Hartmut Ilsemann

The Marlowe Corpus Revisited

Following Dr Barber's unfortunate criticism (Barber 2018), in which she, with an obvious lack of familiarity with them, subjected the Rolling Delta procedures used, to the caveats of Delta and traditional stylometry, this paper makes use of an extended methodological framework and applies Rolling Delta to the target texts with a totality of reference texts. The outcome is different from the expected, since the author of *Tamburlaine 1* and *2* emerges as stylistically also dominant in the anonymous play *The Tragedy of Locrine*, in Kyd's closet play *Cornelia*, in Peele's *The Battle of Alcazar* and *David and Bethsabe*. In contrast, the official Marlowe corpus relates stylistically to contemporary authors, but not to the two *Tamburlaines*. Traditional scholarship and learning do not refute conjectures of misattributed Peele plays and there are also strong indications that plays associated with Lord Strange's Men nominally became Marlowe plays when Henslowe acquired them in 1594 for his Admiral's Men and printers made use of the cult of personality in which the author's death became an important factor in the marketing of printed playbooks. Otherwise there is no documentary and empirical evidence that Marlowe wrote the plays in question. The canonization of the plays occurred only in the nineteenth century, and the Marlowe we have inherited – the poet, spy, astheist, homosexual, and so on – is almost entirely an invention of the twentieth century (Hooks, 98).

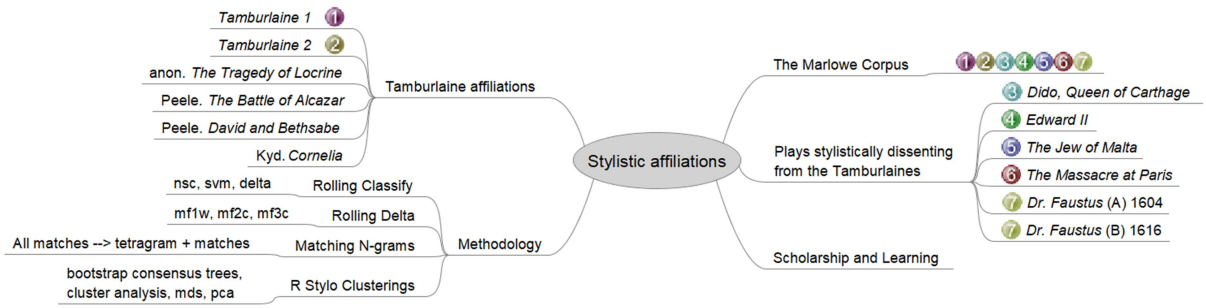
Overall aim

The general view of Christopher Marlowe is that he was a principal English Renaissance playwright who greatly influenced William Shakespeare. His plays became also famous because of the use of blank verse and their overreaching protagonists.[1] In the present paper the combined methodologies of R Stylo (Eder, M., Rybicki, J., and Kestemont, M. (2016)) together with the compilation of matching N-grams by Pervez Rizvi (http://www.shakespearestext.com/can/index.htm), and the critical summary of Marlowe authorship views (Dabbs 1995, Knutson 2018 et al.) result in a number of perceptions which are in disagreement with scholarship and general learning.

1. The Marlowe corpus is stylistically not homogeneous, a fact which cannot be dissolved by stating stylistic variety.
2. The style of the two *Tamburlaines* corresponds largely to a set of plays consisting of *The Tragedy of Locrine*, of Peele's *The Battle of Alcazar* and *The Love of David and Bethsabe*, and of Kyd's *Cornelia*.

3. The remaining corpus is stylistically highly diverse with its multivariate references to Greene, Kyd, Shakespeare, Rowley and Chapman.

Figure 1 Mind map of stylistic affiliations and methodological approaches



Methodological considerations

Non-traditional stylometric tools like Rolling Delta und Rolling Classify[2] (Eder, Kestemont, Rybicki, 2016) are easy to use, but they have to be used with due care.[3] They must be tested and evaluated in the face of existing authorship attributions by traditional stylometry and by scholarship and learning. My contention is that neither side is not on safe ground. Existing authorship ascriptions have often been subjective, a matter of preconceived ideas, and/or erroneously interpreted empirical evidence, while both traditional and non-traditional stylometry get into dire straits as soon as their results depend on wrongly attributed reference texts. Marlowe's co-authorship of *3 Henry VI,* which was established by Hugh Craig and the late John Burrows with the delta method (*New Oxford Shakespeare*, Authorship Companion, 2017, p. 194-217), is a fine example of premises taken over from existing scholarship. They applied '58 single-authored, well-attributed plays' (p. 201) to the Shakespearean and non-Shakespearean parts of *3 Henry VI* and in both lists Marlowe's *Edward II* took pole position. The fact that *Edward II* came top on both lists apparently did not provide sufficient food for thought and as a consequence Marlowe's co-authorship became a recognised circumstance. When Rolling Delta and Rolling Classify are applied to *Edward II* it becomes clear that Marlowe's play is neither single-authored nor well attributed, as the two *Tamburlaines* among the reference texts are stylistically hardly present in *Edward II*. Attempts at explaining this discrepancy with Marlowe's diversity of style and stylistic developments (Barber, p. 2) are futile, considering character trigrams as variables which attest to the workings of an author's mind irrespective of genre, topic or time (Stamatatos, 2013, p. 421). In my assessments of the generally accepted Marlowe corpus[4] over the last few years, a number of strategies have been employed, each time to the best of my knowledge and belief. To begin with, reference texts were selected according to common knowledge, as laid down, for example, in Wikipedia articles. The outcome was disastrous when nominal Marlowe plays like *The Jew of Malta* or

Doctor Faustus were employed as reference texts and led to entirely wrong attributions. The next stage was to try out various combinations of reference texts and to judge their suitability from the outcome, with some circularity implicated. In some cases an artificial reference text was created from those text segments in which variables like word frequencies and frequencies of character bi- and trigrams had consistently indicated one author. But this *pars-pro-toto* key did not yield clearer results than other reference texts.[5] It had to be seen as a big step forward when all the reference texts that I had collected became a substantial part of the process.[6] The computer however reached its limit, and it took about four hours to evaluate a single text with 5000-word windows and character trigrams as variables. On the one hand the outcome was fascinating as the best suited reference-text windows with the lowest delta values and the strongest stylistic similarity were provided by the program and not by a fallible individual. At this stage another problem emerged. In all the attributions Shakespeare played an important role. One could even say there were only just a few plays up to 1600 in which he had not participated. This was due to a corpus of mixed authorships and stylistic influences of the time. A remedy was found when only Shakespeare core plays which are seen as his masterpieces and which are definitely not co-authored were used as reference texts. They are: *Romeo and Juliet, Much Ado About Nothing, Twelfth Night, Hamlet, Othello, King Lear* and *Winter's Tale*.[7] In this way a bias in favour of authors with large surviving canons, such as Shakespeare was also eliminated. But one has to be aware of the fact that of the remaining reference texts a large number are co-authored or even wrongly attributed. This will become clearer as Marlovian plays are checked against the enlarged reference corpus.

Rolling Delta on windows of plays

Whereas the earlier paper 'Christopher Marlowe: Hype and Hoax' (Ilsemann, 2018a) tested window sizes of 1000 to 5000 words with variables like word frequencies, and character bi- and trigrams, the larger reference corpus made it necessary to use only one window size and one type of variable. Empirical experience generated over years with various data-sets and values derived from a huge number of analyses with varying reference and target texts pointed to an optimal window size of 4000 or 5000 words as well as character trigrams[8] to determine delta. Larger windows would tend to result in a collaborative scenario where plays appear to be co-authored by fewer collaborators or one author only might even be indicated. Smaller windows have the tendency to return more collaborators, unless the play is single-authored and a 1000-word window already reveals the author.

In contrast with Burrows's delta which is a single figure representing the distance of the target text from a number of reference texts, Rolling Delta subjects each window of the

target text to a comparison of its delta with the windows of about 130 reference texts. All deltas are displayed in a spreadsheet in such a way that column A contains the plays, column B the plays' deltas starting with the 5000-word window at 2500 words and the columns to the right contain subsequent windows at 2750, 3000, 3250 words and so on, depending on the length of the target text. In each column (except A of course) the three lowest deltas are then highlighted and those plays and windows that do not have a single lowest delta are eliminated.[9] The remaining plays and windows are then transposed by 90° and in the case of *Tamburlaine*, part 1 yield the results shown in Table 1**Fehler! Verweisquelle konnte nicht gefunden werden.**.[10]

Tamburlaine 1

The files stylistically closest to *Tamburlaine 1,* emerging from about 130 reference texts and their windows are listed in lines 68 to 71. Their deltas are displayed for each measured window in columns B to E, and lines 64 to 66 give the number of the lowest, the second-lowest and the third lowest delta values of each column. The sequence of windows at an interval of 250 words is indicated in column A and the accumulated word count of scenes is in column G, optimally adapted to the 250-word sequence of column A. The lowest deltas, however, are all denoted in bold white letters and a black background, the second-lowest have white letters and a dark grey background and the third-lowest have a lighter grey background.

