

Peers, Equals, and Jurors

New Data and Methods on The Role of Legal Equality in Leveller Thought *

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Abstract

We consider Leveller thought on equality relative to their contemporaries during the Civil War(s) period. We compile a corpus of hundreds of seventeenth century pamphlets and combine this with novel word embedding techniques trained on millions of Early Modern English documents to make statements about word “meanings”. We focus on understandings of the phrase “peers and equals” (and its variants). We provide quantitative and qualitative evidence, in line with extant literature, that the Levellers—John Lilburne specifically—had a prevailing interest in equality in a way that is different to that expressed by other groups of the time. But contrary to current scholarship, we show that the Levellers and Lilburne were animated primarily by notions of *legal* rather than social equality, and that their interest in parity or the status of peers primarily pertained to juries, an institution that did indeed aim to level down legal judgment.

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1 Introduction

The historical study of political equality, both ancient and modern, is enjoying a renaissance. Among the figures receiving renewed attention are the Levellers, a political group active during the English Civil War(s) of the mid-seventeenth-century. The *Putney Debates* of 1647—for which three days of transcripts were rediscovered in 1890—are now a staple of courses in modern political thought and democratic theory. A fragment from these meetings by Colonel Thomas Rainsborough is so familiar as to constitute a cliché of Leveller ideology: “I think that the poorest he that is in England hath a life to live, as the greatest he.” Although scholars widely recognize the significance of the Levellers for the development of democratic thought, particularly with respect to the franchise, they continue to debate the nature of their egalitarianism.

A currently dominant interpretation of the Leveller commitment to egalitarianism focuses on standing in relation to others (Anderson, 2017; Waldron, 2017; Bejan, 2022). Philosopher Elizabeth Anderson devoted the first of her Tanner Lectures, in part, to a reconstruction of the Levellers as a source for arguments against social hierarchy in support of a free society of equals (Anderson, 2017). Relational equality is today a regulative ideal for many political theorists, but scholars have long sought to marshal the Levellers for their own normative conceptions of equality. As such, it is important to characterize the Levellers’ claims as accurately as possible. Here we test a number of hypotheses about the character of Leveller egalitarianism to argue that the Levellers were primarily committed to a legal equality, and that their arguments for social equality were generally downstream from their advocacy for trial by jury, in particular.

While the Levellers have been of continual interest, studying them systematically has proven difficult. A major issue is data availability and awareness: the Levellers wrote a large number of pamphlets and other material, only some of which are widely anthologized and have received much scholarly attention. We would expect a broader corpus of Leveller works to be more heterogeneous—and potentially representative—than a selective reading of their “major” works. Beyond this, without reading widely from contemporaneous pamphlets and other documents, it is hard to identify those arguments that are distinctive to the Levellers and not common in the era. Related,

it may be difficult to identify exactly who counts as a Leveller at a given time since Levellers “did not make up a structured and organized political movement fashioned by authors understood to be party leaders.” (De Krey, 2017, 2) Third, within the subset of recognized Levellers, taking any argument or figure to be representative of their ideology as a whole is perilous: the writings of Lilburne pose particular challenges (Foxley, 2004, 2016). It is difficult to assess whether claims advanced by one or two major actors reflected, or produced, agreement among the Levellers as a whole, or were idiosyncratic to these individuals.

These are political theory problems for which we contend quantitative text-as-data approaches are—or can be—tailor made (see, e.g., Ballandonne and Cersosimo, 2023; Blaydes, Grimmer and McQueen, 2018). Towards that end, we develop a new, relatively large and comprehensive corpus of pamphlets from the seventeenth century that combines “core” Leveller works with those of contemporaries. This data, which comprises some 260 contemporary documents of various lengths,¹ is derived from the Leveller Tracts project (Hart and Kenyon, 2018). It covers the years 1638–1666, and includes the social and political writings of over 60 different authors from that period. In that sense, it is a broader, deeper collection than previously employed. This allows greater purchase on the issues of comparison and purported distinctiveness we mentioned above. Of course, such a dataset is only useful to the extent that it can be analyzed appropriately. Our second contribution then is to provide and use new tools for this purpose. In particular we will employ word embedding approaches. These techniques are proving popular in political science when researchers want to capture the “meaning” of terms, across groups or over time (Rheault and Cochrane, 2020; Rodman, 2020). They do this by implicitly incorporating information about the contexts—other words—of the terms of interest. We will use a specific variant of these models that allows for statistical inferences, even when we have relatively little data (i.e., when the terms are quite rare) (Rodriguez, Spirling and Stewart, 2023). This arrangement nonetheless requires a background corpus written in a style and period approximating that of the pamphlets. Here we will use millions of words from official reports of Parliament in the seventeenth century (courtesy of

¹Technically, there are 262 documents, but two are repeats.

Rodon and Paskhalis, 2021). This leads us to build up embeddings for (political) *Early Modern English*, that we believe have not previously existed and that we anticipate will be *per se* useful to other scholars across the humanities and social sciences.

A key element of text-as-data analysis is that it enables scholars to uncover “patterns, trends, and facts” that lie beneath the surface (Rodman, 2023, 14). Rodman argues, reasonably, that this paradigm means that text-as-data will always be a hard sell to many theorists. Skeptical theorists argue that there can be no substitute for close reading, and that mere quantification of terms and concepts will add relatively little to our understanding of these works. But close reading has its own liabilities, particularly in the context of large collections. Scholars’ heuristics or prior beliefs may shape the search, leading them to over-emphasize certain concepts relative to their actual significance, or to cherry-pick, yielding selection bias. A well-designed analysis can preserve the benefits of expertise— necessary to form worthwhile questions in the first place—while enabling a scholar to determine more precisely the relative salience and usages of concepts in given historical or geographic domains. This is our approach below, and we combine embeddings work with focused, qualitative investigation.

In the next section we briefly situate the Levellers as an entity in history, before discussing debates on their beliefs and doctrine. This sets up a series of research questions for which our new data—described in Section 3—is arguably ideal. We introduce our embedding methods in Section 4, focusing on the challenges of working with *Early Modern English*. Our empirical results are presented in Section 5, followed by our qualitative results in Section 6. We conclude in Section 7.

2 Peers and Equals

Although Rainsborough’s “poorest he” speech is perhaps the most-recited summary of Leveller thought, and the *Putney Debates* mark the beginning of the “zenith” of Leveller power (Frank, 1955, 135), the group’s practical influence on England’s constitutional settlement after the first Civil War—especially as regards suffrage reform—was minimal. Indeed, the Levellers were es-

entially an extinguished force by 1650. But they remain of both political and historical interest for at least two reasons. First, the Levellers arguably represent a genuinely new form of radicalism (Foxley, 2004, 2016). Their central ideas—of freedom of conscience, constitutional reform and parliamentary sovereignty—broke new ground in democratic thought. Second, the Levellers communicated widely using the relatively new technology of printing. That is, we have an unusually dense record of information about their doctrine, discussions, and how they evolved.

In recent years, the democratic character of Leveller thought has focused on its egalitarianism. Scholars such as Waldron (1999) and Anderson (2017) have emphasized its anti-hierarchical strains.² Again, in her first Tanner Lecture, Elizabeth Anderson turns to the Levellers to vindicate a conception of social or relational equality. For Anderson, egalitarianism, including the egalitarianism of the Levellers, is a means for “dismantling or taming social hierarchy.” (Anderson, 2017, 8) Specifically, she argues that the Levellers challenged the authority of priests and the Church of England through defending toleration; the domination of men over women through expanded franchise; and the power of guild monopolies through advocacy of private property and free trade. Anderson highlights the persuasive (and on her account, feminist) force of Leveller John Lilburne’s characterization of Adam and Eve and their progeny as “by nature all alike and equal in power, dignity, authority, and majesty, none of them having by nature any authority, dominion, or magisterial power one over or above another.”

