

Mulgrave, Dryden, and *An Essay upon Satire*

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1. Preamble

This article is a pale shadow of what it should have been. The particular question we shall be considering was drawn to my attention by Harold Love early in 2005. He prepared texts of the poems on which the argument is focused. For more than a decade before that, he and Meredith Sherlock had contributed, in generous measure, to our electronic archive of seventeenth-century poetry and drama. In the present instance, as was our long-standing custom, he withheld his opinion until my work was done. After I had shown him my findings, he said that they concurred with his own. But ill health prevented him from following through with the deeply informed and illuminating context he provided in our earlier articles. What should have been yet another product of a long and happy scholarly partnership is diminished into a tribute to his memory.

Let us begin with something that he sought from me. He always maintained that those doing work like mine should offer a general account of their position and even try to enunciate a Theory. We had lively exchanges on this subject. Intent on following the data-trail from day to day and trying to understand where it was leading, I was slow to take up his challenge. But he was surprised and gratified by the preamble of my original version of this article, which ran pretty much as follows. I have since used it elsewhere¹ and must hope that the present occasion will condone a passage that verges on self-plagiarism.

Computational stylistics deals in patterns derived from the relative frequencies of many words across a range of texts appropriate to the particular task in hand. In recent years, much attention has been given, in this area of scholarly inquiry, to the most frequent words of all. These, of course, are words that every writer of English will call upon in almost any form of written expression. It is becoming widely recognised that, across any given range of texts, there are strong concomitant variations of frequency among these ubiquitous words. The consistency of the variations is usually sufficient to bear the weight of statistical analysis. This makes it possible, among other things, to distinguish the writings of different authors from each other and, accordingly, to test the authorship of doubtful texts. Some established statistical procedures can be used for these purposes and new ones continue to emerge. The files of *Literary and Linguistic Computing* illustrate what has been done in the last twenty years or so.

¹ John Burrows, "All the Way Through: Testing for Authorship in Different Frequency Strata," *Literary and Linguistic Computing* 22 (2007): 27–47.

Such variations of frequency are seldom apparent to a reader. A given writer's customary choices among comparatively rare words, on the other hand, are easily seen, often attract comment, and lend themselves to parody. In the large area between the two extremes of ubiquity and rarity, it is also possible to identify many not uncommon words that a given writer uses more often than most others do. Where this holds good in comparable bodies of work, it seems fair to postulate that, in further specimens of their work, the user is more likely to return to them than the others are to take them up. It would follow that each writer's use of such words might yield a distinctive profile.

If the words that make up the second and third of these frequency-strata are to yield evidence of authorship, appropriate statistical procedures must be brought to bear. In the third stratum, literary scholars tend to confine their attention to words used by a target-author but not by any other contributor to vast databases covering all the known writers of an era or all those who work in a particular genre. While the presence of such words in a fresh text can be of real evidential value, their absence may easily be adventitious: we do not use all of our favourite expressions every time we write. Such words, moreover, are usually too few to bear much weight statistically. It is nevertheless possible to strengthen this form of evidence by relaxing one's stipulations and including words that most (rather than all) others do not use. The evidential power of each word is thus reduced but there is far more room for a cumulative effect. Special considerations arise in cases (like the one we shall be examining) where there are only two candidates for the authorship of a particular text. In such cases, ample evidence accrues from the words used by one and not by the other. The results can then be set beside those yielded by a complementary procedure, taking words used by the latter author but not by the former.

In studies of putative authorship, the middle frequency-stratum has scarcely been addressed. It seems almost unreasonable to seek evidence of authorship in a body of words, most of them lexical, that we take up and discard according to the dictates of a topic or an occasion. Among these words, however, there are many that respond to simple rules of consistency and contrast. Once the words that everybody uses are excluded, it is possible to identify words which many writers seldom use but which recur, with some consistency, in a wide-ranging set of work by a target-author. Few if any of them will recur in everything that he or she writes. But, as with the third stratum, my trials suggest that more of them will occur in a new text by that author than in those of other authors.

Statistical tests directed at each of the strata are proving increasingly accurate in identifying the true author of authentic texts of two thousand words or more in length. The level of accuracy gradually falls away with shorter texts. The errors that do arise, even with longer texts, differ from stratum to stratum. The evidence of the very frequent words can be distorted when an authorial sample does not properly represent that writer's *œuvre* or when an author makes a radical change of genre. When Henry Fielding turns his hand to verse, we have a case in point. The evidence

of the middle range of words can be distorted by a sharp change of subject, as when Aphra Behn turns her mind from love to death. The evidence of the unusual words is open to aberration when circumstance carries a particular word into a little flurry of occurrences. Some culling of the word-list usually alleviates these last difficulties. But to avoid the risk of corrupting the results by “cherry-picking,” any culling should be governed by a plainly stated rule.

Since there is little or no overlapping among the words tested in each stratum, the three sorts of evidence are largely independent of each other. But complete independence is denied us, to a small but incalculable extent, by links, overt and covert, among the occurrence-rates of different words. Some links are grammatical, as between the very frequent “I” and the much less frequent “am.” Other associations can be more widespread. They include the concurrence of more frequent members of any lexical field and their more unusual associates. Despite such restrictions on the mutual independence of the frequency-strata, their membership still differs so markedly that agreement between the different sets of test-results strengthens a given outcome.