Table 1 Attribution scheme of Marlowe's *Tamburlaine 1*

	A	B	C	D	E	F	G
1	words	**Rolling delta attributions**				**Scenes**	**Words**
		of Tamburlaine					
2	0	***1***				I.0	60
3	250						
4	500	Window size: 5000 Words					
5	750	Step size: 250 Words					
6	1000	Culling value: 70 %					
7	1250						
8	1500	single-authored				I.1	1418
9	1750	well-attributed					
10	2000						
11	2250						
12	2500	29,8	**19,7**	24,9	25,8		
13	2750	29,7	**19,6**	25,3	25,8		
14	3000	30,3	**19,5**	25,5	25,9		
15	3250	30,7	**20,0**	25,7	26,3	I.2	3315
16	3500	31,3	**20,5**	26,4	26,7		
17	3750	30,9	**20,5**	26,5	26,8	II.1	3821
18	4000	30,6	**20,1**	26,3	26,5		

19	4250	30,2	**20,2**	26,2	26,7	II.2	4381
20	4500	30,4	**19,6**	26,1	26,6		
21	4750	30,0	**19,4**	25,5	26,6	II.3	4877
22	5000	29,8	**19,1**	25,2	26,3	II.4	5192
23	5250	29,6	**19,2**	25,4	26,1		
24	5500	29,4	**19,3**	25,7	25,8		
25	5750	29,1	**19,2**	25,4	25,3		
26	6000	28,8	**18,9**	24,7	25,0	II.5	5983
27	6250	28,5	**18,5**	25,0	25,1	II.6	6280
28	6500	28,7	**18,1**	25,3	25,0		
29	6750	28,8	**17,9**	25,2	25,2	II.7	6771
30	7000	28,8	**17,9**	25,3	25,5		
31	7250	28,7	**17,8**	25,0	25,2	III.1	7271
32	7500	27,9	**17,7**	24,9	24,9		
33	7750	27,9	**17,3**	24,6	24,8		
34	8000	27,5	**17,3**	24,4	24,6	III.2	8092
35	8250	27,3	**17,9**	25,0	24,8		
36	8500	27,0	**18,1**	24,7	24,7		
37	8750	26,9	**17,9**	24,7	24,7		
38	9000	27,1	**17,8**	24,9	24,5		
39	9250	27,4	**17,9**	25,2	24,5		
40	9500	27,5	**18,1**	25,3	24,4		
41	9750	27,6	**18,5**	25,3	24,4		
42	10000	27,9	**18,9**	25,3	24,7		
43	10250	28,6	**18,9**	25,8	25,1	III.3	10130
44	10500	28,3	**18,2**	25,8	24,5		
45	10750	28,4	**18,0**	26,0	24,3	IV.1	10634
46	11000	28,8	**18,2**	26,3	24,6		
47	11250	28,2	**18,1**	25,7	24,2		
48	11500	27,4	**18,0**	25,0	24,3	IV.2	11597
49	11750	27,0	**17,8**	25,0	24,2		
50	12000	26,7	**17,7**	24,8	23,9	IV.3	12067
51	12250	26,5	**17,4**	24,9	23,6		
52	12500	26,5	**17,4**	24,7	23,5		
53	12750	26,2	**17,6**	24,5	23,6		
54	13000	26,1	**17,6**	24,4	23,5		
55	13250	25,8	**17,4**	24,2	23,1		
56	13500	25,8	**17,2**	24,5	23,1		
57	13750	25,7	**17,6**	24,7	23,4		
58	14000	25,5	**17,8**	24,7	23,6		
59	14250	25,8	**18,4**	25,4	23,9		
60	14500	26,0	**18,8**	25,5	24,0		
61	14750	26,2	**19,1**	25,8	24,4		
62	15000	26,1	**19,3**	26,3	24,4		
63	15250	B	C	D	E		
64	15500		**51**				
65	15750			21	30		

66	16000		1			29	21				
67	16250						%				
68	16500	B = Kyd. *Cornelia*									
69	16750	C = Marlowe. *Tam2*					100				
70	17000	D = Peele. *Alcazar*							IV.4	17130	
71		E = anon. *Locrine*									

The remarkable information to emerge is that, apart from *Tamburlaine 2* (100 %), the following stylistically close plays do not come from the nominally existing Marlowe corpus, but from the anonymous play *The Tragedy of Locrine* and Peele's play *The Battle of Alcazar*. *Locrine* had already been determined to be by Marlowe in earlier investigations (Ilsemann, 2018a). Peele's play came as a surprise, brought about by the totality of reference texts. Likewise among the third lowest deltas Kyd's *Cornelia* can be found, a play that Kyd recruited from Marlowe's literary remains as laid down in 'Forensic Stylometry' (Ilsemann, 2018b).

Tamburlaine 2

Table 2 Attribution scheme of Marlowe's *Tamburlaine 2*

	A	B	C	D	E	F	G	H	I	J	K
1	Words	**Rolling Delta attributions in**								**Scenes**	**Words**
2	0		***Tamburlaine 2***							Prol.	61
3	250		Window size: 5000 Words								
4	500		Step size: 250 Words							I.1	595
5	750		Culling value: 70 %								
6	1000										
7	1250									I.2	1265
8	1500										
9	1750									I.3	1852
10	2000										
11	2250										
12	2500	29,5	30,9	29,2	31,6	30,7	**19,4**	26,6	29,6		
13	2750	29,1	30,4	28,9	31,3	30,6	**18,8**	26,5	29,0	I.4	2739
14	3000	28,8	29,5	29,0	30,3	30,4	**18,7**	26,3	28,9	I.5	2845
15	3250	28,6	29,1	28,8	30,0	30,1	**18,4**	25,7	28,6		
16	3500	28,9	29,4	29,0	30,1	30,5	**18,6**	26,1	28,5	I.6	3586
17	3750	28,6	29,1	28,2	29,7	30,3	**17,6**	25,8	28,0		
18	4000	28,6	29,3	28,1	29,7	30,7	**17,4**	25,7	27,6	II.1	4025
19	4250	29,0	29,4	27,8	29,6	30,7	**17,5**	25,4	27,5		
20	4500	28,8	29,5	27,4	29,4	30,8	**17,1**	24,8	27,2		
21	4750	29,0	29,7	27,5	29,9	31,1	**17,7**	24,7	27,2	II.2	4850
22	5000	29,2	29,8	27,0	30,3	31,1	**17,8**	24,3	26,9		
23	5250	29,4	29,6	26,9	30,3	31,2	**18,0**	24,3	27,1		
24	5500	28,7	29,2	26,5	29,9	30,6	**18,1**	24,4	26,7		
25	5750	29,0	29,4	26,5	30,4	30,7	**18,2**	24,7	27,0		