In an important article published in this journal, Teresa Bejan 2022 argues for a distinctive Leveller theory of “parity,” a social concept which distinguished between those eligible to be treated as high-status peers and those consigned to be low-status “equals”: to be a peer was to “level up” to the status of aristocrats. Against Anderson, she holds that their concept of equality was not merely relational, in the sense that it aimed to challenge hierarchies of standing, but that it entailed “levelling up” to the equal high standing of aristocrats. For Bejan, “the point” of Leveller parity was “first, to erase the hierarchical distinction between Peers and Commoners that rendered the

²Waldron (1999) invoked Rainsborough’s argument from Putney in support of the claim for the “poorest he” to hold equal political power with, and contest exclusion by, an aristocratic elite. Although Waldron’s more recent use of Rainsborough tends to be in support of “basic equality,” rather than social equality as such, he nonetheless still typically emphasizes interpersonal forms of dignity and standing (Waldron, 2012, 2017).

former superior and the latter inferior; and second, to claim the rights and privileges of Peerage for themselves.” (Bejan, 2022, 612) Those rights of peerage, which she characterizes as “levelling up,” nonetheless left women, foreigners, and bondsmen as mere “equals” by nature, remaining subordinate. Bejan argues that as natural “pares,” commoners had a claim to be treated “ ‘on a par’ ” with their aristocratic counterparts, while remaining stratified between genders; “commoner wives would be treated like ladies, and their husbands like lords.” (Bejan, 2022, 613) Bejan writes that although Lilburne argued that “the meanest man in England” could become a high-status peer, “as much entitled and entailed. . . as the greatest subject,” women would remain merely “low-status equals.” ” (Bejan, 2022, 613)

We agree with Bejan that the concept of peers is crucial to understanding Leveller claims for equality. However, the analysis of “peers” in our corpus demonstrates that the Levellers typically used the term in legal contexts, and mostly, if unsurprisingly, in advocating for trial by jury. To be sure, Bejan does note that the primary target of Leveller demands was the law, and highlights a number of passages in which the ostensible point of parity was to point out that differences in social standing should not give rise to legal distinctions. Yet we believe that reading “peers” in these passages as advocating “levelling up” is mistaken. The legal reform program was indeed egalitarian: the Levellers aimed to make law accessible through English translations and to dismantle the national courts at Westminster in favor of local justice. But the invocations of peers in the jury context were not intended to level up, but radically down: to eliminate the expert judiciary and the lawyers, described as “vermin and caterpillars.” (Shapiro, 1975) Put simply, Leveller equality was neither about satisfying the “eyeball test,” to use Philip Pettit’s evocative phrase (Pettit, 2012) , nor of the democratization of aristocratic claims to standing. Rather, the Levellers sought to situate legal judgment with the people without asserting that they thereby would acquire the dignity of common lawyers, whom they reviled.

Our main arguments here—that the use of “peers” by the Levellers is primarily a legal rather than social matter, and that the call for a jury of one’s peers levels down rather than up—are consistent with the history of the jury, at least from *Magna Carta*. Consider, for example, the

famous language from *Magna Carta* in chapter 39—prescribing that no “free man” is to be subject to arrest or imprisonment except by the “lawful judgment of his peers [and/or] by the law of the land” [legale iudicium parium]. It is true that this identifies a status distinction between “free” and “unfree”—the unfree do not receive such protections. But the status being described is much broader than the baronial one: it did include those of knightly rank but also lesser freeholders, who were distinct from unfree peasants and serfs. Chapter 21, by contrast, prescribes that earls and barons are only to be fined by their peers for minor offenses. So although it is true that the language of “peers” denoted a status condition—no one could deny that—it is also the case that the standing was not necessarily especially elevated. Freemen were equally entitled to a jury of their peers and/or to adjudication according to the law of the land.

It is surely true that freemen might feel their standing diminished were they to be judged by unfree peasants [although there is some evidence to suggest that in fact this was not uncommon (Musson, 1997; Masschaele, 2008)]. Even when composed of freeholders alone, medieval juries were socially integrated, bringing together peasant villagers, members of the gentry, and occasionally knights and higher lords (Masschaele, 2008). Proximity served as the key eligibility requirement: a jury of one’s peers was drawn from the “hundred,” in part because early English trial juries were at least in part self-informing. A jury of one’s peers did not necessarily require true social equality, but did require those empaneled to render judgment consistent with evidence and norms drawn from the local community. Their equality as jurors—i.e. their status as peers- derived from their ability to find facts and render just verdicts in a given domain, not (at least not necessarily) their high standing.

In sum, the Leveller use of “peers” is more similar to, and in keeping with, earlier well-established understandings of the term than typically recognized. But in order to demonstrate that this is true, we need data and some (new) methods. We now turn to each.

3 Data: Leveller *Pamphlets* and Parliament

Our core data—for both qualitative and quantitative inspection—are the words of the Levellers and their contemporaries. Predominantly, these are printed *pamphlets* which were circulated to local populations. Our source for these pamphlets is the *Leveller Tracts* project (Hart and Kenyon, 2018), distributed on the web by the *Online Library of Liberty*.³ The pamphlets are all transcribed from images of the original printed works. As might be expected with a relatively ancient collection, the “result has been files with thousands of illegible words and characters.” The compilers of the texts therefore insert specific characters, notes or marginalia to alert readers to this possibility. We simply strip out these problematic cases: for a reasonably large corpus, the occasional missing term is unlikely to be devastating for our inference. We also generally dispense with footnotes and endnotes where we find them. Ultimately, we have 260 texts from the seven “main” volumes, plus three addendum volumes.⁴ Their average length is around 12000 words, and the median length is around 6000 words.

Much of this skew is caused by three or four unusually long composite documents—including the *Putney Debates*, the *Whitehall Debates* and several consecutive issues of Lilburne and Overton’s *The Moderate* newspaper—which we treat as single entries to the corpus here. Note that some composite documents, like the *Putney Debates*, are essentially reports of conversations or discussions between actors. We do not consider these “Leveller” (or non-Leveller) pieces *per se* precisely because they contain other voices that are not part of a recognizable single movement.

Our core corpus begins with a document from March 1638, and ends with a document from July 1666. For orientation purposes, we think of the “main” period of Leveller activity as being that from August 1645 (Lilburne’s first writing from imprisonment) until November 1649 (approximately when the authors of *The Moderate* newspaper were jailed). Within this 1645–1649 interval, we have the *Putney Debates*, the publication of the *Agreement of the People* manifestos, and the Banbury Mutiny—which arguably marks the last time that the Levellers were a force in the

³<https://oll.libertyfund.org/>

⁴Plus one document that other scholars deem important, but was not in the original collection: Walwyn’s “Warning for all the Counties of England” (1647)

New Model Army. Where we do not know the precise date of a document, as given by the online library, we impute it.⁵

In terms of authors, specifically *first* authors listed, the data is also skewed. Leveller leaders, such as Lilburne, Overton, Walwyn and Thomas Prince, are responsible for around 40% of all tracts. To these “main” authors—who co-wrote *The Agreement of the People* manifestos from captivity—we add John Wildman and Edward Sexby, as constituting an expanded version of the term Leveller. In Supporting Information A we report some summary statistics on our corpus, and we also provide some evidence that Leveller and non-Leveller authored texts are somewhat balanced (in terms of length) over time.

3.1 Working with *Early Modern English*

The texts we will work with are all written in *Early Modern English* (EME), a form of the language used between the Tudor period and the Restoration (1660). Though certainly intelligible for modern readers, EME is not always trivial to understand. Partly this is a matter of word use and choice, and partly it is grammatical. For one thing, spellings are inconsistent. For another, certain terms which are unused now (such as “thou” as a second-person pronoun) are very common. Consider this snippet from *The Grand Concernments of England ensured*, published in October 1659 (capitalisation as original):

IF thou art prejudicate, save thy purse and thy paines; ’tis the considerate man, he that ponders his wayes, I had rather deal with: I promise thee thus much, I have no design to seduce thee, but whatsoever I have written, is my very thought: it may be thou art perswaded thou maist better employ thy time in Reading; I believe no lesse, however thou shalt finde some things here, not altogether unworthy of Consideration.