After thirty years of assiduously following the data-trail, let me try to put my position in general terms. Evidence of authorship pervades whatever anybody writes. Provided appropriate procedures are employed in the analysis of an appropriate set of texts, that evidence can almost always be elicited. It is inherent, however, not merely in statistical principle but in human behaviour at large, that such evidence cannot be absolute.

In 2005, when I wrote the original version of the present article, I had not long begun an attempt to design suitable procedures for analysing the data offered by the second and third of the frequency-strata. The upshot was a pair of tests that I called Zeta and Iota. By applying simple stipulations of consistency to the words making up the second stratum, Zeta yielded a high proportion of correct results in cases where the identity of the true author is known. Iota takes up the evidence of the third stratum, the large residue of words used by a target-author but not by most others. It proved a little more accurate and decidedly more robust than Zeta. A detailed account of these tests and of some of my early results was written later in 2005 and published in 2007.²

The subsequent experience of those of us who have used these tests suggests that they are both at their best in direct contests between two candidates. Where more than two candidates can be identified, it is sometimes possible to restrict the field by other means and then work through a series of direct contests. In my own trials, meanwhile, I have found that it is often desirable to merge the second and third strata and test that larger frequency range with a variant that I call IotaPlus. This approach, as described and used below, is glanced at in my 2007 article. The present exercise is its first full public trial.

² *Ibid.*, *passim*.

Why should such tests work as accurately and reliably as they do? Provided they are properly used, the proper answer, I believe, is “How could it be otherwise?” Any writer’s vocabulary is a selection from the full resources of a given language as used at that time. His or her preferences will reflect such differentiae as level of education, gender, chosen audience, topics of customary choice, and so on. If it is an international language like English, there will be signs of a given national variety. The writer’s preferences will also reflect idiosyncrasies too subtle for such broad categories. Such a set of preferences will amount, in short, to one major facet of a Saussurian *parole*, drawn from the larger resources of the *langue* itself. As such, like every other meaningful aspect of our behaviour, they will display not only an underlying likeness, greater or lesser, to our various fellows but also our differences from them. Whether that line of thought is an incipient theory or merely an idea of a certain generality, I am too simple an empiricist to judge. I note, however, that Saussure’s distinction is acceptable even to Noam Chomsky, whose basic distinction between “competence” and “performance” is germane. That, I take it, should put it in good standing among adherents of the high-priori sort of language study. Even if he were denied that endorsement, one might still do worse than follow Ferdinand de Saussure and bring a little further evidence to show that his distinction is as useful as it is plausible.³

2. Tests and Results

2.1. *The problem and the texts*

The question to be considered here is whether the methods of computational stylistics can shed any light on the likely authorship of *An Essay upon Satire*. This poem, 2,236 words in length, has generally been regarded as the work of John Sheffield, third Earl of Mulgrave, and afterwards Marquis of Normanby and Duke of Buckinghamshire.⁴ In Buckinghamshire’s posthumous *Works* of 1740, it is said to have been “Written in the year 1675” but it is considered that 1679, when the manuscript was in circulation, is the likely date of composition. Many scholars hold that John Dryden had a part, whether in “revising” or in “correcting” Mulgrave’s text. It has also been proposed that the poem may be entirely Dryden’s. This last view was current at the time of the poem’s first circulation and it has been held to explain why Dryden was savagely beaten in Rose Alley, Covent Garden on 18 December, 1679. Harold Love informed me that the case for Dryden’s sole authorship has been strongly restated with a wealth of external evidence in an as yet unpublished paper by a respected Restoration scholar, Edward L. Saslow. Love’s own interest extended

³ It should be observed, however, that Saussure’s own emphasis was on speech, not writing.

⁴ On the genesis and initial reception of the poem, see *Poems on Affairs of State: Augustan Satirical Verse, 1660–1714*, vol. 1, 1660–1678, ed. George deF. Lord (New Haven, CT: Yale University Press, 1963), 396–413.

from the question itself to the methodological issues that it raises.⁵ For, whatever the outcome of the analyses he asked me to undertake, this particular authorship problem illustrates the relationship between external and internal evidence.

In order to test these possibilities, I have had recourse to our large and diverse database of half a million words of Restoration poetry.⁶ More immediately, I have compared *An Essay upon Satire* with eleven other poems. These are listed in Table 1. Four of them are English poems by John Dryden. Three are his translations from the Latin of Juvenal, Ovid, and Virgil. "Helen to Paris" is a translation of Ovid where both Dryden and Mulgrave acknowledge that they worked together.⁷ And the set is rounded out by three of Mulgrave's own poems, *An Essay upon Poetry*, "The Appointment," and "An Ode on Brutus."

Mulgrave's widow—and perhaps the man himself—had many of his poems "corrected" by Alexander Pope. In order to sidestep this complication, Harold Love located early versions of *An Essay upon Satire* and *An Essay upon Poetry*. "The Appointment," a mildly erotic display of youthful vanity, is an early piece not included in the *Works*: the Duke himself or his dowager may have chosen to forget it. For the present version of this article, I have added the later versions of each *Essay*⁸ and the late version of "An Ode on Brutus." When these fourteen texts (counting the two versions of each *Essay*) are compared with the remaining set of poems from the

⁵ See Harold Love, *Attributing Authorship: An Introduction* (Cambridge: Cambridge University Press, 2002), chaps. 4–6.