26	6000	28,9	29,3	26,4	30,1	30,0	**18,1**	24,5	26,6	II.3	5922
27	6250	28,8	29,4	26,2	30,2	30,0	**18,2**	24,8	26,1		
28	6500	28,9	29,2	26,9	30,1	30,1	**18,6**	25,6	26,3	III.1	6501
29	6750	29,1	29,1	27,2	30,1	30,2	**19,1**	25,8	26,5		
30	7000	29,1	29,1	27,3	29,9	30,4	**18,9**	26,3	26,7		
31	7250	29,1	29,1	27,9	29,7	30,0	**18,4**	26,5	26,9		
32	7500	28,8	28,8	28,5	29,0	29,4	**18,3**	27,0	27,1		
33	7750	28,8	28,7	28,8	29,0	29,3	**18,2**	27,2	27,8	III.2	7703
34	8000	28,3	28,6	28,3	29,1	28,5	**18,1**	26,9	27,5		
35	8250	28,0	28,7	28,7	28,5	28,3	**18,2**	27,3	27,9		
36	8500	27,7	28,4	28,8	28,3	28,1	**18,4**	27,3	27,9		
37	8750	27,6	28,1	28,8	28,4	28,3	**18,8**	27,6	27,9		
38	9000	27,8	28,2	28,7	29,0	28,3	**18,8**	27,3	28,1	III.3	8895
39	9250	27,8	28,5	28,6	28,8	28,4	**18,7**	27,3	28,2		
40	9500	27,5	28,1	28,5	29,2	28,4	**18,9**	27,3	27,6		
41	9750	27,5	27,9	28,4	28,7	28,1	**18,9**	27,4	27,7		
42	10000	26,9	27,6	28,8	28,1	27,7	**19,0**	27,7	28,3		
43	10250	26,7	27,7	28,6	28,1	27,6	**18,8**	28,0	28,1	III.4	10189
44	10500	26,5	27,2	28,2	27,7	27,5	**18,2**	27,3	27,9		
45	10750	26,5	27,0	28,4	27,5	27,6	**18,3**	27,5	28,5		
46	11000	26,7	27,3	28,3	28,2	28,2	**17,9**	27,5	28,5		
47	11250	26,6	27,1	28,2	27,7	28,1	**17,8**	27,2	28,8		
48	11500	26,6	27,3	28,4	27,6	28,1	**17,7**	27,3	28,9		
49	11750	26,7	27,2	28,3	28,1	28,2	**17,9**	27,8	29,1	IV.1	11777
50	12000	27,2	27,4	28,5	28,1	28,3	**18,4**	28,6	29,6		
51	12250	27,2	27,3	28,3	27,9	28,6	**18,5**	28,5	29,8		
52	12500	27,0	27,3	28,0	28,0	28,7	**18,3**	28,3	30,0	IV.2	12534
53	12750	26,9	27,2	27,6	27,8	28,3	**18,6**	28,4	29,7		
54	13000	27,3	27,6	28,1	28,1	28,9	**18,6**	28,6	29,7		
55	13250	27,3	27,9	27,5	28,5	29,2	**18,2**	28,1	29,6		
56	13500	27,5	28,1	27,3	29,2	29,3	**18,3**	27,9	29,3	IV.3	13529
57	13750	27,2	28,0	27,5	28,7	28,8	**18,0**	27,9	29,1		
58	14000	26,7	27,8	27,6	28,0	28,2	**18,3**	28,0	29,4		
59	14250	26,5	27,2	27,9	27,7	27,7	**18,4**	28,5	29,6		
60	14500	26,6	27,9	28,0	27,5	28,0	**18,4**	28,6	30,1		
61	14750	27,1	28,1	27,9	27,9	28,0	**18,8**	28,8	30,1		
62	15000	27,4	28,4	27,6	28,1	28,2	**18,6**	28,3	29,4		
63	15250	B	C	D	E	F	G	H	I	V.1	15205
64	15500						**51**				
65	15750	21		1				29			
66	16000	7	13	10	2	1		1	17		
67	16250								%		
68	16500	B =	Greene. *Friar Bacon and …*								
69	16750	C =	Greene. *Orlando*							V.2	15631
70	17000	D =	Kyd. *Cornelia*								
71	17250	E =	Marlowe. *Edward II*								
72	17500	F =	Marlowe. *Dr Faustus* (B)							V.3	17580

73	G =	Marlowe. *Tamburlaine 1*	100
74	H =	Peele. *The Battle of Alcazar*	
75	I =	Peele. *David and Bethsabe*	

It is no surprise that *Tamburlaine*, part 2 has its stylistic counterpart in *Tamburlaine 1* (G64), but the stylistic similarity of Greene's play *Friar Bacon and Friar Bungay* (B65) and Peele's *The Battle of Alcazar* (H65) is also recorded. The reason for this is explained by Table 3, which evaluates *The Battle of Alcazar* against the whole reference corpus.

The Battle of Alcazar

Table 3 Attribution scheme of Peele's *The Battle of Alcazar*

	A	B	C	D	E	F	G
1	words	**Rolling Delta attributions of**				**Scenes**	**Words**
2	0	***The Battle of Alcazar***					
3	250						
4	500	Window size: 5000 words					
5	750	Step size: 250 words					
6	1000	Culling value: 70 %					
7	1250						
8	1500	single-authored					
9	1750	well-attributed					
10	2000					I.1	1983
11	2250						
12	2500	28,3	**25,3**	25,9	28,5		
13	2750	27,4	**24,7**	24,9	28,2		
14	3000	27,2	**24,2**	24,7	28,5		
15	3250	27,4	**24,4**	24,8	28,4		
16	3500	27,8	**24,9**	25,5	28,9		
17	3750	27,7	**24,6**	25,5	28,4		
18	4000	28,1	**24,4**	25,6	28,4		
19	4250	28,4	**24,7**	25,9	28,7		
20	4500	29,1	**25,1**	26,5	29,2		
21	4750	29,1	**24,9**	26,4	29,4		
22	5000	29,1	**25,0**	26,4	29,3		
23	5250	29,0	**25,0**	26,4	29,8	II.1	5366
24	5500	28,4	**24,1**	25,6	29,0		
25	5750	28,6	**24,3**	25,8	29,0		
26	6000	28,4	**24,3**	26,1	28,9		
27	6250	28,6	**24,5**	26,4	29,0		
28	6500	28,2	**24,3**	26,3	28,9		
29	6750	29,0	**24,8**	27,0	29,0		
30	7000	28,6	**24,5**	26,4	28,5		
31	7250	27,8	**24,1**	25,7	28,2	III.1	7178
32	7500	27,3	**23,4**	24,9	27,4		
33	7750	27,4	**23,5**	25,0	27,6		

34	8000	27,5	**23,8**	25,2	27,2		
35	8250	27,1	**23,7**	25,0	26,9		
36	8500	26,9	**23,7**	24,7	26,3	IV.1	8533
37	8750	B	C	D	E		
38	9000		**25**				
39	9250			25			
40	9500	20			5		
41	9750				%		
42	10000	B = anon. *Locrine*					
43	10250	C = Marlowe. *Tam1*			100		
44	10500	D = Marlowe. *Tam2*					
45	10750	E = Peele. *David &*				V.1	10819

All windows with the lowest delta values belong to *Tamburlaine 1* (C38), followed by *Tamburlaine 2* (D39) and *The Tragedy of Locrine* (B40) and *David and Bethsabe* (E40). George Peele's *The Battle of Alcazar*, which is believed to have been staged under the title *Muly Molucco,* was performed by Lord Strange's Men between February 1592 and January 1593, so that 1591 has become the probable date of writing. The attribution to Peele is questionable (Edelmann, p. 16), and Chambers names the anthology *England's Parnassus* (1600) as the source of that apparently faulty attribution (Chambers, vol. III, p. 459-60). When in 1999 Brian B. Ritchie dealt with this play in his thesis *The Plays of Christopher Marlowe and George Peele: Rhetoric and Renaissance* he stated:

> *The Battle of Alcazar* clearly shows the influence of Marlowe's *Tamburlaine*: the resolution and drive of Sebastian; the aspirations of Stukley; and the prominence of the exotic, of pageantry, and of scenic effects, are all reminiscent of Marlowe's heroic drama. Above all, the choice of the blank verse medium and even the diction reveal the influence of Marlowe (Ritchie, p. 69).

In his footnote on the same page he refers to more background information:

> See Cheffaud, pp. 75-78. Writing of Peele's approach, Cheffaud comments on 'la magnificence des ses tableaux, la rapidité de son action et le ton declamatoire des son style, en un mot par l'adoption sans réserve de tous les proceeds marlowesque' (p.75) […] It is instructive, as an example of adaptation, to see just how Peele uses the characteristically Marlovian theme of aspiration to regal pomp. Kingship and the symbol of the crown as the object of aspiration are chief concerns of Tamburlaine; he says such things as: 'Is it not passing brave to be a king, / And ride in triumph through Persepolis?' […] and 'That perfect bliss and sole felicity, / The sweet fruition of an earthly crown.' […] Peele seizes upon the words 'crown' and 'king' in a speech he gives to Stukley:
>
> There shall no action passe my hand or sword,
> That cannot make a step to gaine a crowne,
> No word shall passe the office of my tong.
> That sounds not of affection to a crowne.
> No thought have being in my lordly brest,
> That works not everie waie to win a crowne,

Deeds, words and thoughts shall all be as kings,
My chiefest companie shall be with kings,
And my deserts shall counterpoise a kings,
Why should not I then looke to be a king?
I am the marques now of Ireland made,
And will be shortly king of Ireland,
King of a mole-hill had I rather be,
Than the richest subject of a monarchie.
Huffe is brave minde, and never cease t'aspire,
Before thou raigne soul king of thy desire. (2.3.452)

The observations of Cheffaud and Ritchie illustrate how difficult it is for traditional scholarship to detect the hidden truth behind stylistic similarities. With Rolling Delta the Marlovian character of *The Battle of Alcazar* becomes more than obvious. The other play listed with Peele's *The Battle of Alcazar* is Peele's *David and Bethsabe*. A brief look at Table 4 reveals that this play too is stylistically equivalent to the two *Tamburlaines* (D54/ C55).