We might “translate” this as something like

⁵If we know the month, but not the day (about 8% of the data), we take it as the 15th of the month; if we do not know the month (about 5% of the data), we take it as July.

If you are prejudiced, don't bother reading. This is for considerate, thoughtful people. What follows is not my attempt to bamboozle you, but just my genuine thoughts on these issues. I for one think my words are worth reading, and hopefully you will agree if you press on.

Obviously, some care is required in dealing with such texts. In particular, off-the-shelf methods trained on modern documents are unlikely to perform well, especially if they mistake unusual (by our standards) spellings for (uniquely) rare words. Certain “normalization” tools can potentially help with this. In those approaches a pre-existing, perhaps user-provided, list of variants is used to map terms of the period to the single (modern) word they represent (see, e.g., Archer et al., 2015). Of course, this comes with some danger of error aggregation (the variant rule being applied may be incorrect in some specific instances) and by its very nature reduces the nuance of the texts. Alternatively though, it can be very time consuming to manually suggest perfect mappings in every case. More importantly, the techniques we will use below will automatically help with the problem at hand. In particular, we will produce word embeddings for terms like “peer” and we will do this in a way that takes averages of other (more common, more uniformly spelled) words around them. In practice, this means that if two words are used in (exactly) the same context, they will get the same representation and thus be treated the same in our analysis. In that sense, we will solve the normalization problem *within* our modeling strategy and in a way that caters specifically to our local corpus. We prefer this rather than relying on rules produced in other contexts for other corpora. In any case though, we will need other texts of the period to contextualize these ones. We discuss these ideas in the next section.

4 Quantitative Methods: Embeddings

We want an automated, quantitative way to estimate what authors mean when they use terms in the *Leveller Pamphlets*. This, when combined with our close-reading below, will enable us to be more confident in our claims. To do this, we will use some theoretical insights from linguistics,

followed by some statistical methods that put those insights to work.

The broad linguistic idea is the “Distributional Hypothesis” perhaps best summarized as the adage that “you shall know a word by the company it keeps” (Firth, 1957, 195). Suppose we observe a sentence fragment such as “right to vote” many times in a corpus of documents. We also observe “the right of people to vote”, “we seek the right of citizens to vote” and such related variations. Here, the term “vote” often occurs together—physically a few words away—with “right.” The techniques we will use—called “word embeddings”—will encapsulate this idea by telling us that “vote” and “right” are related in some (important) way. But they can do more than that. Suppose, in addition, that we also see “suffrage right”, “suffrage for all citizens is a right” and other such variations. Word embeddings techniques can tell us that because “suffrage” and “vote” occur in very similar contexts—literally the other words like “citizens” that are used near those terms are alike—that these two words themselves (“suffrage” and “vote”) likely mean something similar, and that is itself related to a “right”. This is true even if “vote” and “suffrage” are *never* collocates—that is, even if they themselves never appear together. This is a strength of the embedding approach over simply recording which words co-occur with others. That is, the technique can tell us about the relationships between all the words in corpus without explicit instructions to check, say, specific pairs or triples of terms. Thus, for instance, embeddings models can tell us which words appear to be synonyms or antonyms, and they can implicitly incorporate that knowledge into subsequent analysis.

There are many varieties of word embeddings models (see Rodriguez and Spirling, 2022, for an overview), but the essence of them is *prediction*. To simplify, these models attempt to select a word from the vocabulary of the corpus in a way that is best for the problem at hand, where that problem is created by pretending that a given word is missing and needs to be learned. For example, suppose we had the sentence

we seek the [---] of citizens to vote

Here, the goal is to select the best word for the blank space. Ideally, the model would suggest terms like “right” and “liberty” with high probability, and terms like “war” and “book” with (very)

low probability. The model estimates those probabilities from observing many millions of such sentences in the corpus and learning which words co-occur with others. To do this, the model represents each term—like “right” and “war”—as a numerical object. In particular, each word is represented as a long vector of numbers. The specific values of these vectors and the numbers in them is of interest insofar as they have the “correct” relationship to other term vectors. For instance, the model should end up with the vector for “right” being very similar to the vector for “vote” and both of them very dissimilar to the vector for “war”. That will be a consequence and a cause of the model predicting the sentence sequences of terms correctly. We call those vectors “word embeddings”.

The key strength of these techniques relative to alternatives like topics models (e.g. Blaydes, Grimmer and McQueen, 2018) or style detection (e.g. Ballandonne and Cersosimo, 2023), is that if we buy the assumptions, they reveal something more directly about the meaning of terms. But this comes with some startup costs in terms of how we go about the estimation process. First, we need to “train” the model. That is, we need to show it millions of instances of words being used in conjunction with others, such that it can learn the correct relationship between them in terms of the numbers in the vectors that represent them. An immediate problem in our case is that we are working with Early Modern English, so the standard big background corpora available to us—like Wikipedia—probably will not be appropriate since meanings of terms (like “rights” or “law”) have changed over time. To resolve this, we use text data from Rodon and Paskhalis (2021), who provided us with written proceedings of the English Parliament for the relevant period. In particular, we have the “journals” of the House of Commons and House of Lords, starting in 1547 and 1510 respectively. These are non-verbatim summaries of daily proceedings. And we have the statutes passed by Parliament from 1625 onwards, including the interregnum period. All told, this is some 19 thousand documents, and some 35 million tokens.

Our second problem is methodological. As we mentioned above, there are many alternative ways to produce word embeddings once one has data available. We use techniques from Rodriguez, Spirling and Stewart (2023), which are designed for situations where at least some terms occur very

rarely. The essence of this approach is to obtain embeddings for (rare) terms by taking the average of the embeddings of (more common) terms around them. This average is reweighted in a way that has been found consistently to provide high quality embeddings—i.e. they make sense relative to one another—for such situations.⁶ There are two other nice features of the Rodriguez, Spirling and Stewart (2023) statistical approach helpful to us. First, we can speak of meaning *differences* between groups by comparing their embedding vectors for the same word. Second, it is relatively straightforward to get a substantive sense of *how* the groups differ by inspecting the other terms closest to word of interest in each case. For instance, it might be useful to know that Levellers use the word “law” in close proximity to “equality”, while non-Levellers do not.⁷

To reiterate: our approach is contingent on the notion that the way actors *use* language is indicative of what they *mean* by that language. And thus, to the extent that the former differs across groups, so does the latter. Obviously, there are many ways in which this may not be true, and there is a large philosophical literature demarcating more principled approaches (e.g. Schiffer, 1972). For one, actors are strategic, and choose terms they believe an audience will respond to in particular ways, or simply to differentiate their ideas from some other author. In this sense, there may be no “sincere” belief of a difference in meaning. Second, even if all statements are sincere, the contexts in which certain words appear reflect quantities beyond meaning *per se*. For example, Democrats and Republicans in Congress might discuss “immigrants” in radically different ways, but they do not literally disagree on the meaning of the term. Nonetheless, as a first approximation we believe our approach is reasonable and in line with other efforts in corpus linguistics (see, e.g., Camacho-Collados and Pilehvar, 2018, for an overview).

⁶We provide validation of our Early Modern English embeddings, relative to Modern English ones, in Supporting Information B.

⁷We give more details on precisely how we produced our embeddings in Supporting Information C.

5 Quantitative Results

In this section, we provide some broad empirical evidence of the ways in which the Levellers, Lilburne specifically, used the term “peers”. Our consistent claim is that their invocation of this term is in the context of law—juries particularly—rather than in some broad social class sense. For what follows, note that the term “peers” is not very frequent in the corpus, occurring just 292 times in the corpus, in 62 unique documents. Furthermore, “peers and equals” is a rare construction, occurring just twice in that exact form (in two unique documents). We can nonetheless use statistical machinery to explore the relevant distributions.