⁶ The corpus of about 550,000 words ranges widely across the work of the following twenty-six poets: Aphra Behn (1640–89) 21,705 words; Alexander Brome (1620–66) 29,539; Samuel Butler (1612–80) 30,932; William Congreve (1670–1729) 30,917; Charles Cotton (1630–87) 12,625; Abraham Cowley (1618–67) 19,272; Sir John Denham (1615–69) 30,092; Charles Sackville, Earl of Dorset (1638–1706) 9,586; John Dryden (1631–1700) 14,755; Thomas D'Urfey (1653–1723) 18,757; Robert Gould (1660?–1709?) 29,110; Andrew Marvell (1621–78) 23,282; John Milton (1608–74) 18,924; John Sheffield, then Earl of Mulgrave (1648–1720/21) 14,125; John Oldham (1653–83) 32,462; Katherine Phillips (1631–64) 29,004; Matthew Prior (1664–1721) 32,000; Alexander Radcliffe (fl. 1669–96) 11,889; John Wilmot, Earl of Rochester (1648–80) 12,725; Sir Charles Sedley (1639?–1701) 10,304; Elkanah Settle (1648–1724) 24,080; Thomas Shadwell (1642?–92) 14,540; Jonathan Swift (1667–1745) 30,974; Nahum Tate (1652–1715) 20,333; Edmund Waller (1606–87) 16,443; Anne Wharton (1659–85) 12,511. Most of the corpus was prepared by John Burrows and Harold Love, assisted by Alexis Antonia and Meredith Sherlock. The Marvell subset was contributed by Christopher Wortham assisted by Joanna Thompson.

⁷ This piece appears in the collected works of both poets. It is described in the 1680 edition of Dryden's translation of Ovid's *Epistles* as being "by the Right Honourable the Earl of Mulgrave and Mr. Dryden." Almost the same words are used in Buckinghamshire's *Works* of 1740. Either, of course, may have been the principal.

⁸ Although many small changes can be seen, the two versions of *An Essay upon Poetry* differ by only three words in length. In *An Essay upon Satire*, however, the later version falls short by well over two hundred words. The main omissions lie in the attack on Mulgrave's bitter enemy, the Earl of Rochester. The personal abuse remains but the passage claiming that Rochester's poetry will be "forgot by almost all" is dropped. Having outlived Rochester by forty years, even Mulgrave may have seen that this claim had already become untenable.

Works, we can confront the problem of Pope's corrections. In the event, as we shall see, the corrections scarcely affect the outcome.

The texts differ greatly in length, a point to be addressed. Both versions of each *Essay* lie around two thousand words. "Helen to Paris" is of much that length. Four others are shorter and five considerably longer. All of the texts except Dryden's Virgil and Ovid are complete poems. The exceptions are long excerpts from the second book of *The Aeneid* and from the first book of *The Art of Love*.

	Main set Specimens	14755 Cal./CH	Miscellaneous poems and songs
Dryden	Absalom	7824 Cal.	<i>Absalom and Achitophel</i> , Part 1
	Hind	19888 Cal.	<i>The Hind and the Panther</i>
	Heroic	1170 Cal.	"Heroic Stanzas consecrated to ... Oliver"
	Epistle 15	1650 Cal.	"Epistle the Fifteenth"
	Juvenal	4317 CH	"The Tenth Satyr of Juvenal"
	Ovid	7088 Cal.	<i>The Art of Love</i> , Book I
	Virgil	5493 CH	<i>The Second Book of the Aeneis</i> , 1–762
D&M ??	Helen	2075 HHL	"Helen to Paris" (from Ovid)
	EuS_1	2236 HHL	<i>An Essay upon Satire</i> (1679)
	EuS_2	1995 CH	<i>An Essay upon Satire</i> (1740)
Mulgrave	Main set Specimens	14125 CH	Miscellaneous poems and songs
	EuP_1	2765 HHL	<i>An Essay upon Poetry</i> (1682)
	EuP_2	2762 CH	<i>An Essay upon Poetry</i> (1740)
	App't	1159 HHL	"The Appointment"
	Brutus	1224 CH	"Ode on Brutus"

Table 1. List of Texts

Cal. = *The Works of John Dryden*, gen. eds. E. N. Hooker and H. T. Swedenborg, Jr. (Berkeley: University of California Press, 1956–)

CH = Chadwyck Healey Electronic Archive of English Poetry, used chiefly for texts from John Sheffield, Duke of Buckinghamshire, *Works* (1740)

HHL = Text supplied by Harold Love

2.2. *The evidence of very frequent words: the Delta procedure*

In the multivariate statistical procedures used to elicit any intelligible patterns in the distribution of the very frequent words, the texts are treated as specimens and the words as the variables under scrutiny. To allow for differences in length between text and text, the raw frequencies for each word-type are standardised either as percentages or as rates per thousand of all the word-tokens in each text.⁹ The standardised frequencies are arranged in descending order as a frequency-profile for each text in turn.