David and Bethsabe

Table 4 Attribution scheme of Peele's *David and Bethsabe*

	A	B	C	D	E	F	G
1	words	**Rolling delta attributions of**				**Scenes**	**Words**
2	0	***David and Bethsabe***					
3	250						
4	500	Window size: 5000 words					
5	750	Step size: 250 words					
6	1000	Culling value: 70 %					
7	1250					1	1199
8	1500	single-authored					
9	1750	well-attributed				2	1876
10	2000						
11	2250						
12	2500	28,8	27,2	**26,6**	29,9		
13	2750	29,0	27,6	**27,2**	30,2		
14	3000	29,5	28,3	**27,5**	31,0		
15	3250	29,3	28,1	**27,1**	30,3		
16	3500	29,1	28,0	**27,1**	29,7		
17	3750	29,5	28,1	**27,4**	29,4		
18	4000	30,5	29,3	**28,3**	30,3		
19	4250	30,7	29,5	**28,7**	31,0	3	4219
20	4500	31,5	30,3	**29,8**	31,6	4	4597
21	4750	32,0	30,7	**30,1**	31,7		
22	5000	32,4	31,2	**30,8**	32,0		
23	5250	32,4	31,1	**30,6**	31,6		
24	5500	32,0	30,6	**30,4**	31,5	5	5587
25	5750	31,7	30,4	**30,0**	30,9		
26	6000	31,4	30,0	**29,7**	30,8	6	5906

27	6250	31,0	29,7	**29,4**	30,8		
28	6500	30,7	29,2	**29,0**	30,4		
29	6750	30,9	29,6	**29,2**	30,1		
30	7000	30,9	29,2	**28,6**	30,0		
31	7250	29,8	28,2	**27,7**	29,2		
32	7500	29,7	28,2	**27,7**	29,4	7	7363
33	7750	29,6	28,0	**27,6**	29,2		
34	8000	29,6	27,8	**27,5**	28,4		
35	8250	29,6	27,8	**27,5**	28,6		
36	8500	29,6	27,7	**27,1**	28,7	8	8496
37	8750	29,2	27,4	**26,8**	28,7		
38	9000	28,6	27,3	**26,5**	28,6		
39	9250	28,8	27,2	**26,4**	29,0		
40	9500	28,9	27,5	**26,3**	29,2	9	9571
41	9750	29,1	27,8	**26,7**	29,4		
42	10000	28,7	27,6	**26,3**	29,4		
43	10250	28,2	27,1	**25,7**	28,8		
44	10500	28,3	27,0	**25,4**	28,8		
45	10750	28,2	27,3	**25,7**	29,1	10	10870
46	11000	28,3	27,4	**25,7**	28,9		
47	11250	27,7	26,8	**25,2**	28,4	11	11293
48	11500	27,6	26,8	**25,2**	28,4		
49	11750	27,7	26,9	**25,3**	28,6		
50	12000	27,9	27,3	**25,8**	29,1	12	12116
51	12250	28,8	27,7	**26,4**	29,6		
52	12500	28,6	27,4	**25,9**	29,8		
53	12750	B	C	D	E		
54	13000			**41**			
55	13250		41				
56	13500	21			20		
57	13750				%		
58	14000	B = anon. *Locrine*					
59	14250	C = Marlowe. *Tam1*					
60	14500	D = Marlowe. *Tam2*			100		
61	14750	E = Peele. *Alcazar*				13	14790

The plays stylistically next closest to the Tamburlaines (D54/ C55) are once again *Locrine* (B56) and Peele's *The Battle of Alcazar* (E56). Annaliese Connolly (2007) calculates and extensively demonstrates that Peele's *David and Bethsabe* bears traces of Marlovian influence. She sees it in line with biblical drama which according to Blistein 'as a whole seemed to interest neither the Elizabethan dramatists nor his audience' (Blistein 1970, 174). Even though Peele's *David and Bethsabe* was entered in the Stationers' Register in May 1594 its first quarto was only printed in 1599 when Peele had been dead for three years. Its performance is doubtful as Chambers reports:

> Of one other play by Peele it is difficult to take any account in estimating evidence as to staging. This is *David and Bethsabe*, of which the extant text apparently represents an attempt to bring within the compass of a single performance a piece or fragments of a piece originally written in three discourses (Chambers, vol. III, 48).

To which he adds:

> … but the provenance of *David and Bethsabe* is so uncertain and its text so evidently manipulated, that it would be very temerarious to rely upon it as affording any proof of public usage (Chambers, 118).

How the play came to the printers is not known, but when Adam Islip printed its quarto in 1599 an established pattern may have been used, namely to give the name of a deceased, but lucrative author on the title page. That it is not Marlowe's name may have to do with Thomas Beard's disastrous *The Theatre of God's Judgements* which had come out in 1597. Objections to an unbelieving atheist author writing biblical drama are only an external contradiction. Connolly confirms that 'in fact it is the king's relationship with his sons, particularly Absalom, with which the play is most concerned.' (§2) Otherwise, she maintains, it followed Marlowe's leaning towards exotic locations, charismatic protagonists and stage spectacle entirely. If we draw the findings of this section together[11] we can state that the playwright who wrote the plays *Tamburlaine* part 1 and part 2 has a strong stylistic presence in other plays of the time, namely the anonymous *Tragedy of Locrine*, Kyd's *Cornelia*, a closet play, and Peele's *The Battle of Alcazar* and *David and Bethsabe*. There is much in favour of the conjecture that Peele's plays were wrongly attributed. A confirmation is provided by the bootstrap consensus tree (see Figure 2) established from character trigrams and the files relevant to the previous analyses. The plays just referred to occupy the same branch. But it is equally noteworthy that *Dido, Queen of Carthage* is linked with Kyd's *Spanish Tragedy*, and next to *Edward II* we find Rowley's *When You See Me You Know Me*, Munday's *John a Kent and John a Cumber* and *The Massacre at Paris*. The A and B texts of *Dr. Faustus* are independent, but opposite to the two *Tamburlaines*. An interesting point is definitely the twinning of Kyd's *Cornelia* and Mary Sidney's *Marc Antony*, both English translations from Garnier's French originals.

Figure 2 Bootstrap Consensus Tree with MF3C

Figure 3 Cluster Analysis of corpus with MF3C

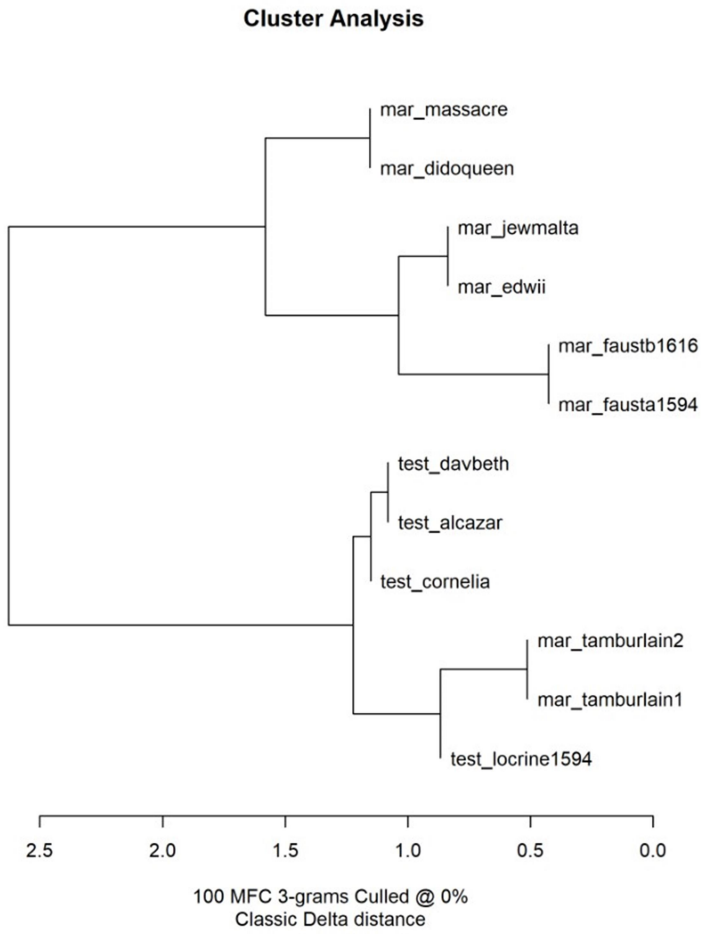


Figure 4 Multidimensional Scaling with MF3C

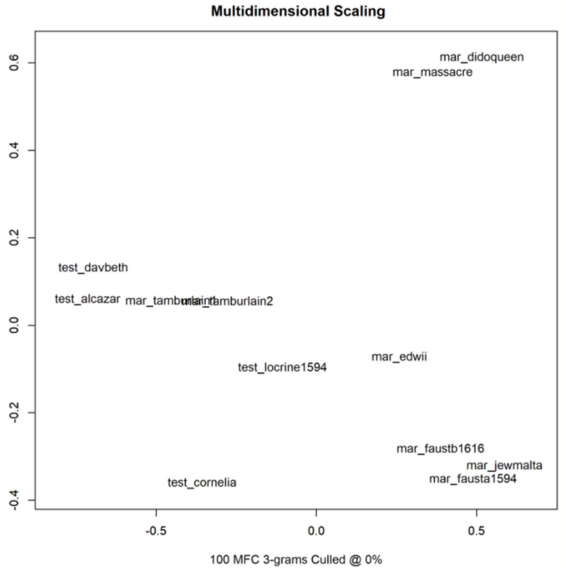
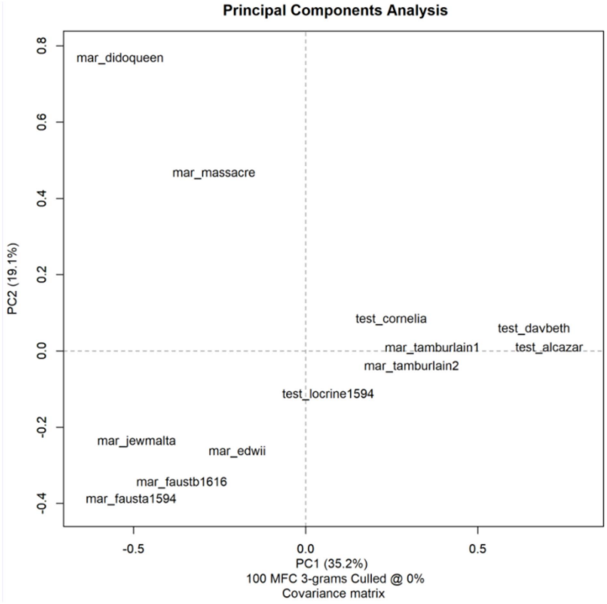


