight. Only differences for advocacy are significant

Table 4: Comparison of mean differences between liberals and restrictionists, July 1966 Second Reading debate

Vocabulary*	Liberals-restrictionists (1966)
Advocacy	-2.70
Legal	2.22
Medical	-0.34
Moral	-1.02
Rhetoric of debate	0.42
Social	1.48

Note: *as % total dictionary present.

as great as for the other— both in percentage and numerical terms. However, we do need to be cautious in attributing too much emphasis to this since many words are not necessarily used frequently. As in the case of the vocabulary construction, commonplace words are ignored. Table 5 shows which words are favoured by each camp respectively and are also effectively used little by the “other”. In addition, where words are present in the dictionary, the appropriate vocabulary title is provided in brackets. In a few instances, words are very similar to vocabulary input and are designated as having a vocabulary “word root”.

Ignoring the raw numbers, 88% of the words favoured by liberals are reflected in the Hamlet dictionary. We should also bear in mind that there are many hundreds of words represented in the dictionary which are used by both camps but do not indicate a high level of *differential* use by one or the other. Medical vocabulary represents the largest vocabulary for both camps and the differential use of words across all vocabularies is interesting. For example, with regard to medical terminology, liberals use “birth”, “doctors” and “contraception” as opposed to restrictionists’ use of “death”, “gynaecologists” and “conception”. Although extent of legal vocabulary is weak, liberals favour “rape” and “law” whereas restrictionists favour “kill” and “evidence”. Advocacy words favoured by liberals include “reasonable” and “respect”, contrasted with “principle” and “safeguard”. The moral tone of favoured language is much more evident for restrictionists, whereas for liberals moral vocabulary is much weaker. Interestingly, lib-

Table 5: Differences in word usage between liberals and restrictionists, July 1966 Second Reading debate*

“High” usage by liberals and “low” usage by restrictionists			
abortion	(Medical)	legislation	(Rhetoric of debate)
abortions	(Medical)	mental	(Medical)
accept		operation	
attitude		opinion	(Advocacy)
babies	(Social)	ought	
birth	(Medical)	patient	(Medical)
Catholic	(Moral)	perhaps	
Children	(Social)	place	
Church	(Moral)	physically	(Medical)
Committee	(Rhetoric of debate)	practitioner	(Medical)
contraception	(Medical)	pregnant	(Medical)
controversial	(Advocacy)	pregnancy	(Medical)
doctor	(Medical)	rape	(Legal)
doctors	(Medical)	reasonable	(Advocacy)
family	(Social)	respect	(Advocacy)
health	(Medical)	risk	
her		satisfactory	
hospital	(Medical)	should	
illegal	(Legal)	social	(Social)
intercourse		termination	(Medical)
just		think	
law	(Legal)	women	(Social)

Table 5 (continued)

“High” usage by restrictionists and “low” usage by liberals			
apologise	(Advocacy)	inhumane	(Moral)
affected		kill	(Legal)
attack		legally	(Legal word root)
baby	(Social)	life	(Medical)
bad		live	(Medical)
conception	(Medical)	logical	(Advocacy)
conscience	(Moral)	moral	(Moral)
contrary		nurses	(Medical)
conviction		principle	(Advocacy)
convictions		profound	
death	(Medical)	protection	
deformed	(Medical)	rid	
deformity	(Medical)	safeguard	(Advocacy)
destroy		society	(Social)
duty	(Moral)	statistics	
embryo	(Medical)	sanctity	
evidence	(Legal)	sterility	(Medical word root)
fundamental		suffering	
future		truth	(Moral)
gynaecologists	(Medical)		
him		unborn	
his		value	(Moral word root)
human	(Moral word root)	variation	
humane	(Moral word root)	vital	(Advocacy)
humanitarian	(Moral)	womb	(Medical)

Note: *Dictionary information given in brackets.

erals use “her” twice as much as restrictionists who use “him” and “his” twice as much as liberals.