The Delta procedure, a member of the multivariate family, compares the upper range of the frequency-profile of a given text with those of many authors and shows which of them is least unlike it. The operation of the procedure is described elsewhere and a large body of results is shown.¹⁰ Delta is especially effective in exploring a crowded field: the results point towards the more likely candidates and allow the elimination of the more unlikely. The errors that occur from time to time stem from unusually strong changes in an author's style, as between the early and the late work of Cowley or Henry James; as between the satires and the lyrics of Robert Gould; or as when a gifted translator like Dryden submerges many of his usual stylistic propensities as he tries to catch the spirit of his foreign model.

The outcome of each Delta test stands free of all the others in the sense that each specimen text, in turn, is matched against the same collection of authorial sets. If those sets are changed, the various specimens are all affected; but, in contrast to other procedures like cluster analysis and principal component analysis, the specimens tested do not affect each other.

A "delta-score," as I term entries like those shown under that heading in Table 2, can be defined as "the mean of the absolute differences between the *z*-scores for a set of word-variables in a given text-group and the *z*-scores for the same set of word-variables in a target text." When they are calculated, as here, for a sufficient number of authors, they can be ranked and "delta *z*-scores" can be derived to allow more meaningful comparisons among the results for different texts.

⁹ Students of linguistics observe a useful distinction between word-types and word-tokens. The many occurrences of "the" in any given text are called word-tokens, each being an instance of the word-type "the."

¹⁰ John Burrows, "Questions of Authorship: Attribution and Beyond," *Computers and the Humanities* 37 (2003): 1–26. See also John Burrows, "'Delta': A Measure of Stylistic Difference and a Guide to Likely Authorship," *Literary and Linguistic Computing* 17 (2002): 267–86. For two assessments of the method, see David Hoover, "Testing Burrows's 'Delta'," *Literary and Linguistic Computing* 19 (2004): 453–75 and Shlomo Argamon, "Interpreting Burrows's Delta: Geometric and Probabilistic Foundations," *Literary and Linguistic Computing* 23 (2008): 131–48. While favourably disposed towards the method, both Hoover and Argamon suggest possible modifications. It remains to be seen which of the versions now current will prevail. For a part-precursor, see Richard Forsyth, David Holmes, and Emily Tse, "Cicero, Sigonio, and Burrows: Investigating the Authenticity of the *Consolatio*," *Literary and Linguistic Computing* 14 (1999): 393.

	Dryden Epistle 15 1650			Dryden & Mulgrave Helen to Paris 2075			Mulgrave Ode on Brutus 1224		
	Rank	Delta	Delta z	Rank	Delta	Delta z	Rank	Delta	Delta z
Behn	20	1.756	0.760	4	1.838	-0.853	23	2.125	1.236
Brome	26	1.868	1.810	9	1.869	-0.495	16	2.009	0.142
Butler	12	1.642	-0.308	22	1.982	0.796	7	1.909	-0.799
Congreve	6	1.594	-0.760	2	1.787	-1.427	22	2.116	1.151
Cotton	15	1.701	0.248	12	1.885	-0.309	10	1.961	-0.309
Cowley	18	1.750	0.710	26	2.141	2.619	8	1.952	-0.395
Denham	13	1.668	-0.065	17	1.918	0.072	4	1.876	-1.113
Dorset	14	1.694	0.183	1	1.784	-1.465	13	1.976	-0.168
Dryden	1	1.423	-2.359	15	1.915	0.029	18	2.024	0.280
D'Urfey	5	1.572	-0.960	18	1.925	0.152	9	1.959	-0.334
Gould	3	1.541	-1.256	5	1.843	-0.785	3	1.858	-1.286
Marvell	16	1.725	0.469	20	1.960	0.543	5	1.897	-0.911
Milton	22	1.761	0.808	25	2.078	1.895	25	2.172	1.682
Mulgrave	23	1.771	0.907	13	1.890	-0.253	2	1.827	-1.580
Oldham	10	1.632	-0.399	10	1.874	-0.440	15	1.993	-0.012
Phillips	25	1.860	1.739	6	1.845	-0.768	1	1.794	-1.883
Prior	11	1.636	-0.360	16	1.915	0.033	20	2.085	0.856
Radcliffe	17	1.747	0.677	3	1.795	-1.344	24	2.133	1.312
Rochester	21	1.756	0.763	11	1.874	-0.433	17	2.017	0.219
Sedley	19	1.754	0.747	14	1.903	-0.105	26	2.209	2.029
Settle	2	1.533	-1.330	21	1.974	0.708	6	1.907	-0.824
Shadwell	9	1.627	-0.449	23	2.012	1.140	11	1.966	-0.263
Swift	4	1.550	-1.169	7	1.852	-0.692	14	1.983	-0.099
Tate	7	1.600	-0.706	8	1.863	-0.558	21	2.094	0.948
Waller	8	1.604	-0.661	19	1.957	0.516	12	1.972	-0.203
Wharton	24	1.777	0.961	24	2.036	1.420	19	2.028	0.326

Table 2. Dryden, Mulgrave, and twenty-four other poets

Delta results for three poems

Table 2 shows that Dryden ranks first of the twenty-six for his “Epistle the Fifteenth,” fifteenth for the collaborative “Helen to Paris,” and eighteenth for Mulgrave’s “Ode on Brutus.” At twenty-third, thirteenth, and second respectively, Mulgrave’s rankings for these poems stand in sharp and appropriate contrast. The identity of those others who rank towards the top of the range is always worth considering. The Delta scores themselves and the accompanying Delta z-scores are also instructive. But what matters here is that Dryden and Mulgrave are so sharply distinguished from each other, their rankings converging only for the poem where each acknowledged the participation of the other.