5.1 The Levellers v Their Contemporaries

Our first cut on the problem is to compare the Levellers’s use of “peers” in our corpus with those who were contemporaries but not Levellers (as defined above).⁸ Here, we are asking which embedded terms in the corpus are closest—via cosine similarity, a standard measure—to each group’s understanding of the focus term (here, “peers” in its various guises).⁹ The results are in Table 1. We see that the Levellers use “peers” in a way closest in connotation to terms such as “legall”, “illegall” and “tryall” in the pamphlets, while their contemporaries use that term closest in connotation to terms like “parliament” and “king” Our point here would be that these are not (in either case) obviously examples of social equality—they are legal in nature.

⁸Given our comments about the nature of English at the time, and simply to be as inclusive as possible, we actually search for the following variants of “peers”—“peer”, “peere”, “peeres”, “peers”.

⁹These are typically called the “nearest neighbors”, but we refer to them as the “nearest neighbor-terms” here to avoid confusion with “neighbor” as a specific term of interest in the 17th Century.

Table 1: Levellers and non-Levellers have different connotations for “peers” (10 nearest neighbor-terms), and they are legal in nature

rank	Levellers	Others
1	legall	parliament
2	illegall	peers
3	peerer	king
4	tryall	lawes
5	charta	commons
6	lawes	kings
7	law	therefore
8	condemn	parliaments
9	magna	peerer
10	expresly	right

To throw the comparison into starker relief, we now report the nearest neighbor-terms that are *most distinctive* to each group. The results are shown in Figure 1. To understand that figure, and some others that follow, note first that for a given group (say, the Levellers) we can provide an embedding for any term (say, “peers”) and then calculate the cosine similarity of that term to any other (say, “legall”). We can do that for another group too (say, the Levellers’s contemporaries), and thus we have two cosine similarities between two terms, for each group. The *ratio* of those two cosine similarities can take various values: if it is 1, then the cosine similarities are both the same (top and bottom), and we draw the conclusion that both group use the term identically (at least relative to the focus word). If that ratio departs from one, it means that either the group in the numerator has a much larger cosine similarity than that in the denominator, or that the group in the denominator has a much larger cosine similarity for the terms than the group in the numerator. The figure shows the (top) terms that have (absolute) cosine ratios that are distinct from one. The *x*-axis is simple the (raw) value of that ratio. The *y*-axis is the ratio’s absolute deviation from 1, and makes comparisons of magnitude a little easier.

On the left of the figure then, we have the terms for which the ratio is lower than one: that is, the terms for which the non-Levellers have higher similarities to “peers” than the Levellers. To the right of the plot are the terms for which the Levellers have higher similarities to “peers” than the

non-Levellers. Terms nearer the top of the plot are words for which the cosine ratio magnitudes is most different from one—so, terms used in ways that are most distinct to the two groups (Levellers and non-Levellers). The plotting characters at the bottom provide information about where the words themselves exist in terms of being nearest neighbor-terms in the sense presented in Table 1: some of the most distinct terms are nearest neighbor-terms for the Levellers use of “peers” (e.g. “legall”, marked with a square) , some of the most distinct terms are nearest neighbor-terms for the non-Levellers (e.g. “commons”, marked with a circle), and some in both lists (e.g. “lawes”, marked with a triangle). The terms with statistically significant cosine ratios (for which a ratio of one is the null hypothesis) are marked with asterisks.

Examining Figure 1, we see that—to the far right and top—the most distinctive term that it is statistically significant is “tryall” (trial). Equivalently, the Levellers use the term “legall” in the close context of “peers” in a way the non-Levellers do not. This is *prima facie* statistical evidence that while the Levellers have a different understanding of “peers” to their contemporaries, it is fundamentally a legal one, and refers to notions of (criminal) trials.

5.2 Lilburne’s Position

It could conceivably be the case, that while the Levellers as a whole appear to have a predominantly legalistic understanding of “peers”, this masks Lilburne’s *personal* socially egalitarian stance on the matter. To investigate, we repeat the exercise above, but splitting the corpus as documents that Lilburne-authored vs documents authored by the other Levellers. We begin with the nearest neighbor-terms in Table 2.

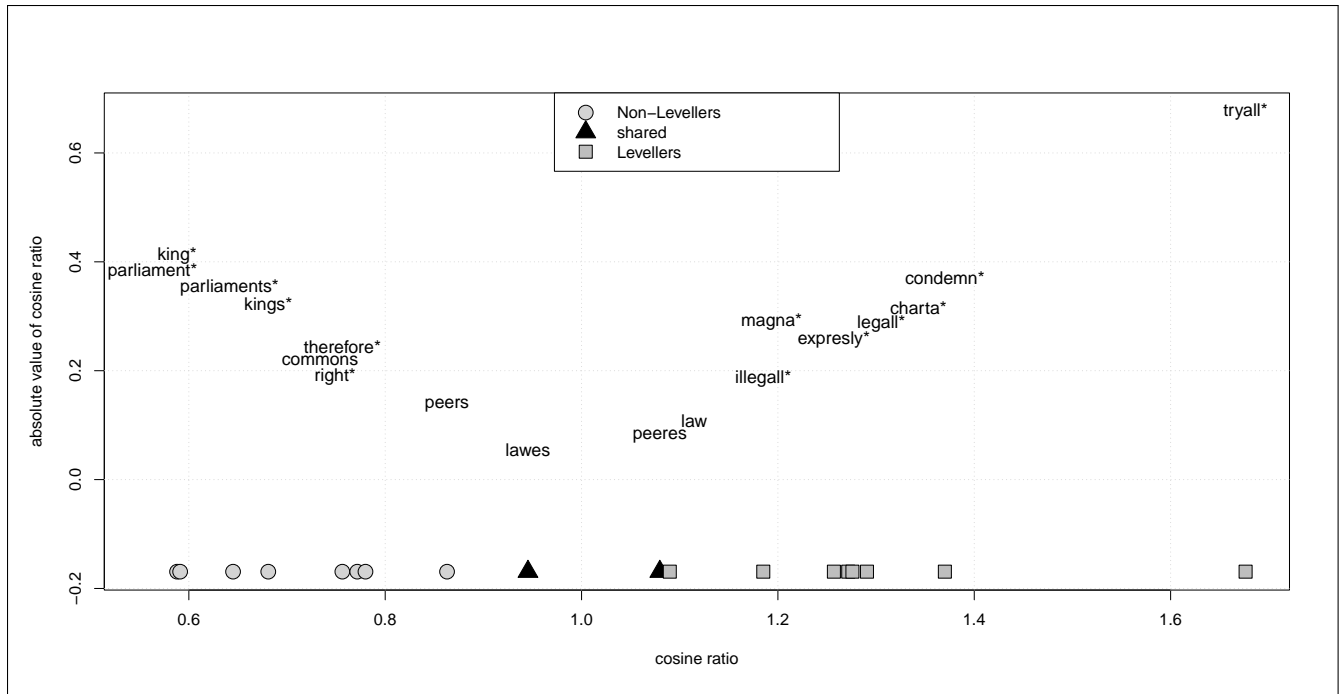


Figure 1: Non-Leveller v Leveller most distinctive nearest neighbor-terms of “peers”: Levellers use of “peers” is different to that of the contemporaries but is legal in nature. Asterisk indicates $p < 0.01$.