In sum, the Hamlet analysis shows us a discursive world in which a small proportion of the total vocabulary used in a debate can be used to define its salient features. The six classes of vocabulary can be thought of as falling into two broad groups, the procedural and the substantive. Advocacy and issues of parliamentary etiquette and procedure are a high proportion of the vocabulary, and the core moral vocabulary is a low proportion. It is possible to distinguish the distinctive vocabulary used by liberals and restrictionists, although the size of the difference is not great. It is also useful to bear in mind that in the project overall, one of our concerns was to test the robustness of the dictionary in order to examine whether the language of parliamentary debates on abortion altered significantly. Results show that debates overall and the speeches of prominent speakers who participated in three or more of the debates demonstrate that this is largely the case. This is despite the fact that both the focus and the framing of many of the later debates were quite different.

Fully Automated Analysis in Alceste

Alceste is programmed to treat a text as a set of sentences that together make up the text. It conducts its content analysis on the whole text, reducing various grammatical forms (for example tensed forms) to a root form. It uses its own dictionary to divide the vocabulary of the text in root form into two classes: “function” words, which enable sentences to operate as part of natural languages and “content” words, which contain the distinctive meaning of the text (Brugidou 2003: 419). For example, in the debate we analyse here, function words include “again”, “as”, “may” and “except”; content words include “capacity”, “child”, “defect” and “handicapped”. The key statistical analyses performed within Alceste are conducted purely in relation to the content words.

Content words are examined in the sentences (“elementary context units” as designated by Alceste) in which they appear. Operationally, the sentences are delimited primarily by full stops, although the programme in fact performs two analyses gauging the sentences somewhat differently on each occasion. One central element of the Alceste approach is to look for the co-occurrence of content words as they appear in sentences. To under-

stand this approach, we need to understand how the text can be represented as a data matrix.

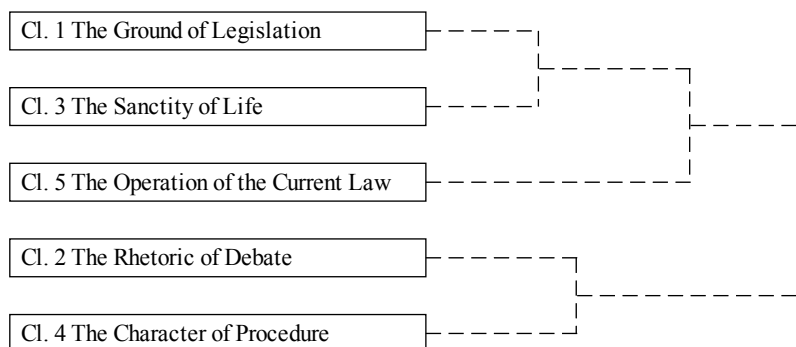
One can think of a text as a data matrix, within which each word ("form") is assigned a column, and each sentence a row. At the intersection of the sentence row and the word column, the presence (1) or absence (0) of that word is recorded as occurring in the sentence. Typically, then, in any data matrix based on a parliamentary debate there will be many more zeros than ones entered. For each sentence there will be a row marginal total that gives the number of content words in the sentence, and for each word a column marginal that gives the number of times that word appears in the text. The marginals can be thought of as follows. The row marginals are the weight or proportionate contribution that the sentence makes to the total table and the column marginals are the weight of proportionate contribution that the word makes to the total table.

Alceste provides a descending hierarchical classification of the content words as follows (Guérin-Pace 1998: 79). All sentences are placed together in the same class. That single class is then partitioned into two, according to the criterion of marginal χ^2 values. The initial partitioning aims to maximise the χ^2 values of the margins, dividing the table into two sub-tables. The operation is then repeated until a stable set of partitioned classes is created. This is the procedure by which Alceste identifies the key themes of a debate and groups them together. We can think of this as follows: the arguments that are in play within a debate are indicated by the presence, absence and co-occurrence of key words.