Figure 5 Principal Component Analysis of corpus



Rolling Classify Summaries

Analyses with Rolling Classify would have produced a similar space consuming list of tables as Rolling Delta. Suffice it therefore to inform that the guidelines and specifications were followed which M. Eder, M. Kestemont and J. Rybicki had laid down in their commentary file *stylo_howto.pdf*, further annotated by M. Eder's 'Rolling Stylometry' (2016, 457-469). Once again a large number of single-authored and well-attributed reference files was used, the window size was set to 8000 words and the step size was 7750 words to attune the results to Rolling Delta's evaluated text segments (smaller windows tended to produce a larger number of outliers). The classifiers *nsc* (nearest shrunken centroid), *svm* (support vector machine), and *delta* in its classic Burrowsian flavour (Eder, 2016, 460) then tested the reference corpus with words, character bigrams (mf2c) and character trigrams (mf3c) following the pattern of Table 5.

Table 5 Comprehensive arrangement of classifiers and variables

words			mf2c			mf3c		
		delete			delete			delete
nsc	svm	lta	nsc	svm	lta	nsc	svm	lta

Abbreviated author names appeared in the respective columns according to the classification results. **M** = Marlowe, G = Greene, C = Chapman, S = Shakespeare, K = Kyd, L = Lodge, R = Rowley, H = Chettle (**H**enry), P = Peele, N = Nashe, D = Dekker, J = Jonson, T = Heywood (**T**homas) and A = Marston (**A**nthony). In column P of the score (Table 6) abridged

play names are given. *Tam1 = Tamburlaine,* part 1*, Tam2 = Tamburlaine*, part 2*, Locrine = The Tragedy of Locrine, Alcazar = The Battle of Alcazar, David & B. = David and Bethsabe, Cornelia = Cornelia, Dido, Queen = Dido, Queen of Carthage, Edward II, Jew Malta = The Jew of Malta, Massacre = The Massacre at Paris, Faustus (A) = Dr. Faustus (A), Faustus (B) = Dr. Faustus (B).* It is no surprise that the classifiers do not all come to the same attribution in the various text segments, as 'they rely on substantially different mathematical kernels' (Eder, 2016, 460). But as the attribution percentages are calculated from the matrix of each play it becomes clear that there are two distinct differences in the corpora. The highest attribution percentage of each play was marked in bold white letters and a dark background, and here Marlowe is ahead in the first six plays on the list, but not so in the remaining official Marlowe corpus.

Table 6 Rolling Classify attribution percentages

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	**M**	G	C	S	K	L	R	H	P	N	D	J	T	A	%	
2	**97.4**	1.5	1.2												100	*Tam1*
3	**93.2**	0.3	6.6												100	*Tam2*
4	**55.2**	37.4			7.0	0.4									100	*Locrine*
5	**72.2**	27.8													100	*Alcazar*
6	**56.0**	6.7		29.8	7.5										100	*David&B.*
7	**45.6**	9.6		5.4	36.0				3.4						100	*Cornelia*
8	1.4	**49.8**		41.5	5.8			1.4							100	*Dido, Queen*
9	7.4	3.3	5.4	**42.5**	7.4		31.6	2.4							100	*Edward II*
10			3.9	**94.2**	1.7					0.3					100	*Jew Malta*
11	11.1	11.1		**55.6**	17.5		4.8								100	*Massacre*
12		26.2	1.6	**42.9**	27.8					1.6					100	*Faustus (A)*
13		**37.8**	3.0	19.3	4.8		1.9	2.2	3.7	7.4	6.3	13.0	0.4	0.4	100	*Faustus (B)*

N-grams and Collocations

In his recently composed paper 'Working blind, without preconceived theories of authorship' Thomas Merriam discusses in detail the usefulness of n-gram matches and refers to Mueller's dictum 'Authors are trumps' as he 'found that plays by the same known author share on average twice the number of matching n-grams as plays by different authors' (Merriam, 2018, p.1).[12] If we make use of the n-gram summaries of Rizvi that are based on 527 texts we can follow the relationships between the plays just referred to and the remaining nominal Marlowe corpus.

Table 7 Contingency table of unique and total n-grams

	A	B	C	D	E	F	G	H	I	J	K	L	M

1		866	195	225	139	70	124	77	107	85	166	*A Tam1*	Ø A-F
2	271		166	188	123	99	138	133	142	83	166	*B Tam2*	173,1
3	17	16		149	90	90	92	90	106	68	134	*C Locrine*	
4	4	12	21		104	50	60	149	73	47	152	*D Alcazar*	Ø G-K
5	10	10	4	10		43	56	61	73	41	287	*E David & B.*	99,2
6	7	6	9	6	1		56	35	59	45	72	*F Cornelia*	
7	7	7	0	1	5	6		65	91	72	152	*G Jew Malta*	
8	2	9	8	15	5	4	5		41	59	321	*H Massacre*	
9	4	4	8	2	4	5	3	4		59	165	*I Dido Queen*	112,2
10	7	8	3	4	1	2	1	5	6		97	*J Faustus*	
11	11	7	11	8	10	2	11	23	9	6		*K Edward II*	
12													
13	Ø 1-6	26,9											
14	Ø 7-11	5,7					7,3						

The contingency table is not symmetrical in the sense that the parts divided by a diagonal line from top left to bottom right contain identical information. Instead the bottom left part contains the recorded numbers of unique n-grams which are not shared with any other play whereas the total numbers of n-grams shared between two or more plays can be found at top right. The plays that have been identified by Rolling Delta, R Stylo and Rolling Classify as Marlovian can be found in column A to F and lines 1 to 6 respectively. Nominal Marlowe plays follow from lines 7 to 11 and columns G to K respectively. The conclusive information is that the average (Ø) of unique n-grams (line 13) is 26.9 for the identified Marlowe plays, but only 5.7 for the remaining Marlowe corpus (line 14). If we look at the total number of n-grams the evaluated Marlovian plays (M2) share on average 173.1 n-grams, but the un-Marlovian Marlowe corpus (M5) only 99.2. In the official Marlowe corpus (G7 to K11) unique n-grams reach an average of 7.3 (bottom left) and the total number of n-grams goes up to 112.2 (top right). There is reason to confirm Mueller's view that the number of n-grams can attest to authorship.

Another test is the number of collocations provided by Rizvi.[13] The contingency table reveals once again the difference between Marlovian plays and the nominal Marlowe corpus.

Table 8 Contingency table of collocations

	A	B	C	D	E	F	G	H	I	J	K	L	M
1		5856	2187	2374	2386	2005	1178	1390	1346	1016	2801	*A Tam1*	Ø A-F
2	5856		2517	2181	2600	2226	1307	1315	1620	1143	2422	*B Tam2*	2364
3	2187	2517		1727	2101	2127	1113	1125	1315	853	2116	*C Locrine*	
4	2374	2181	1727		2072	1344	816	1522	864	646	2521	*D Alcazar*	Ø G-K
5	2386	2600	2101	2072		1759	1042	1403	1449	819	2958	*E David & B.*	1394
6	2005	2226	2127	1344	1759		1012	913	1194	740	1873	*F Cornelia*	
7	1178	1307	1113	816	1042	1012		742	921	768	1450	*G Jew Malta*	

8	1390	1315	1125	1522	1403	913	742		709	519	2844	*H Massacre*
9	1346	1620	1315	864	1449	1194	921	709		621	1817	*I Dido Queen* 1123
10	1016	1143	853	646	819	740	768	519	621		838	*J Faustus*
11	2801	2422	2116	2521	2958	1873	1450	2844	1817	838		*K Edward II*
12												
13	Ø 1-6	2364										
14	Ø 7-11	1394					1123					

The group of plays that Rolling Delta linked stylistically with the *Tamburlaines* (1 – 6) have on average 2364 collocations in common, whereas the remaining Marlowe corpus (7 – 11) only produces 1394 collocations on average in relation to the tested Marlovian plays. On its own the Marlowe corpus has only 1123 collocations on average. The figures give a clear indication of the stylistic discrepancy between the two groups and largely confirm the findings of n-grams listings and Rolling Delta attributions.