The results for all the other texts under consideration are tabulated in exactly the same way and they show just as sharp and just as appropriate a contrast between the two poets, each ranking high for his own work and low for the other’s. In each of his translations, Dryden ranks a little lower than he does in his own English poems; but even there Mulgrave continues to rank around twentieth out of twenty-six poets.

Instead of asking the reader to pore over a series of pages like Table 2, I offer Figure 1, a graphic rendering of the main outcome. In its electronic version, one can, if so desired, identify the pattern of rankings for all twenty-six poets across the range of our fourteen texts. But only two of these poets lie at the heart of our inquiry. The others provide a framework against which the behaviour of Dryden and Mulgrave is set in high relief. The solid line that traces Dryden’s rankings runs across the upper edge of the set for all seven of his texts. It falls halfway down the page for “Helen to Paris” and declines even further for the six texts then remaining. The dashed line that traces Mulgrave’s rankings observes an opposite pattern, running low at first, rising for “Helen to Paris,” and then staying near the top. The crux, of course, is that “EuS_1” and “EuS_2,” the two versions of *An Essay upon Satire*, behave so much like Mulgrave and not at all like Dryden. Although the Delta test cannot yield definitive proof of authorship, such a result as this is most suggestive. If Dryden were the author of *An Essay upon Satire*, such an outcome as this would be quite without precedent among the many occasions on which I have used this test on texts approaching these in length. With such texts, in cases where the truth is known, it is rare indeed for the actual author to rank anywhere outside the first two or three. (Translations, where “authorship” is a questionable concept, are a special case.)

2.3. *The evidence of less frequent words: the IotaPlus test*

The demonstratives, especially “that,” and the interrogative forms of “who” and “what” are among the very frequent words that occur much more freely in the two verse-essays than they do in Dryden’s verse. While he was preparing some of our copy-texts, Harold Love observed that Pope’s corrections of Mulgrave’s original texts included the excision of the periphrastic verbs “do” and “did.” These emphatic words all contribute, I suggest, to the hectoring tone of both verse-essays. Less frequent words cannot produce such large effects. But each of many can contribute to