The statistical analysis for the 1966 debate performed by Alceste identifies five dimensions of the debate, which in terms of the descending hierarchical classification fall broadly into two classes: substantive and procedural. A convenient way of representing the analysis is in terms of a dendrogram, setting out the pattern of the descending hierarchical classification. Figure 1 gives such a dendrogram, with the branches identified in terms of an interpretation of the five classes. Also identified are some words distinctive of the class. It will readily be seen that the first bifurcation is between classes the content of the vocabulary of which is procedural and classes the content of the vocabulary of which is substantive.

It should be stressed that the classes are generated by a statistical analysis on the formal properties of co-occurrence. The interpretation that one puts on the classes is a matter of judgement by the analyst. Whilst the identification of the classes is a matter of interpretation, it is not difficult to see in some cases how the interpretation is arrived at. Consider for example

Figure 1: Dendrogram of classes from Alceste

*Notes:*

Class 1: capacity, child, defect, handicapped, mental+, mother+, physical, risk;

Class 2: cambourne; congratul+, david, falmouth, friend+, hon, member+;

Class 3: baby+, embryo, human+, kill+, life, unborn, potential+;

Class 4: bill+, hope+, read, private+, entire+, government+, house, second+;

Class 5: abortion+, law+, illegal+, women+, find, go, carried, change+;

+ indicates root form of word.

the two classes that comprise the procedural category. If we look at the specific vocabulary that occurs in Class 2, we note that it contains words like “congratulate” and its various forms or “speak” as well as the names of constituencies. Similarly, Class 4 contains words like “bill”, “read”, and “private” and “debate”.

More care has to be taken over the interpretation of the three substantive classes. Class 1 contains words like “defect”, “handicapped” and “severe”, which would lead one to think that it was focused on medical themes, but it also contains words like “clause”, “phrase” and “subsection”, and so the class is not simply one in which various circumstances surrounding abortion are being referred to but more particularly the way in which those circumstances enter into legislative provision according to which an abortion would be permissible under the law. Class 3 is more explicitly ethical in content, and key terms like “baby”, “embryo”, “kill” and “life” appear. It may be thought of as the class that contains the core ethical vocabulary in the debate. Class 5 contains words that mix a reference to medical facilities and to the prevailing operation of the law, so that we find “law”, “abortion”, “doctor” and “hospital” in this class. Here we find words concerned

Table 6: Leading sentences of Class 3 with speakers

Norman St John Stevas (89): of #course, there is scope for #argument about when the right to #life #begins, but it is of #profound significance that modern microbiology has confirmed the assertions of #theologians that #human #life is #fully present from the moment of #conception and there is no #qualitative #difference between the #embryo and the born child.
Jill Knight (66): should they be put down, too? hon. members: oh. it is an #utterly inhuman #doctrine, yet it would be a #perfectly #logical next #step after this bill. once we accept that it is #lawful to #kill a #human being because it #causes inconvenience, where do we #end? #society, or at any #rate the majority in this house, has already conceded that the #life of a convicted #murderer shall be preserved.
Jill Knight (63): I have #seen plenty of #spastics who #appear to be thoroughly #enjoying #life. there is something #utterly repugnant to me here, because it so #reminds me of hitler's #conception of a race of #perfect physical specimens.
William Wells (53): I am told I may be #wrong; I know no medicine that three #weeks after #conception the #embryo has a #heart which beats. this #seems to be as #clear a case of the existence of an #independent #human #life as it is possible to have.
Leo Abse (52): every #failure that we make to plan so that every #life can #live out its #full #potentiality within its puny transient span is a defeat, just as every hanging of a #murderer or traitor is a defeat for the #community,
Norman St John Stevas (52): there is only a #difference of #development. the #embryo has a #life of its own and has the #full #potentiality of becoming a #human being. therefore, it cannot be treated as #mere animal matter to be excised from the #womb and thrown aside and discarded in a dustbin or incinerator.
John Dunwoody (48): I take it further than that and think of the #community as a whole. if one #looks at it in that #light, one can #see that far from undermining respect for the #sanctity of #human #life this bill could enhance respect for #human #life in the #fullest #sense, of the phrase.
William Wells (40): if one #looks at clause 1, 1, 6, c and d, of the bill, it is #perfectly #clear that this #argument is justified. the very, wording of paragraph, b, makes it #clear that if the clause becomes law there will be a number of #embryos capable of #development and with a #chance of #developing into healthy #human #beings which will be #destroyed.
Jill Knight (40): there is something very #wrong indeed about this. #babies are not like #bad teeth to be jerked out just because they #cause suffering. an #unborn #baby is a #baby nevertheless. would the sponsors of the bill think it right to #kill a #baby they can #see? of #course they would not.
William Wells (37): the bill draws in its provisions a sharp #distinction between the born and the #unborn child. hon. members, who would recoil with horror at the #destruction of a #live #baby, are #perfectly willing and anxious to #legalise the #destruction of #embryos.