In the next section we shall deal with plays that should reveal a relationship with plays *Tamburlaine* part 1 and part 2, very much in the way as the plays just discussed reference each other.

The absence of Marlowe in his corpus

When the remaining Marlowe plays are subjected to a totality of reference texts, any stylistic closeness should be revealed instantaneously, judging the rapid and sensitive response that Rolling Delta shows in all investigations.

Dido, Queen of Carthage

In *Dido, Queen of Carthage* (see Table 9) there is indeed an initial stylistic correlation which – with a 5000-word window – covers about 13.5% of the text.

Table 9 Attribution scheme of Marlowe's *Dido Queen of Carthage*

	A	B	C	D	E	F	G	H	I	J	J
1	words	**Rolling Delta attribution of *Dido, Queen*								**Scenes**	**Words**
2	0	***of Carthage***									
3	250										
4	500	Window size: 5000 words									
5	750	Step size: 250 words									
6	1000	Culling value: 70 %									
7	1250	Checked against 54 ref. texts									
8	1500	single-authored									
9	1750	well-attributed									
10	2000									I,1	1984
11	2250										
12	2500	26,8	27,3	27,9	27,8	25,0	**24,8**	26,6	28,9	I,2	2347
13	2750	26,7	27,2	27,8	27,8	24,8	**24,6**	26,4	29,1		

14	3000	26,5	26,9	27,5	27,2	25,7	**25,2**	26,7	28,4			
15	3250	26,4	26,2	26,8	26,7	26,0	**25,3**	26,4	27,4			
16	3500	26,1	25,7	26,3	26,5	26,6	**25,7**	26,5	26,7			
17	3750	26,6	**26,1**	26,4	26,9	27,3	26,6	26,8	26,7			
18	4000	26,9	**26,2**	26,5	27,0	27,8	27,3	26,9	26,9			
19	4250	27,1	**26,4**	26,5	26,8	28,0	27,5	27,1	26,9			
20	4500	27,2	26,5	26,5	**26,4**	28,1	27,6	27,4	27,0			
21	4750	27,4	26,5	26,4	**26,1**	28,1	27,7	27,3	26,8			
22	5000	27,1	26,0	**25,9**	26,0	28,3	27,8	26,7	26,1	II,1	4939	
23	5250	26,6	26,1	**25,6**	26,0	27,6	27,2	26,5	25,8			
24	5500	26,3	25,9	**25,3**	25,9	27,3	26,8	26,2	25,6			
25	5750	26,6	26,1	**25,6**	26,3	28,0	27,1	26,4	25,8			
26	6000	26,5	25,9	**25,1**	26,2	28,1	27,4	26,5	25,4			
27	6250	26,3	25,9	**24,9**	25,9	28,4	27,7	26,6	25,1	III,1	6301	
28	6500	26,4	25,7	**24,9**	25,7	28,6	28,0	26,8	25,0			
29	6750	26,8	25,8	24,8	25,7	29,5	28,9	27,2	**24,5**			
30	7000	26,7	25,5	24,5	25,7	29,7	28,8	27,2	**24,1**	III,2	7082	
31	7250	26,8	25,6	24,7	25,8	29,7	28,8	27,1	**24,2**			
32	7500	26,8	25,4	24,4	25,6	29,6	28,6	27,1	**24,0**			
33	7750	26,7	25,5	24,4	25,7	29,3	28,4	27,5	**24,4**	III,3	7765	
34	8000	25,9	25,3	**24,0**	25,6	28,4	27,4	27,2	24,9			
35	8250	25,9	25,2	**23,9**	25,3	27,7	26,9	26,9	24,6	III,4	8270	
36	8500	26,1	25,2	**23,9**	25,4	27,7	26,7	26,6	24,6	IV,1	8545	
37	8750	26,2	25,3	**23,6**	25,3	27,9	27,1	26,3	24,1			
38	9000	26,1	25,4	**23,7**	25,5	27,9	27,0	26,5	24,0	IV,2	8979	
39	9250	26,1	25,0	**23,5**	25,4	27,9	27,0	26,4	23,5			
40	9500	26,4	25,2	23,7	25,9	28,1	27,3	26,3	**23,3**	IV,3	9409	
41	9750	26,5	25,9	23,9	26,4	29,1	28,3	26,9	**23,4**			
42	10000	27,2	26,5	24,3	26,9	29,6	28,9	27,6	**23,7**			
43	10250	27,3	26,2	24,5	26,8	30,0	29,1	27,8	**23,9**			
44	10500	27,5	26,9	24,7	27,3	30,8	29,8	28,1	**24,5**			
45	10750	27,3	26,7	24,9	27,4	30,3	29,4	27,9	**24,9**	IV,4	10713	
46	11000	27,4	26,8	25,4	28,0	30,6	29,7	27,9	**25,1**	IV,5	11019	
47	11250	27,4	27,0	25,3	28,1	31,1	30,2	28,4	**25,3**			
48	11500	27,8	27,1	**25,1**	28,1	31,5	30,2	28,8	25,4			
49	11750	B	C	D	E	F	G	H	I			
50	12000		**3**	**14**	**2**		**5**		**13**			
51	12250		2	17	1	4			13			
52	12500	2	24	1	6		1	2	1			
53	12750								%			
54	13000	B = Greene. *Friar Bacon and …*										
55	13250	C = Greene. *Orlando*						3	8,1			
56	13500	D = Kyd. *Soliman and Perseda*						14	37,8	V,1	13598	
57		E = Kyd. *The Spanish Tragedy*						2	5,4			
58		F = Marlowe. *Tamburlaine 1*										
59		G = Marlowe. *Tamburlaine 2*						5	13,5			
60		H = Nashe. *Summers Last Will*										

61 I = Shakespeare. *Romeo and …* 13 35,1

Marlowe seems to have started the play, but then it is only Kyd and Shakespeare whose styles dominate *Dido*. It may well be that Marlowe borrowed from Greene who often complained about plagiarism. The important point, however, is the all too extensive absence of Marlowe, and also Nashe, whose name was given as co-author on the title page of the 1594 quarto. Discussing methods used by protagonists of the Shakespeare authorship question Refat Aljumily commented in his methodology chapter on corpus problems:

> *Dido, Queen of Carthage*, is at best a collaboration between Christopher Marlowe and Thomas Nashe, though scholars have typically sought to limit Nashe's involvement. It is therefore, at the least, a contested play and cannot be used to generate Marlowe's profile.

Price reminds us of some peculiarities that *Dido* has in comparison with the remaining Marlowe corpus. Printed in 1594, it was not reprinted, 'and there is no evidence that it was revived' (p. 41). Furthermore it was 'Played by the Children of her Maiesties Chappell' as the title page testifies, and this would be suggestive of a date in the 1580s, more precise in 1588 as Wiggins claimed. Price assumes that *Dido* owes more to the repertoire of boy companies and their tradition of indoor, hall theatres than to adult companies and their outdoor playhouses (49). If that is so then Marlowe becomes an unlikely candidate for the complete authorship of *Dido*.

Edward II

Edward II is perhaps the most interesting play that carries Marlowe's name, as it has also contributed fundamentally to crediting Marlowe with the co-authorship of *3 Henry VI*. Table 10 returns mainly the influence of Kyd and Shakespeare, followed by Rowley. In preliminary tests Peele's *Edward I* claimed more than 40 % of all measured windows. Munday's *The Downfall of Robert Earl of Huntington* and Lodge's *A Looking Glass for London and England* were also recorded. But then it became obvious that these plays were not single-authored, and some 60 % of the *Edward I* windows were returned as writings by Greene. Accordingly the z-scores arising from this text could not yield reliable figures. Those could only come from single-authored and well-attributed plays.