Table 2: Lilburne and the other Levellers have different connotations for “peers” (10 nearest neighbor-terms), and Lilburne’s are legal in nature

rank	Lilburne	Other Levellers
1	legall	peers
2	charta	therefore
3	tryall	commons
4	magna	parliament
5	peerēs	neither
6	expresly	thus
7	condemn	yet
8	law	kings
9	lawes	must
10	commoner	peerēs

What we see is clear: Lilburne’s nearest neighbor-terms for “peers” are essentially identical to those of the Levellers as a whole, above. This makes sense, insofar as he wrote the lion’s share of their output, and he himself was repeatedly placed on trial, most famously for treason in 1649. But

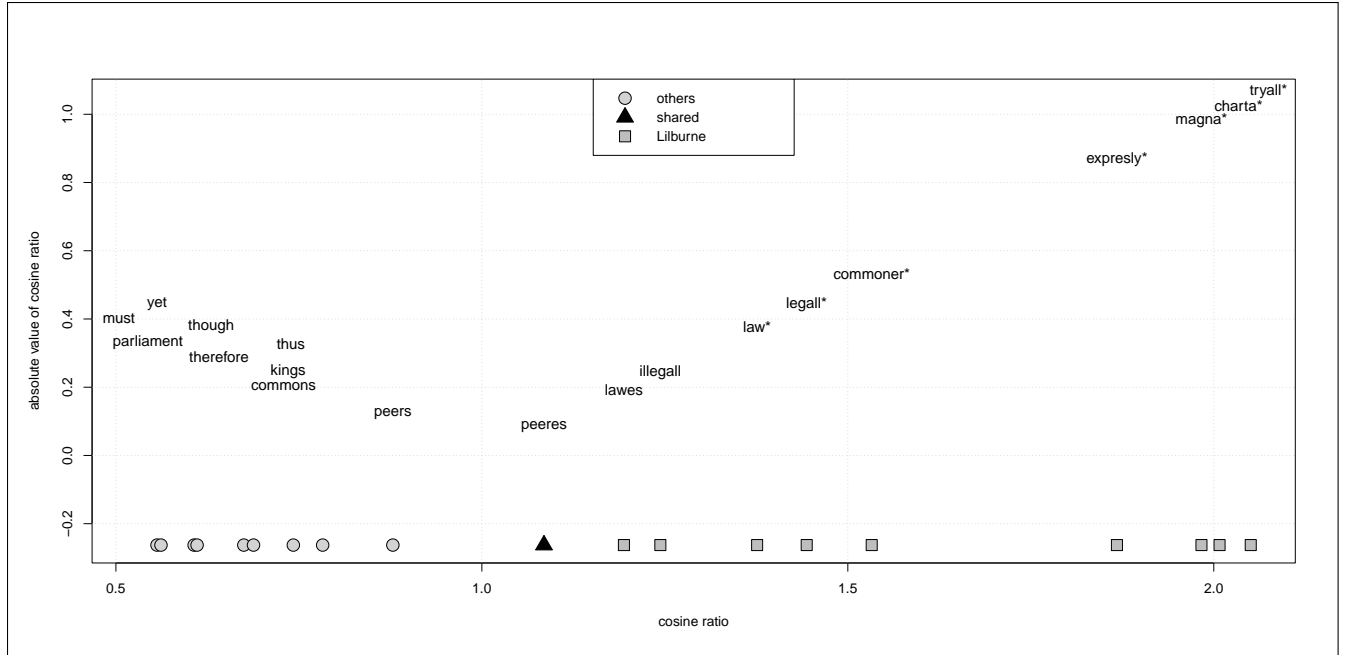


Figure 2: Lilburne v other Levellers most distinctive nearest neighbor-terms of “peers”: Lilburne’s use of “peers” is legal in nature. Asterisk indicates $p < 0.01$.

the terms do not pertain to social equality in this case, either: they are legal in nature. The other Levellers use even less socially related terms. In Figure 2 we provide similar graphical evidence as above: this time we see that Lilburne’s use of “peers” is with respect to legal notions like “tryall” and “magna” “charta”.

5.3 *His Apologeticall Narration*

“His Apologeticall Narration” is the title of the only Lilburne-authored pamphlet containing the *exact* phrase “peers and equals”. While there are obviously related constructions like “Peers or Equals” or “Peeres or Equalls” or “Peers, that is Equalls”, this document is still potentially special. We mean this in the sense that it contains a particularly influential use of “peers” that we should investigate directly. There are two related ways to proceed. First, and an indirect route: we remove the document from the Leveller (only) corpus, and re-estimate our nearest neighbor-terms as above. If the document is particularly distinct, we might expect the lists to look different when the document is out of the data versus when it is included. They do not: the nearest neighbor-terms

look almost identical, whether “His Apologeticall Narration” is included or not.¹⁰

Still, it could be that mere numbers are misleading: that is, perhaps the document does differ substantially, but this is drowned out by the homogeneity of the other Leveller texts discussing “peers.” To check this, we reran our analysis above, both in terms of the nearest neighbor-terms and their ratios *on this document specifically*. This provides an opportunity for the (potentially distinct) use of “peers” in this particular text to shine through. But that is not what we find; in particular, the use of “peers” in “His Apologeticall Narration” is, as everywhere else in the corpus, legalistic in nature. We see this first in Table 3, where the nearest neighbor-terms are tokens like “tryall” and “judges”. We see it also in Figure 3, where essentially all the terms have legal connotations.¹¹

Table 3: The use of peers in “His Apologeticall Narration” is legal in nature

rank	Other Leveller Texts	“His Apologeticall Narration”
1	legall	tryall
2	illegall	june
3	peerer	speciall
4	lawes	tryed
5	charta	barre
6	law	jury
7	tryall	judges
8	magna	legall
9	condemn	john
10	expresly	parl

A feature of note in Figure 3, is that the differences are generally not statistically significant because the sample size is small by construction (there is just one document—“His Apologeticall Narration”—providing the comparison set). Nonetheless, it could conceivably be the case that the embedding of “peers” in this document differs in some overall sense to the embedding elsewhere. To check that, we conducted an “embedding regression” in the sense of Rodriguez and Spirling (2022). This technique uses permutation to assess whether embedding vector for a word for one

¹⁰Specifically, the top ten nearest neighbor-terms for the Levellers v non-Levellers comparison are identical, albeit reordered. This is also true for the Lilburne v other Levellers comparison.

¹¹Note that to make the table easier to read we “corrected” letter *is* to *js* where appropriate, but we left the figure as the original spelling.