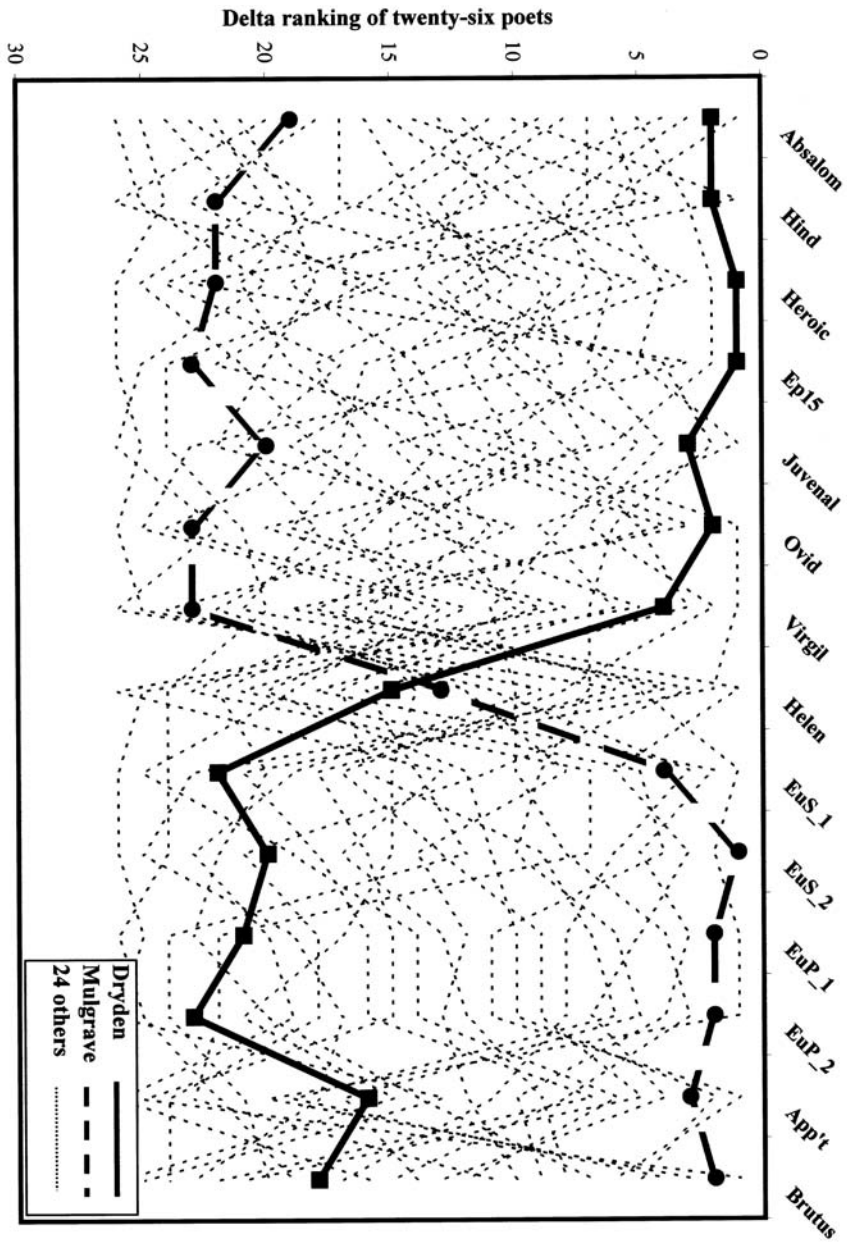


Figure 1. Delta rankings of Dryden, Mulgrave, and twenty-four other poets for fourteen texts

something general: “Alas,” for example, is another mark of Mulgrave’s heavy hand. It occurs in each of our Mulgrave specimens. It occurs four times in “Helen to Paris.” In the fourteen thousand words of our main Mulgrave set, it occurs twenty-four times. By contrast, it occurs only once in the fourteen thousand words of our main Dryden set. It occurs once in the twenty thousand of *The Hind and the Panther*, and twice in our selection from Dryden’s *Aeneid* (where Laocoon’s celebrated misadventure gives good cause to cry “Eheu!”). It does not occur in any of our other Dryden specimens.¹¹ But it has its place, once only, in *An Essay upon Satire*. A tell-tale marker? Perhaps so—but not enough for a definite conclusion.

As I observed earlier, this line of reasoning is a hit-and-miss affair. In the present inquiry, “Alas” would be of little interest here were it not for the single instance in *An Essay upon Satire*. Worse still, any large body of texts almost always supplies comparable evidence for the opposite side of any case. The word “set,” which is much more common in Dryden than in Mulgrave, occurs three times in *An Essay upon Satire*. To the extent that we might rely on the evidence of “Alas,” we should feel obliged to rely on the counter-evidence of “set.” It is possible, nevertheless, to put the incidence of the less frequent words to more reliable evidential use.

The Delta procedure focuses on a text and seeks to identify the likeliest of many possible authors. By contrast, the Zeta and Iota tests focus on one author at a time and seek to identify which of many texts are most likely to be his or hers. The point of departure for these new tests is the complete word-list for a large sample of a particular author’s work. To match the Mulgrave set, when it was introduced,¹² the Dryden set was reduced from over eighteen thousand word-tokens to 14,755 word-tokens. (This was done by excluding *Threnodia Augustalis*, its length being appropriate to the purpose.) These represent 3,577 distinct word-types. Corresponding frequency-lists for these 3,577 word-types were then established and tabulated, showing their incidence in the Mulgrave set of 14,125 word-tokens; in the several independent specimens for each author; and in both versions of *An Essay upon Satire*. In my various trials to date, around 10,000 word-tokens seem to suffice as a reliable minimum for an authorial set, five hundred (but preferably many more) for an independent specimen.

These new tests all begin with a data-table of this kind and then introduce stipulated contrasts between its base set (the main sample of the current target-author) and a counter-set (comprising one or more other authorial samples). In the IotaPlus

¹¹ The Chadwyck-Healey archive of English poetry has fifty-nine instances of “Alas” in Dryden and sixty-one in Mulgrave. (Many of Mulgrave’s come from his two ponderous tragedies, which are not included in our fourteen-thousand-word sample of his verse.) Apart from the fact that Dryden’s corpus is by far the larger, almost all the instances given as his come from his translations of Ovid and Virgil, his rendering of Chaucer, and his collaborations with Mulgrave and Nahum Tate. In his own English poems, as in our samples, the word is seldom to be seen.

¹² On deciding to confront such problems as might arise from Pope’s corrections, I turned to the *Works* (1740). I excluded Mulgrave’s two verse-tragedies and set aside “Helen to Paris,” the “Ode on Brutus,” and the two *Essays*. This left a total of 14,125 word-tokens, covering 2,988 word-types.

variant, the main stipulation excludes all such word-types of the base set as do not occur in the current counter-set.

For the first phase of the present exercise, Dryden's 14,755 word-tokens were taken as the base set and Mulgrave's 14,125 as the counter-set. Of Dryden's 3,577 word-types, 2,081 do not occur in Mulgrave. In the second phase, the authors' roles are reversed. Of Mulgrave's 2,988 word-types, 1,492 do not occur in the Dryden counter-set. Dryden's greater vocabulary range can be seen, I believe, as a mark of his much greater versatility.