Table 10 Attribution scheme of Marlowe's *Edward II*

	A	B	C	D	E	F	G	H	I	J	K	L
1	words	**Rolling delta attributions of**									**Scenes**	**Words**
2	0			***Edward II***								
3	250											
4	500			Window size: 5000 words								

5	750		Step size: 250 words										
6	1000		Culling value: 70 %										
7	1250		single-authored										
8	1500		well-attributed									I.1	1590
9	1750												
10	2000											I.2	2218
11	2250											I.3	2256
12	2500	29,7	27,9	**25,7**	31,3	30,5	27,1	25,8	26,8	28,5			
13	2750	29,3	27,8	25,9	31,2	30,4	27,0	**25,9**	27,2	28,7			
14	3000	29,7	28,0	**26,3**	31,6	30,8	27,0	26,4	27,6	29,1			
15	3250	29,1	27,4	25,9	31,2	30,5	26,7	**25,7**	27,4	28,5			
16	3500	28,9	27,2	26,0	31,3	30,3	26,6	**25,4**	27,4	28,0			
17	3750	29,0	27,2	25,8	31,2	30,4	26,5	**25,2**	27,4	27,8			
18	4000	29,0	27,2	26,2	31,3	30,7	26,1	**25,2**	27,4	27,7			
19	4250	28,9	27,1	26,1	31,6	30,7	26,0	**24,9**	27,2	27,5			
20	4500	27,9	27,2	25,6	31,5	30,6	25,2	**24,4**	26,3	26,4			
21	4750	27,7	27,1	25,6	31,0	30,2	25,3	**24,0**	25,8	26,1			
22	5000	28,1	27,5	26,2	31,2	30,4	25,2	**24,1**	26,1	25,9			
23	5250	28,2	26,6	26,0	30,3	29,4	25,5	**24,3**	26,1	26,6			
24	5500	28,1	26,4	25,7	29,9	29,2	25,5	**24,2**	25,8	26,6		I.4	5597
25	5750	27,8	26,4	25,7	30,4	29,8	25,3	**24,0**	25,6	26,7			
26	6000	27,7	26,2	25,6	30,1	29,5	25,1	**23,8**	25,5	26,8			
27	6250	27,7	26,3	26,3	30,0	29,5	25,1	**24,1**	25,4	27,0		II.1	6250
28	6500	27,7	26,1	26,4	29,7	29,2	25,1	**23,8**	25,3	27,0			
29	6750	27,0	25,9	26,3	29,0	28,3	25,1	**23,6**	25,2	26,7			
30	7000	26,8	26,2	26,4	29,0	28,6	25,1	**24,0**	25,1	27,0			
31	7250	26,8	26,2	26,4	29,3	28,9	25,2	**24,0**	25,1	27,3			
32	7500	26,7	26,6	26,6	29,6	29,3	25,0	**24,1**	25,1	27,2			
33	7750	27,2	26,9	26,7	29,8	29,6	25,3	**24,5**	25,2	27,7			
34	8000	27,0	26,8	26,6	29,3	29,2	25,1	**24,3**	24,6	27,2			
35	8250	27,5	26,9	26,6	29,4	29,4	25,1	**24,6**	25,0	27,4		II.2	8244
36	8500	28,1	27,5	26,8	29,4	29,6	25,7	**25,3**	25,4	28,2		II.3	8463
37	8750	28,5	27,7	27,6	29,2	29,3	**25,9**	26,0	26,0	28,9			
38	9000	28,2	27,7	27,3	28,4	28,8	**26,0**	26,1	26,2	29,2		II.4	8993
39	9250	28,2	27,8	27,5	28,5	28,8	**26,1**	26,5	26,5	29,7			
40	9500	28,4	27,8	28,0	28,2	28,4	**26,3**	26,9	26,9	30,3			
41	9750	28,5	27,7	27,9	27,8	28,1	**26,6**	26,8	26,8	30,4		II.5	9842
42	10000	28,4	27,5	28,0	27,6	28,0	**26,9**	27,3	27,1	30,9		III.1	9994
43	10250	28,6	28,0	28,2	28,8	29,3	**26,7**	27,4	27,4	30,9			
44	10500	28,6	28,4	28,7	29,3	29,7	**26,8**	27,8	27,9	31,3			
45	10750	28,9	28,8	29,0	29,2	29,8	**27,3**	27,9	28,4	31,4			
46	11000	29,4	29,4	29,8	29,7	30,0	**28,0**	28,6	29,0	32,0			
47	11250	29,4	29,3	30,0	29,4	29,6	**28,1**	28,6	29,4	31,9		III.2	11401
48	11500	29,7	29,6	30,1	29,4	29,8	**28,6**	29,0	29,9	32,4		III.3	11664
49	11750	29,5	29,4	30,0	29,3	29,7	**28,5**	28,7	29,6	32,2			
50	12000	29,6	29,4	30,5	29,4	29,5	**28,8**	29,2	29,9	32,6		III.4	12129
51	12250	29,1	29,2	30,4	29,2	29,1	**28,7**	28,9	29,7	32,3		IV.1	12253

52	12500	28,7	28,8	30,1	28,6	**28,3**	29,1	28,7	29,6	32,1		
53	12750	28,2	28,6	29,7	28,3	28,1	28,3	**28,1**	29,2	31,4		
54	13000	**28,1**	28,5	29,7	28,9	28,3	28,4	28,3	29,3	31,8	IV.2	12955
55	13250	**27,5**	27,9	28,9	28,4	27,7	28,0	27,8	29,2	31,4	IV.3	13382
56	13500	**27,2**	27,8	28,6	28,4	27,5	27,8	27,4	28,9	31,1	IV.4	13611
57	13750	**26,9**	27,6	28,0	28,6	27,6	27,7	27,0	28,6	30,7		
58	14000	26,8	27,4	27,4	29,1	27,5	27,4	**26,4**	28,3	30,4		
59	14250	26,2	27,3	26,8	29,0	27,5	27,2	**25,7**	28,0	29,8	IV.5	14304
60	14500	26,0	27,2	26,4	29,4	27,8	26,9	**25,5**	27,6	29,3		
61	14750	25,6	27,1	26,0	29,5	28,0	26,3	**25,3**	27,6	29,0		
62	15000	24,9	26,7	25,1	29,1	27,8	25,5	**24,4**	26,8	28,0		
63	15250	25,6	27,2	25,2	29,5	28,2	25,9	**24,9**	27,4	28,6	IV.6	15230
64	15500	25,2	26,8	24,7	29,0	27,7	25,6	**24,7**	27,2	28,3		
65	15750	25,4	26,9	**24,1**	29,2	27,7	25,5	24,4	27,1	28,2		
66	16000	25,1	26,9	**23,2**	29,3	27,7	24,9	23,7	26,5	27,5		
67	16250	24,9	26,8	**23,3**	29,6	28,0	24,5	23,7	26,4	27,2		
68	16500	24,7	27,0	**23,5**	30,2	28,7	23,9	23,6	26,2	26,9	V.1	16455
69	16750	24,8	27,0	**23,3**	30,5	28,9	23,7	23,9	26,2	26,6		
70	17000	25,3	27,5	23,8	31,3	29,7	23,8	**23,6**	25,9	26,4		
71	17250	26,2	27,8	**24,0**	31,8	30,1	24,2	24,1	26,2	26,9	V.2	17387
72	17500	26,7	28,5	**24,5**	32,3	30,7	24,7	24,6	26,4	27,1		
73	17750	26,9	28,5	**24,5**	32,2	30,6	24,7	24,6	26,3	26,9		
74	18000	27,6	29,2	**24,3**	32,6	31,1	25,5	24,8	26,6	27,4	V.3	17917
75	18250	27,6	29,7	**24,8**	33,3	31,6	25,6	25,1	26,1	27,3		
76	18500	B	C	D	E	F	G	H	I	J		
77	18750	**4**		**12**		**1**	**15**	**32**			V.4	18833
78	19000	5		6	1	3	16	25	8			
79	19250	4	3	12	2	2	18	7	15	1		
80	19500									%		
81	19750	B =	Chettle. *Hoffman, or …*						4	6,3	V.5	19791
82	20000	C =	Greene. *Friar Bacon and Friar …*									
83	20250	D =	Kyd. *The Spanish Tragedy* (pure)						12	18,8		
84	20500	E =	Marlowe. *Tamburlaine 1*								V.6	20596
85		F =	Marlowe. *Tamburlaine 2*						1	1,6		
86		G =	Rowley. *When You See Me …*						15	23,4		
87		H =	Shakespeare. *Hamlet*						32	50,0		
88		I =	Shakespeare. *King Lear*									
89		J =	Shakespeare. *The Winters Tale*									

The *Tamburlaines* are noted around IV.2 with only 1.6 % of all window attributions, whereas some 70 % refer to Kyd and Shakespeare. This is quite telling in relation to *3 Henry VI* where *Edward II* played an important role in erroneously attributing part of the play to Marlowe.

The Jew of Malta

Likewise *The Jew of Malta* cannot be counted among the plays that resemble the *Tamburlaines* which can be seen in Table 11 .