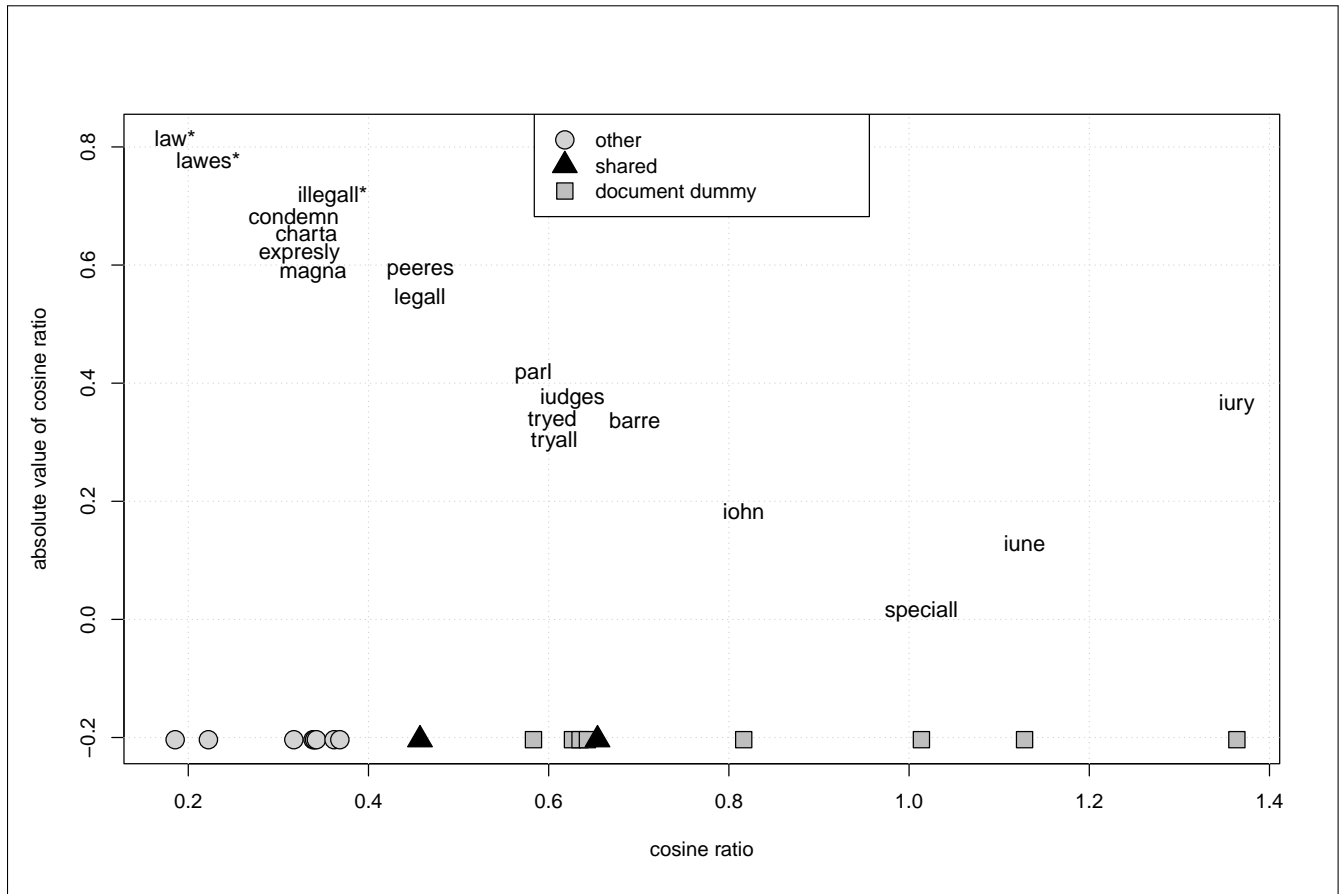


Figure 3: “His Apologeticall Narration” v other Levellers most distinctive nearest neighbor-terms of “peers”: These are primarily legal in nature.

group (in this case, the Levellers) differs from that of another (in this case, the specific uses in “His Apologeticall Narration”. Table 4 provides the relevant normed estimate and standard error. We do not see evidence of a difference ($p = 0.19$). Of course, this is not the same as having evidence of no difference, and the result may simply be a product of low power (we only have a few mentions to compare). But it is at least not inconsistent with our claim that the particular way Lilburne used “peers” in this document is not different to other Leveller uses—and by extension, not non-legal.

	peers
His Apologeticall Narration	3.034
	[0.606]

Table 4: The use of “peers” in “His Apologeticall Narration” is not statistically significantly different to other uses by the Levellers.

To summarize for this section, we have found very little quantitative evidence that what the Levellers meant by “peers” is related to social equality. Rather, their discussions of this term appear to relate to legal matters, especially juries. We now turn to more in-depth qualitative commentary on this claim.

6 Qualitative Results

As we have discussed, the Leveller obsession with law reform took particular institutional form in the jury; as Thomas Green has written, “The ‘jury right’ was more than just another Leveller reform item: the supposed right lay at the very heart of Leveller political and social theory...” (Green, 1985, 154) It encapsulated a great number of Leveller preoccupations: the use of Latin rather than English in the law; the enactment of arbitrary and unequal punishments; the excessive power of Parliament, and in particular the House of Lords, against the people; and the value of local control, both with respect to matters of justice and of parliamentary elections. It is no surprise, then, that close reading of key Leveller passages demonstrates that legal judgment was in fact the means by which freemen became “equal and alike” or “peers.”

Take, for instance, Bejan's passage from Lilburne—i.e., that “the meanest man in England” could become a high-status peer, “as much entitled and entailed. . . as the greatest subject.” Again, Bejan invokes this passage to demonstrate the significance of socially “levelling up” (while leaving women in a subordinate position). Yet in the “The Oppressed Mans Importunate and Mournfull Cryes to be brought to the Barre of Justice,” Lilburne starts by pointing out that “the Law of the Land is equally and alike our common birthright and inheritance (for all the distinguishing, deviding names amongst us) unto which”—and here we leave off where Bejan begins—“the meanest man in England is as much entitled and entailed. . . as the greatest Subject.” That is, the way in which social unequals—the meanest man and greatest subject—in fact are able to relate as equals and peers is through their status under the law. But it is also the case that Lilburne denied that the House of Lords were the “Peeres of Commoners,” and that Commoners of England ought to be tried by their own “Peers, that is, Equals.” (“Oppressed Mans Oppressions Declared” and “People's Prerogatives and Priviledges”) He denied that a committee that mixed Lords and commons was permissible, “seeing the Lords are none of their or my Peers and Equalls by Law, and so cannot, nor ought not to be there, to be my examiners, tryers and Judges. . .” Lilburne's argument was not that the Commoners should have parity with respect to the high status of Peers: rather, they should remain socially distinct on the grounds that “their peers were in fact not *his* Peers” (Bejan, 2022, 611)

That “peers” here did not entail leveling up is an important point for the wider history of the Leveller movement because, far from seeking to gain access to the bench, the second Agreement of the People instead sought to “rid the Kingdom” of lawyers. In a letter to Col. Henry Marten, Lilburne himself specifically repudiates the aim of high standing, because of his hostility to the established legal establishment: “I do believe you will never find one president in England before mine, for as I was (for anything I could ever hear) the first man in England that refused the Star Chamber's illegal and unjust oath, so I believe I am the first man in England, that ever at the Lords (to their faces) protested against their jurisdiction in criminal cases, over the Commons of England; and Solemnly and formally appealed to the House of Commons, as me legal Peers and

Equals.” Likewise, in “People’s Prerogative and Priviledges,” Lilburne refers to peers and/or equals repeatedly in invoking the jury, denying that Parliament—which had arrogated to itself both law-finding and fact-finding—had a right to try him. (Green, 1985, 168). Again, the argument was in support of lay justice, rather than the pursuit of power to render elite judgment.

Of course, Bejan is right to note that, on Sir Edward Coke’s gloss of *Magna Carta* in the *Institutes*, there is a difference between the peers of the “peerage,” and the peers of the commoners (Bejan, 2022, 208). But that does not mean that the commoners were themselves mere equals; to adopt Bejan’s language, Coke in fact identified differential dignity within each rank. “For as every of the Nobles is a Peer to each other, though they have severall Names of Dignity, as Dukes, Marquisses, Earles, Viscounts, and Barons; so of the Commons of the Realme, each Commoner is a Peer or Equall to another, though they be of severall Degrees, as Knights, Esquires, Citizens, Gentlemen, Yeomen, and Burgesses.” (19) Moreover, as Rachel Foxley has persuasively argued, Lilburne in particular developed a new and distinctive egalitarian legal language drawing on Coke and *Magna Carta*: as she notes, Coke’s discussion of the freemen of *Magna Carta* chapter 29 was inclusive in terms of status, extending to villeins (Foxley, 2016, 94) Lilburne’s use of the terminology of “peers” for the aim of lay justice by fellow Commoners is thus consistent.¹²

The use of “peers and equals” in “Apologetical Narrative” clarifies the point. Lilburne complained that he had been judged by the “Lords barr,” and protested that they had asserted jurisdiction over commoners, which he maintained was against the 29th chapter of *Magna Carta* and the Petition of Right, which “positively and expressly declare, that the Commons of England, shall be tried by nonewhatsoever, but their *equals*.” (emphasis added) He lamented further that Cromwell and the Earl of Manchester had brokered a deal in which they would release him if he acknowledged the “Lords jurisdiction over me,” but he refused and—true to form—“printed several high discourses” against Cromwell. Yet eventually a petition to Parliament succeeded in freeing him. At a later point, Lilburne recounted, he, Walwyn, Prince, and Overton had been locked in the

¹²We would also note that these arguments further bolster R.B. Seaberg’s view—against Hill (1958) and Pocock (1957)—that the Levellers were not mere critics of the common law as the “Norman Yoke.” Rather, the Levellers believed the jury trial (among what Lilburne termed the “kalendar of Englishmens fundamental liberties”) had persisted through the “Conquests of the Romans, Saxons, Danes, or Normans.” (Seaberg, 1981)

Tower and subject to “barbarous crueltie” by his adversaries in Parliament; after having been denied “all these legal liberties and privileges, that by the declared Law and England were and are my undoubted Birth-right,” eventually he was “most gloriously delivered by the clear and entire verdict of a jury of twelve Londoners, being my Peers and equals (the Law requiring me to be tried only by such a number of legal and good men of my neighborhood) of their own choosing,” and which was met—on his account—by great celebrations on the part of the people of London. The reference to “Peers and equals” at once cites the freedoms of *Magna Carta*, resists trial by Parliament, and celebrates the value of lay judgment by neighbors. Lilburne evinces no ambition either to eliminate the hierarchical distinction or to claim the rights of peerage: rather, he sought just to be judged by those of his own status and proximity, rather than those above him. There is neither explicit nor implicit distinction between those who are high-status peers or mere low-status equals: Lilburne uses both terms to characterize similarity of social standing *qua* geographically proximate freemen, as opposed to Lords.