Note: Figures in brackets are χ^2 values; # indicates content word of class.

with the defects in the prevailing operation of the law and, for example, the extent to which illegal abortion takes place.

Further evidence for any specific interpretation that one may put on a class is given by the list of sentences that Alceste identifies within each class containing the characteristic words statistically associated with one another. Space precludes our giving anything but an example of such sentences, but Table 6 shows the sentences most characteristically distinctive of Class 3.

How can we determine the extent to which speakers on different sides of the debate are associated with different patterns of vocabulary and therefore argument? Alceste uses the χ^2 measure of association to assess how far the profile of speaker sentences is or is not associated with a particular class of vocabulary. Table 7 gives the details. It can be seen from this table that some speakers are disposed to use words from some classes rather than others. The most distinctive result is that the restrictionists are more likely to be associated with the moral vocabulary than the liberals. By contrast, liberals are more likely to be associated with the social vocabulary.

Comparing Alceste and Hamlet

At the operational level, the two programmes have a number of similarities. Both effectively use the same input files and both programmes enable the analyst to carry out similar forms of analysis. In different ways they also both allow identification and tracking of individual speakers in the debates and limited use of identifying factors such as party, gender and voting record. Despite these operational similarities, the two programmes provide different types of result. Some can be seen as relatively superficial; others are more profound.

Consider first differences that are relatively superficial. Speaker profiles in Hamlet (Table 2), give some measure of the extent to which different speakers are associated with different themes. Alceste, by contrast, provides a χ^2 measure of association. The latter is a summary measure of the sort of speaker profiles contained in Table 2, so that though the results supplied are not easily compared, it is possible to see how they emerge from the same analytic family (see Greenacre, 1994). Similarly, given that only function words are discarded from the analysis in Alceste, whereas Hamlet includes only those words that are specified by the analyst in the dictionary, we should expect a difference in the proportion of the text that

Table 7: Speakers most associated with Class of Sentences

Class 1 The Grounds of Legislation: Edward Lyons (14.19); John Hobson (11.15); <i>Kevin McNamara</i> (9.13); Harry Legge Bourke (3.90); Renée Short (3.88).
Class 2 The Rhetoric of Debate: <i>Norman St John Stevas</i> (3.27); Joan Vickers (3.66).
Class 3 The Sanctity of Life: <i>Jill Knight</i> (50.54); <i>Norman St John Stevas</i> (32.17); Leo Abse (4.09).
Class 4 The Character of Procedure: <i>William Wells</i> (8.16); Roy Jenkins (7.23); <i>Norman St John Stevas</i> (4.28); Leo Abse (4.16); <i>Peter Mahon</i> (3.93); Charles Pannell (3.93); John Hobson (2.39).
Class 5 Operation of Current Law: David Steel (19.54); David Owen (6.40); John Dunwoody (5.21); Renée Short (3.56).

Notes: Figures give χ^2 degree of association; names in italics are who voted against reform; John Hobson abstained.

is actually subject to statistical analysis in the two programmes, and we find that Alceste analyses some 41% of the words in the text, Hamlet only analyses some 14%.

These differences may not be profound, however. Comparable, though not identical, results might emerge from the two forms of analysis. More or less useful output might be produced by each approach, but there would be no fundamental difference in methodology. However, other differences, most notably the way in which the classes of vocabulary are defined obviously betoken a difference of analytic approach, and it is this sort of difference that should be of interest in the context of our substantive concerns.