Neither of these complementary frequency-tables ranged up towards the head of the author's original list. Among Dryden's 2,081 surviving word-types, "year" and "crimes" both occurred twelve times. Among Mulgrave's 1,492, "Apollo" occurred thirteen times and "nymph" ten. No other word reached double figures in either list. Across the range of independent specimens, I saw a few words whose discrepant frequencies might have justified their exclusion but none that I felt obliged to cull. "Scripture" occurred once in Dryden's main set, fourteen times in *The Hind and the Panther*, and nowhere else. "People" occurred four times in Dryden's main set, sixteen times in *Absalom and Achitophel*, and seven times among the other Dryden specimens, but not in any of Mulgrave's specimens. Discrepant as they are, I decided that the high scores for these two words were sufficiently absorbed in the length of the poems where they abound. None of Mulgrave's 1,492 word-types yielded notable discrepancies. Neither did *An Essay upon Satire*.

The outcome of the IotaPlus test, as applied to the two word-lists described above, is summarised in the upper panel of Table 3. Columns A and B identify the author and the text treated in each row of the table and Column C gives its overall length in word-tokens. Columns D, E, and F show what results when Dryden supplies the base set. Columns G, H, and I serve that office when Mulgrave supplies it. Columns D and G show how many of the 2,081 and the 1,492 word-types occur in each specimen. Columns E and H show how often each occurs, while Columns F and I standardise the raw number of word-tokens as rates per thousand of that text. The remarkable effectiveness of standardising in this way is illustrated by the close proximity of these rates per thousand in *The Hind and the Panther*, our longest specimen, and others as short as the "Heroic Stanzas" and "Epistle the Fifteenth." A closer study of Column F shows that Dryden's scores are always higher, just as Mulgrave's are in Column I. "Helen to Paris" occupies an appropriate intermediate position in both columns. The scores for both versions of *An Essay on Satire* are always akin to Mulgrave's.

I find, not unexpectedly, that it is desirable for a base set and the corresponding counter-set to be of comparable length. The lower panel of Table 3 represents my attempts to discover whether differences of text-length among the specimens affect the outcome of the IotaPlus test. To examine this question, I combined our four specimens of Dryden's English poems and our three specimens of his translations into two large "texts" of almost thirty thousand and over seventeen thousand word-tokens respectively. I then made a series of trials with segments of two thousand

A	B	C	D	E	F	G	H	I
			Dryden: free			Mulgrave: free		
			Mulgrave: zero			Dryden: zero		
Poet	Text	Total	Types	Tokens	per 1000	Types	Tokens	per 1000
Main authorial samples								
Dryden		14755	2081	2853	193.49	0	0	0.00
Mulgrave		14125	0	0	0.00	1492	2059	145.77
Independent specimens								
Dryden	Absalom	7824	420	742	94.84	218	287	36.68
Dryden	Hind	19888	678	1433	72.05	435	781	39.27
Dryden	Heroic	1170	80	87	74.36	45	47	40.17
Dryden	Epistle	1650	109	119	72.12	63	72	43.64
Dryden	Juvenal	4317	229	280	64.86	168	205	47.49
Dryden	Ovid	7088	311	456	64.33	246	369	52.06
Dryden	Virgil	5893	277	450	76.36	185	253	42.93
Dry/Mulg	Helen	2075	83	100	48.19	92	103	49.64
??	EuS_1	2236	77	93	41.59	112	139	62.16
Mulgrave	EuP_1	2765	90	101	36.53	124	165	59.67
Mulgrave	App't	1159	41	45	38.83	63	68	58.67
Mulgrave	Brutus	1224	39	48	39.22	65	72	58.82
??	EuS_2	1995	63	68	34.09	110	131	65.66
Mulgrave	EuP_2	2762	91	102	36.93	125	168	60.83
Random segments (from Dryden specimens)								
Dryden	P1	2000	166	209	104.50	77	87	43.50
Dryden	P2	2000	147	197	98.50	66	68	34.00
Dryden	P5	2000	114	135	67.50	67	70	35.00
Dryden	P7	2000	113	155	77.50	64	80	40.00
Dryden	P12	2000	127	149	74.50	80	91	45.50
Dryden	P15	2000	136	148	74.00	74	85	42.50
Dryden	T7	2000	127	163	81.50	76	89	44.50

Table 3. Dryden and Mulgrave

IotaPlus results for fourteen texts and for seven random segments

words, chosen at random. (The comparatively sparse supply of Mulgrave's work precluded a similar approach on his side. His specimens, however, lie within reach of two thousand words apiece.) The results of various trials, typified by those set out here, differed little from each other or from the original results for whole poems. The segments labelled P1, P2, P5, P7, P12, and P15 come from the English poems, while T7 comes from the translations. As with the results for the whole poems, Dryden consistently outscores Mulgrave in Column F and falls consistently below him in Column I.

For a graphic representation, let us turn to Figure 2, which portrays the results from the upper panel of Columns F and I in Table 3, treating the specimens as wholes. The horizontal axis draws on Column F and shows the scores per thousand when Dryden supplies the base set. The vertical axis draws on Column I and shows the corresponding scores when Mulgrave supplies the base set. The two authorial clusters stand far apart. "Helen to Paris" occupies an intermediate position. And both versions of *An Essay upon Satire* stand with Mulgrave.