It was not only Lilburne who invoked peers and equals in this way. For instance, the anonymous “Vox Plebis” again characterizes peers as those who share in judgment from the proper standpoint, and—further—indicates that the invocation of “equals” does not only pertain to those of lower status:

A Nobleman hath this privilege of trial as well per legem terra, as by this Charter: and that anciently, legale iudicium parium, or lawful trial of Peers, for all manner of persons, as well Noble-men as Commons: was, veredictum duodecim proborum & legalium hominum de vicineto, a verdict of 12. good and lawful men of the neighborhood. Now to prove that legale iudicium parium, or lawful judgment of a man’s Peers or Equals, is by verdict of 12. men, and not otherwise: for the word Peers [universally] signifies both.

Bejan takes this argument to demonstrate that the Levellers here “deliberately and systematically conflated any distinction between high-status ‘Peers’ and low-status ‘Equals.’” But read in the context of the common law arguments of “Vox Plebis,” drawing on the medieval work of Glanvill

(likely via Coke), *Magna Carta*, and Coke's *Institutes* ("Amercements [fines] ought to be assessed by the equals of him that is amerced") it seems clear that "peers" pertained not to Peerage but to the "good and lawful men of the neighborhood" capable of rendering judgment. Both noblemen and commoners were entitled to the judgment of twelve of their peers or equals, drawn—in either case—from the good and lawful men of the community.

The main point is this: if "peers" is a significant concept during this period—and we concur with Bejan that it was—it is because it is so closely associated with the legal reform agenda of the Levellers, and the value of judgment by those similarly situated, both with respect to locality and to standing. The Levellers were surely, in key respects, socially and politically egalitarian; but insofar as they used the language of parity to characterize their commitment to the jury, it was invoking the freemen of *Magna Charta* rather than the earls and barons of the realm. To achieve justice according to a jury of their peers and equals, they did not need to level up, but down.

It might seem that the distinction between levelling up and levelling down is an insignificant one: why should we care, so long as rights are allocated on equal terms? But it has acquired outsized significance in discussions of equality within political philosophy. In "Justice and Equality," Gregory Vlastos argued that the wide distribution of citizen rights does not "trivialize" these privileges, but conferred a " 'rank of dignity' in some ways comparable to that enjoyed by hereditary nobilities of the past" (Vlastos, 1962, 47). Waldron drew on these arguments in his Tanner Lectures to argue that human dignity now accords to every human being "the dignity, rank, and expectation of respect that was formerly accorded to nobility." (Waldron, 2012, 33-34). Invoking this concept of equal high standing in support of a distinctly democratic conception of dignity, Josiah Ober suggests that civic dignity may be understood as "elite peerage regrounded in explicitly political relations and extended to a broad and diverse set of persons," and that this concept was central to Athenian democratic institutions and political culture (Ober, 2012, 829). It is important for the history of democratic thought, then, to see if this mechanism—the democratization of "peerage"—travels. It may indeed, but we do not believe it extends to the Levellers.

It is also true that the Levellers may not have consistently distinguished between legal and

social (or, for that matter, political) equality. Yet what our analysis has demonstrated is that, quite often, these latter arguments derived from appeals to legal equality. There are, of course, good historical reasons for this, including Lilburne’s own endless trials, as well as wider Leveller concerns about legal persecution for assertions of religious freedoms.¹³ Legal equality was not the sole commitment of the Levellers, but the extent they invoked the concept of parity, it was in the pursuit of equal legal standing, rather than a more expansive demand for equal high standing.

7 Discussion

Commentators have often noted that the Levellers evade easy characterization, variously construed as proto-democrats (e.g. Frank, 1955); as religious sectarians (Robertson, 1951); as bourgeois individualists (Macpherson, 1962) or classical liberals (Otteson, 2020) or socialists (Brockway, 1980) *avant la lettre*; or as radicals *manqué* (Foxley, 2016). In the modern UK, partisan forces from both the communitarian left (Tony Benn, Jeremy Corbyn) and the libertarian right (Daniel Hannan, Douglas Carswell) cite them as inspirations. Recent efforts to marshal the Levellers in the service of egalitarian political philosophy are no different: all sensible readers agree that the Levellers were invested in equality of some form, but they disagree about its scope and character. In response to recent work situating the Levellers with respect to relational egalitarianism, we have argued that the Levellers were preoccupied by legal judgment, and that their defenses of social equality tended to be downstream from their institutional arguments. While we agree that it is important to understand what the Levellers meant by their repeated invocations of “peers” and “equals,” we have contended that it clarifies the outsized importance of lay legal judgment to the Levellers, and to levelling down, rather than up.

We combined new data and methods to make these points. We built word embeddings for our corpus—a fairly comprehensive set of period pamphlets—and used those to assess the “meaning” of terms like “peers” in terms of “nearby” words. Our overwhelming impression from the quan-

¹³We thank an anonymous reviewer for pressing us on this point.

titative work was that, to the extent “peers” are mentioned by the Levellers, it occurs in the legal context. We demonstrated this by comparing Levellers to their non-Leveller contemporaries, and then with a specific focus on Lilburne. Our qualitative examination—where we looked at the term usages in a more holistic way—confirmed these “thinner” statistical claims. Future work might examine other questions about the Levellers or this period, including Leveller differences with respect to the Diggers, their potentially changing views over time, or their commitment (or not) to representative democracy and its institutions.

Whatever the substantive matter at stake, we note three broader issues that other historical work of this nature must grapple with. First, the techniques are only as good as their data. Embeddings require non-trivial amounts of data to be of high quality—that is, to make sense for the domain to which they are being applied. Here, we studied early modern English, and were fortunate to have a large background parliamentary corpus to “train” our model. This is likely to be a bottleneck for earlier periods, where the available corpora are smaller or non-existent. Perhaps for later periods, training on contemporary English sources would be reasonable, but we would advocate basic qualitative diagnostics when doing so. In our case, the nearest neighbor-terms of Supporting Information B told us that our local corpus seemed sufficient (and indeed that embeddings fit to modern texts would not suffice). Second is the importance of guided inference—that is, that qualitative experts direct quantitative queries. The statistical techniques we used above can reveal the “meaning” of terms but only in a shallow sense. They can tell us about tokens and their distances to other words, but that is not a substitute for a deep understanding of the term within its historical milieu. By extension, the methods cannot tell us what to test; their utility comes in determining how to test. Our point here is that future work in this vein—whether for this period or others—should start with substantive questions that could plausibly have statistical answers, rather than with statistical answers that could plausibly have substantive questions. Our third broader point flows from this observation: mixing quantitative and qualitative approaches is non-trivial and that clarity is needed in terms of the workflow of a study. For example, it can be hard to specify hypotheses in the case of political theory, and even harder to pre-register them. Specifically, scholars of thought often work

through a given set of texts—such as Lilburne’s writings—in an inductive fashion, updating their views about the author as they go. This implies an “unsupervised learning” world view, where the task of the analyst is to uncover latent structure in the documents. Translating that process to testable “theories” about the data is difficult in any discipline, including political science. More concrete guidelines for these concerns would clearly be helpful, and we leave that for future work.