Because Hamlet requires the analyst to specify a dictionary, its use presupposes that the analyst has a prior understanding of the main themes of the debate and that the analytical task is to discover how those themes are patterned in respect of one another. The assumption is that the analyst has a semantic grasp of “what the debate is about”, and the problem is how to attribute different features of the debate to speaker roles, political positions or some other variable of interest. Alceste, by contrast, does not make the assumption that the substance of the debate is understood before analysis. Classes of vocabulary are not imposed by means of a dictionary but emerge through statistical analysis of co-occurrence. In Alceste, therefore, formal patterns precede semantic interpretation. The five classes of debate identified by Alceste depend upon the purely formal patterns of association. It is an open question as to what interpretation they can be given. In Hamlet,

the class of words is grouped on a semantic test (medical, legal, advocacy and so on), without there being an assumption that the words will show any particular statistical relationship to one another.

This fundamental difference of approach would not matter if the more numerous Hamlet classes were simply sub-sets of the Alceste classes. We could then just map the vocabulary of the one onto the other in some form of one-to-one correspondence. However, there is no way in which this can be done. For example, certain words that associated with the medical class in Hamlet (“handicapped”, “health” and “pregnant” for example) are associated with the grounds of legislation class in Alceste, because those words occur in a context in which the conditions of lawful termination are being discussed. The difference illustrated here stems from a fundamental difference between the approaches embodied in the two programmes. For Hamlet it is the occurrence of terms that is crucial; for Alceste the co-occurrence of terms. For Hamlet, terms have meaning and the task is to map the occurrence of that meaning; for Alceste meaning inheres in the way that terms are combined into sentences, which can be thought of as enthymemes (cf. Brugidou 2003: 414), that is to say incomplete arguments. For Hamlet, semantics precedes syntax; for Alceste syntax is the clue to semantics.

We reinforce this conclusion once we note that there are two classes that closely coincide in Hamlet and Alceste and these are the classes associated with the rhetoric of debate. Why, if in general, the classes do not overlap do we find a substantial similarity in these two cases? The explanation is that in both cases the class is largely made up of proper names, reflecting the conventions of the House by which members refer to one another by the names of their constituencies. Proper names do not have meaning, and there is therefore no semantic association between them. All they have in common is the property of being used in particular ways, a formal property that is as well picked up in a similar way by an automatic and by a coding process. Sentences containing such terms stand out by comparison with sentences containing other sorts of terms.

Given the fundamental difference of approach between Alceste and Hamlet, it is possible to argue that we can place greater confidence in results that emerge from each of the programmes, when they coincide. For example, the imposed distinction between broadly procedural and broadly substantive vocabularies defined for the Hamlet analysis is confirmed through Alceste’s descending hierarchical classification. Hamlet does not need such a classification, since its classes are already defined. The dis-

tion is further confirmed by a correspondence analysis (not reported here) in which the first principal component maps the distinction between procedural and substantive. A second point of confirmation is the small proportion of the debate that is given over to purely ethical concepts and argument.

Conclusions

In this analysis we have found that both CATA techniques have produced results which are pertinent to the study of deliberation set within a parliamentary context and that each of them has particular strengths. It is clearly the case that Alceste's strengths lie primarily in the field of analysing dimensionality and identifying easily words and their textual locations. The contribution of speakers to identifying underlying dimensions is also something which can be carried out relatively quickly. All of this can be underpinned by automatic statistical testing. It also goes without saying that there is absolutely no chance of human contamination at any stage of the operation. Preparation of materials can, however, be difficult and time-consuming and interpretation of dimensions *a posteriori* may also prove a laborious undertaking.