Although neither formed part of my intended role in this affair, I would like to end with a scintilla of external evidence and an expression of opinion. Whereas both poets published "Helen to Paris," with acknowledgments to each other, only Mulgrave published *An Essay upon Satire*. After Rose Alley, it may be thought, Dryden would not have wanted anything to do with the poem. Is that reason enough for Mulgrave to exculpate him? In *An Essay upon Poetry*, written in 1682, Mulgrave says that Dryden had been "prais'd and punish'd for another's Rimes." Whoever wrote it and whether or not it was the occasion, he was certainly punished. And yet, for what my taste in satire is worth, it is remarkable that anyone should ever have been praised for such leaden invective as *An Essay upon Satire*. It is far more at home in the dreary Mulgravian wastes, the *Works* (1740).¹³

3. Conclusion

It has been possible to establish consistent and wide-ranging differences between Dryden and Mulgrave. Set in that light, neither version of *An Essay upon Satire* resembles Dryden's unassisted work. If it is a collaboration, it would seem that Mulgrave had by far the major hand. The tests, in my opinion, are not entirely independent of each other because there will always be some interrelationships among the frequency strata. Even so, the likelihood that the same error would recur in all the tests I have made or even in those actually shown above is negligible.

¹³ The tedium is sometimes relieved by the man's astonishing pretensions. In "The Election of a Poet Laureat in 1719," for example, the god Apollo greets Mulgrave as an old friend but feels obliged to rule him out of contention: it would be unprecedented for a Peer of the Realm to be granted a title that Commoners claim as theirs.

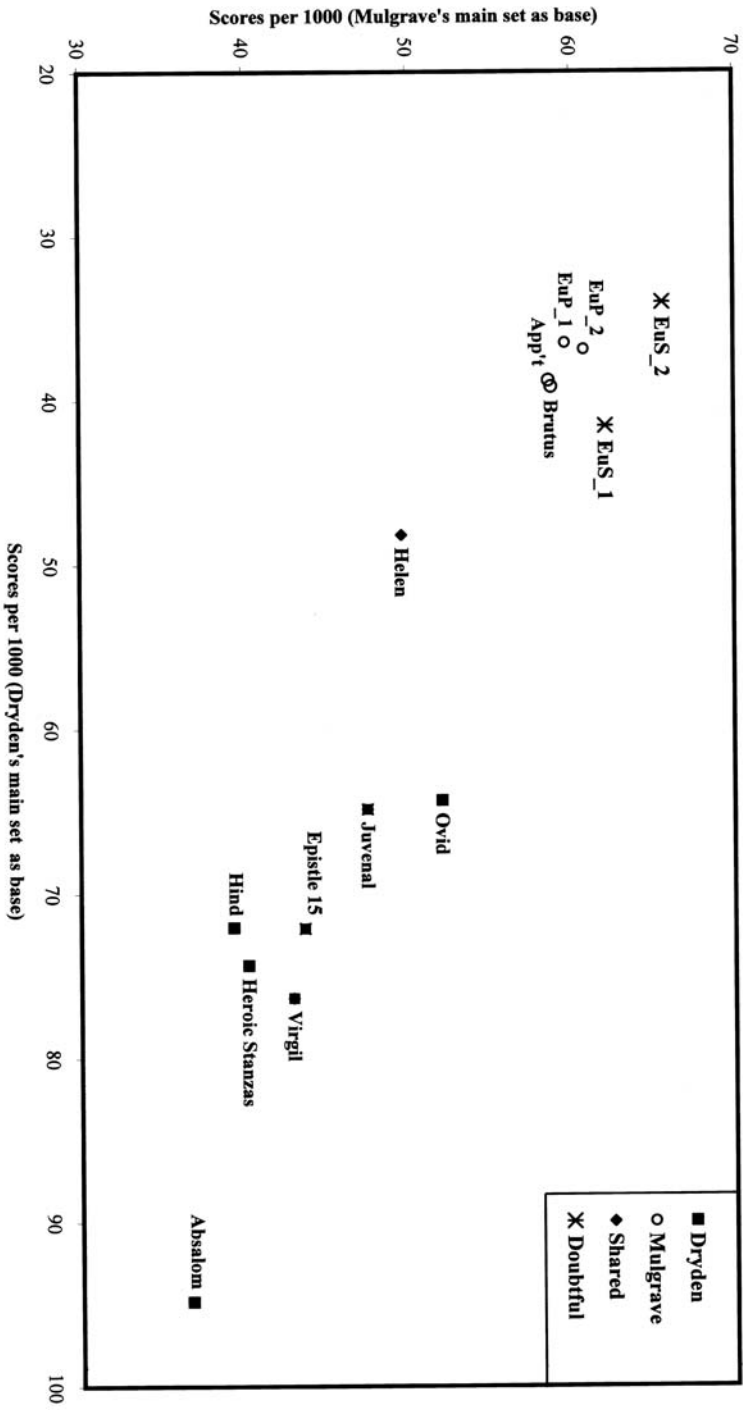


Figure 2. *Dryden, Mulgrave, and An Essay upon Satire.*
IotaPlus scores for fourteen texts

Many people still seem to share Dryden's belief that there will come a day when such truths are all made known. If that is indeed the day when, as Dryden himself has it, "The dead shall live, / The living die," then most of those present will doubtless fix their attention upon the cataclysmic untuning of the sky. But if any one among them puts first things first and spares a thought for cherished points of scholarship, it will be our dear friend Harold.

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