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Online Supporting Information for *Peers,
Equals, and Jurors: New Data and Methods on
The Role of Legal Equality in Leveller Thought*

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A Data Details

Table 5 provides an overview of the (260) pamphlet (and associated document) lengths: the mean is around 13000 words, but the median is around 7500 words.

Min	25th percentile	Median	Mean	75th percentile	Max
196	3030	6272	12041	13487	111280

Table 5: Lengths of texts (numbers of tokens) in our “core” Leveller corpus.

To get a sense of the balance between these groups and others overtime, consider Figure 4. There, the [red] circles and [pink] squares mark Leveller texts (“main” or from “other” authors), while the [blue] triangles are non-Leveller texts (by our definition). Notice that the y-axis is the log (base 10) length of text, and thus the Leveller and non-Leveller texts are somewhat balanced on this dimension over time. Our “main” period—where most of the data appears—is demarcated by broken bold lines at the center of the plot.

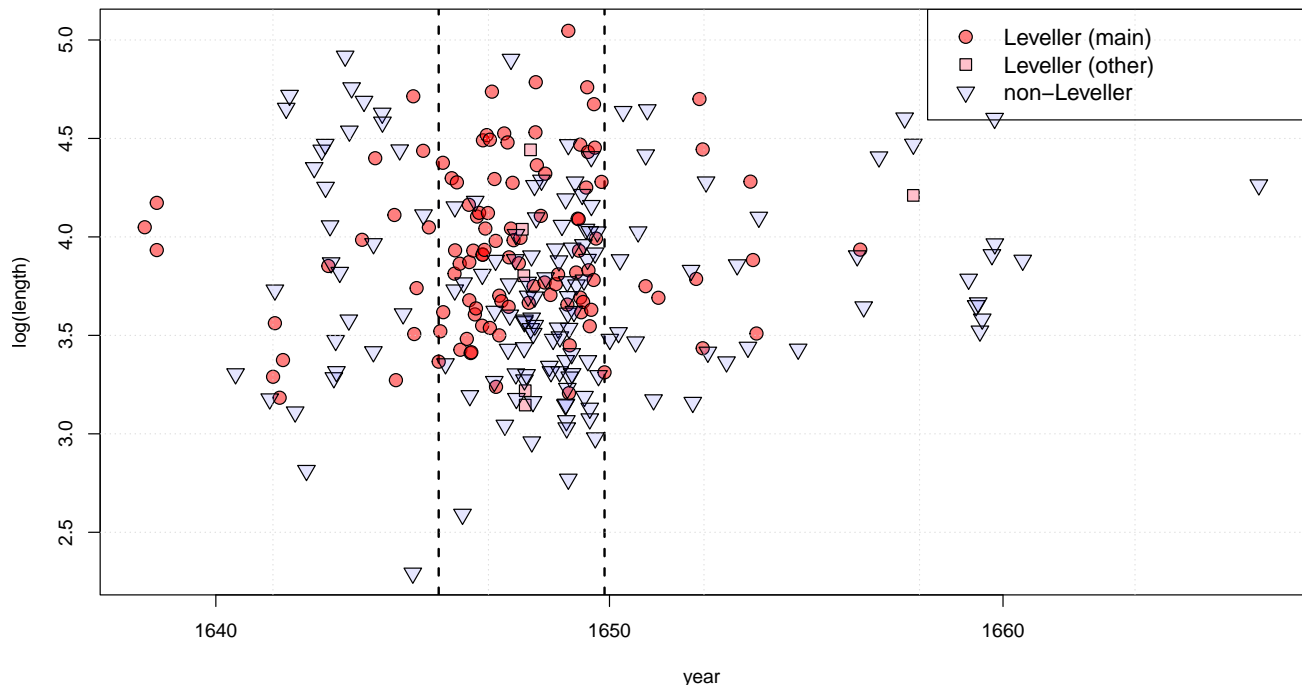


Figure 4: Authorship of core corpus, overtime and by (log) length. The two vertical dashed lines signify our “main” period of study

B Validating the Embeddings

We can gain some immediate insight into the merits of our localized embedding strategy by exploring how it represents key words from the period. We can do this both in an absolute way (“does this meaning make sense?”) and in a relative way (“does this meaning improve on other techniques?”). Table 6 displays some results for six words of specific importance in our period. In the “Standard GloVe” column, we report the (nine) nearest neighbor-terms in embedding space for a pretrained standard GloVe model fit to modern English sources such as Wikipedia (available from Pennington, Socher and Manning, 2014). In the final column is our model, fit to the parliamentary data and the various Leveller texts noted above. In all cases we remove the search word itself from the results (because e.g. the closest neighbor to “sovereign” is “sovereign” and thus not very informative).

We will not belabor this point, but from inspection it is obvious that our model returns terms that are more meaningful—and thus accurate—for our corpus of study. For example, the term *sovereign* is associated with being “gracious” and “dutiful”. For the standard model, it is associated in part with “debt” and a potential “downgrade”. Similarly, *rights* in our case returns associated terms of the age like “ancient” “priviledges”. For the standard model, we see modern terms such as “advocacy” and “human [rights]”. The word *alms* may seem obscure, but provides final evidence of the quality of our local model. In particular, “alms” or rather, the receiving of alms, were a potential disqualifier for Leveller notions of suffrage. Our model correctly locates this terms near “freemen” and “housekeepers” who generally were thought worthy of the vote. The standard model meanwhile returns “zakat”, an Islamic term for almsgiving, and “gt2”, a type

token	Standard GloVe	Our Model
sovereign	sovereignty, entity, debt, status, downgrade, creditworthiness, entities, affirmed, monarch	reign, gracious, dutiful, memory, majesty's, subjects, loyal, queen, followeth
parliament	parliamentary, mps, assembly, legislature, duma, lawmakers, deputies, elected, speaker	assembled, lords, present, commons, now, whereas, hath, may, house
cromwell	1649, 1653, oliver, 1658, 1651, 1654, 1652, 1655, 1657	oliver, ireton, gen, wentworth, maynard, north, lieutenant-general, lieutenant, morley
rights	human, freedom, freedoms, liberties, abuses, advocacy, advocates, activist, legal	liberties, privileges, just, subject, privileges, enjoy, ancient, freedoms, preserve
alms	zakat, begging, gt2, lmp2, gt1, prayers, mans, scavenging, blessings	lot, housekeepers, freemen, voted, receiving, householders, elected, poor, scot
god	allah, gods, divine, heaven, christ, bless, jesus, faith, worship	world, people, even, heart, almighty, spirit, yet, christ, glory

Table 6: Nearest Neighbor-terms (9), Standard GloVe v our locally trained model.

of BMW car.

C Specification Details on Quantitative Analysis

As always with text analysis problems, specification matters. Here we lay out how we set up our embeddings and other important objects.

C.1 Making the Corpora

The training corpora involves several parliamentary text data sets courtesy of Rodon and Paskhalis (2021). These are:

- Acts of the Interregnum period
- Parliamentary journals of the House of Commons
- Parliamentary journals of the House of Lords
- Statutes of the period under consideration

These are then combined with the 260 documents in the Leveller Pamphlet collection. We preprocessed our corpora as follows using `quanteda`:

1. lower-cased, removed punctuation, removed symbols, removed numbers, removed separators

2. removed English stopwords, and forced a floor on token length of 3
3. dropped all features not appearing at least five times in the whole corpus

C.2 Making the Embeddings

We first constructed a *feature co-occurrence matrix* with a 12-word window. We set our embedding vector length to 300. We fit the Glove-based embedding model using `text2vec`. We set our convergence tolerance for the optimization to 0.001 or 200 iterations, whichever occurred first. In practice, the model converged at 185 iterations (this took around 15 minutes on a modern desktop PC).

For the local transform matrix (the A matrix in the original Rodriguez, Spirling and Stewart (2023) presentation), we used log weighting.

C.3 Modeling etc

When using the various `conText` functions, we used the local transform matrix formed as described above. We used the bootstrap and/or permutation functions when appropriate, with 1000 of each in every case.