Hamlet's strengths are different. It is clear that in comparison with Alceste this tool is weaker in terms of its facility to provide quick and statistically accurate results with regard to dimensional analysis and for many people, the fact that the analyst creates the dictionary is problematic. Certainly there is greater scope for contamination although in the case of Hamlet this is less than for other forms of semi-automated CATA. At the same time Hamlet is able to produce material which is able to test hypotheses relating to linguistic patterns and signifiers of more fundamental issues. It is also able to deal with smaller subsets of text than Alceste, which in this instance have enabled more detailed examination of individual speakers or small groups over time. It also facilitates retesting and replication of dictionaries which have been essentially prepared for other purposes. The reliability of coding, after all, is not an issue. Some of the statistical analysis techniques accessible from within the software are less easily accessible than is the case with Alceste, although once basic results have been obtained these can be fairly easily re-assigned for treatment by standard statistical applications such as SPSS.

It must be stressed that neither type of content analysis we employ can in themselves explain the role of factors outside the immediate confines of the debates themselves which have led to success or otherwise in terms of passing legislation or amendments. In particular, the role played by discussion within the wider political arena, for example in the media, extra-parliamentary lobbying by pressure groups or public opinion in general cannot be analysed directly. The most we can hope for is that speakers will allude to such factors in their individual contributions, and although this does occur, it is not necessarily widespread. Furthermore, it is clear that one major reason for the success of the 1966 (Steel) Bill was that the government of the day provided support in various ways, for example by ensuring time in the busy parliamentary calendar. We cannot guarantee that such factors are reflected in this type of analysis. What the analysis can do is underpin the validity of assumptions and conclusions reached by other forms of analysis, provide a basis for further analytical testing of new conclusions not necessarily discussed in previous studies and, in this particular case, test the validity of claims suggested by theorists and commentators who see parliamentary assemblies as sites for deliberation. The ultimate choice of one form of CATA over the other is, however, a function of the aims, intentions and methodological demands of the analyst.

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Computergestützte Analyse von Parlamentsdebatten

Die Analyse parlamentarischer Debatten liegt an der Schnittstelle verschiedener Forschungsinteressen in der Politikwissenschaft (u.a. Deliberation). Die Autoren fragen, welchen Beitrag automatisierte und semi-automatisierte Analysetechniken bei der Erfassung von Parlamentsdebatten liefern können. Im vorliegenden Artikel vergleichen sie zwei solcher Methoden – die eine semi-automatisiert (Hamlet), die andere gänzlich automatisiert (Alceste). Die beiden Methoden werden verwendet, um wichtige Themen in parlamentarischen Debatten zu identifizieren und unterschiedliche Diskurs- und Deliberationsmuster herauszuarbeiten. Ausgehend von einer Debatte des britischen Unterhauses zu Abtreibung (1966) können sie aufzeigen, dass Hamlet und Alceste ähnliche Resultate liefern, obwohl gewisse Unterschiede bestehen bleiben. Insbesondere kann bei der Analyse mit Hamlet ein bestimmtes Vokabular identifiziert werden, welches von einer Rednerin oder einem Redner bevorzugt gebraucht wird. Alceste dagegen liefert eine statistische Basis für die verschiedenen Kategorien Vokabularen, welche in der Debatte vorkommen.

Analyse informatique des débats parlementaires

L'analyse des débats parlementaires est au confluent d'un grand nombre de développements en science politique. Quels éclairages peuvent apporter les techniques automatisées et semi-automatisées par rapport à cette analyse? Les auteurs comparent deux approches de ce type dans le cadre de cet article: une semi-automatisée (Hamlet) et une autre totalement automatisée (Alceste). Ces deux approches sont utilisées afin d'identifier les thèmes saillants dans les débats, et d'évaluer à quel point les orateurs qui privilégient différentes prises de position adoptent un modèle de discours distinct. L'objec-

tif est d'évaluer à quel point les deux approches produisent des analyses convergentes ou divergentes. En choisissant un débat de deuxième lecture de la Chambre des communes au Royaume-Uni relatif à un projet de loi de 1966 sur l'avortement, les auteurs ont pu montrer qu'il existe des similitudes d'analyse, malgré les différences entre les deux approches. L'analyse dans Hamlet permet d'identifier en particulier à quel point les orateurs emploient un type de vocabulaire au lieu d'un autre. Alceste est, quant à lui, capable de fournir une base statistique pour les différentes catégories de vocabulaire qui apparaissent dans le débat.

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