Table 11 Attribution scheme of Marlowe's *The Jew of Malta*

	A	B	C	D	E	F	G	H	I	J	K	L
1	words	**Rolling delta attributions of**									**Scenes**	**Words**
2	0		***The Jew of Malta***									
3	250										P	278
4	500		Window size: 5000 words									
5	750		Step size: 250 words									
6	1000		Culling value: 70 %									
7	1250		single-authored									
8	1500		well-attributed									
9	1750											
10	2000											
11	2250			Shakespeare								
12	2500	25,7	**23,7**	25,1	25,9	31,3	27,4	26,9	29,0	25,9		
13	2750	25,9	**24,5**	25,1	26,2	31,9	27,6	27,0	29,4	26,1		
14	3000	25,9	**25,0**	25,4	26,2	31,9	27,6	27,3	29,4	26,0		
15	3250	25,3	24,8	**24,7**	25,4	31,3	26,9	26,6	28,8	25,6		
16	3500	25,4	24,9	**24,7**	25,5	31,5	26,9	26,7	28,8	25,7		
17	3750	25,2	24,9	**24,3**	25,0	30,9	26,4	25,9	28,3	25,3		
18	4000	25,2	24,9	**24,0**	24,6	30,6	26,2	25,7	28,0	25,0		
19	4250	24,7	24,8	**23,6**	24,1	30,4	25,4	25,0	27,6	24,3		
20	4500	24,8	24,7	**23,9**	24,0	29,9	25,5	24,5	27,3	24,0	I.1	4611
21	4750	24,8	24,7	24,1	**23,7**	29,9	25,4	24,3	26,9	24,1		
22	5000	24,4	23,9	24,0	**23,6**	29,6	25,4	24,3	27,3	24,1		
23	5250	24,7	24,2	23,6	**23,4**	29,0	25,0	24,0	26,7	23,6		
24	5500	24,4	24,2	23,6	**23,5**	28,7	24,9	23,9	27,0	23,8		
25	5750	24,7	25,0	23,5	**23,4**	27,9	24,4	23,7	26,4	24,1		
26	6000	24,9	25,5	23,9	**23,4**	27,6	24,4	23,5	26,5	24,3		
27	6250	25,1	26,0	23,5	**23,1**	26,7	23,3	23,1	25,7	23,9		
28	6500	25,4	26,2	23,4	23,2	26,5	23,2	**22,9**	25,8	23,8		
29	6750	25,4	26,2	23,5	23,3	26,4	23,2	**22,8**	26,1	23,7		
30	7000	24,9	26,0	23,4	23,4	26,6	23,1	**22,6**	26,3	23,6		
31	7250	24,9	26,4	23,6	23,4	26,8	23,3	**22,9**	26,3	23,9		
32	7500	25,0	26,7	23,7	23,4	27,1	23,3	**22,6**	26,2	23,8		
33	7750	24,9	26,8	23,9	23,8	26,8	23,2	**22,6**	26,1	23,9		
34	8000	25,0	27,6	24,7	24,4	27,0	23,7	**22,6**	26,4	24,5		
35	8250	25,9	28,4	25,3	24,7	27,4	24,0	**23,6**	26,8	24,7		
36	8500	25,5	28,4	24,8	24,2	27,1	23,5	**23,4**	26,4	24,5	II.1	8568
37	8750	24,7	27,7	24,1	23,7	26,8	23,1	**22,8**	25,9	23,7		
38	9000	24,4	28,2	24,5	24,0	27,1	23,4	**23,2**	26,6	24,1		
39	9250	24,5	28,3	24,7	24,3	27,3	23,6	**23,3**	26,8	24,7		
40	9500	24,3	28,4	25,0	24,8	27,7	23,9	**23,7**	27,3	25,1		
41	9750	24,0	27,5	24,7	24,8	27,1	23,6	**23,1**	27,1	24,8		
42	10000	25,1	28,8	25,3	25,2	27,2	23,7	**23,3**	27,0	24,9		

43	10250	25,1	28,9	25,4	25,3	27,4	23,8	**23,5**	27,4	25,0			
44	10500	25,3	29,1	25,7	25,4	27,5	24,2	**23,3**	27,2	25,1			
45	10750	25,2	28,7	25,2	24,9	27,1	23,8	**22,7**	26,7	24,7			
46	11000	24,8	27,7	24,1	24,2	26,4	23,0	**22,3**	25,8	23,9	III.1	11107	
47	11250	24,6	27,4	23,8	23,9	26,2	22,9	**22,1**	25,6	23,4			
48	11500	24,3	27,1	23,5	23,3	25,8	22,8	**22,2**	25,2	23,2			
49	11750	24,2	27,4	23,3	23,4	25,5	22,6	**22,4**	24,9	23,4			
50	12000	24,7	27,5	23,7	23,6	25,4	22,6	**22,4**	24,9	23,7			
51	12250	25,5	28,0	24,4	23,9	25,4	**22,6**	22,9	24,9	24,2			
52	12500	26,4	28,6	25,1	24,7	25,5	**23,1**	23,5	25,5	25,2			
53	12750	27,1	28,7	25,3	24,9	25,3	**23,5**	23,8	25,5	25,2			
54	13000	27,7	28,8	25,2	25,2	25,4	**23,7**	24,3	25,6	25,5			
55	13250	27,8	29,0	25,4	25,7	25,4	**23,7**	24,5	25,6	25,7			
56	13500	28,0	29,4	25,6	25,8	25,4	**23,9**	24,5	25,6	26,0			
57	13750	28,4	29,6	26,0	26,0	26,3	**24,4**	25,1	26,0	26,7			
58	14000	28,3	29,0	25,9	25,9	26,2	**24,3**	25,0	25,9	26,3			
59	14250	27,8	28,7	25,5	25,4	26,4	**24,1**	24,6	25,4	26,0			
60	14500	28,3	29,1	25,7	25,6	26,5	**24,0**	25,2	25,3	26,1			
61	14750	27,6	29,3	25,5	25,5	27,0	**24,1**	25,1	25,3	26,1			
62	15000	27,1	28,8	25,4	25,7	26,9	**24,3**	24,9	25,6	26,1	IV.1	14906	
63	15250	26,4	28,2	25,0	25,5	27,1	**24,5**	24,6	25,6	26,1			
64	15500	26,2	27,9	25,2	25,3	27,2	**24,8**	25,0	26,0	26,1			
65	15750	26,2	27,9	25,6	25,4	27,9	25,4	**25,4**	26,6	26,3			
66	16000	26,0	28,4	26,1	**25,6**	28,8	26,1	25,7	27,2	26,8			
67	16250	B	C	D	E	F	G	H	I	J			
68	16500		**3**	**6**	**8**		**14**	**24**					
69	16750		4	7	4		23	17					
70	17000	8	1	8	16	2	2	1	3	14			
71	17250									%			
72	17500	B =	Kyd. *Soliman and Perseda*										
73	17750	C =	Nashe. *Summers Last Will…*						3	5,5			
74	18000	D =	Shakespeare. *Hamlet*						6	10,9	V.1	17890	
75		E =	Shakespeare. *King Lear*						8	14,5			
76		F =	Shakespeare. *Much Ado …*										
77		G =	Shakespeare. *Othello*						14	25,5			
78		H =	Shakespeare. *Romeo and …*						24	43,6			
79		I =	Shakespeare. *Twelfth Night*										
80		J =	Shakespeare. *Winters Tale*										

The 5000-word window and character trigrams results in a clear Shakespeare reference which is also confirmed by Rolling Classify (see: "Brief Survey of the Marlowe corpus assessments" (2019), http://www.shak-stat.engsem.uni-hannover.de/surveymarlowegreene.pdf, p. 3) and Table 6 (D10). It is no wonder that Refat Aljumily reaches the following verdict in his description of corpus problems.

> *The Jew of Malta* was printed in 1633, long after Marlowe's death, because it was revived for Caroline performance. The 1633 quarto includes two prologues and an epilogue added by Thomas Heywood, and unclear whether further revisions were made to Marlowe's text. Even if the prologues and epilogue are removed, the authenticity of the text remains in doubt. (3.1 Corpus)

Rolling Delta in its selection of suitable windows did not detect Heywood, neither at the beginning nor at the end of the play. Prologue and epilogue would be too small to register anyway. The obvious fact, despite Rolling Delta's sensitivity, is the absence of other Marlowe references. However, there is a pattern in the history of the play that applies to *Edward II* too. Both plays are first linked with Lord Strange's Men. When the theatres were closed during the plague in 1592 and 1593, an amalgamation of actors from the Admiral's and Strange's Men toured the country under the auspices of Lord Pembroke (Chambers, vol. II, p. 128-131). One of their members is very likely to have been William Shakespeare. Even though the plague rendered travelling imperative (p. 129) both tours were a financial disaster as Henslowe wrote to Alleyn on 28 September 1593 (p. 128).[14] The company had to sell all their assets. Among the plays they performed on their tour were *Edward II* and *The Taming of a Shrew*. Knutson reports that 'an entry in the Stationer's Register on 6 July 1593 indicates that the publisher William Jones had acquired a copy of *Edward II* a week or more before the company returned to London' (36) and she asks why Marlowe did trade with Pembroke's and did not take his business to Alleyn, who 'was with Strange's Men at the Rose in the summer of 1592, playing (and owning) *Jew of Malta*.' (36) She also adds that Strange's acquired *The Massacre at Paris* in January 1593 and constructs commercial competition between Pembroke's *Edward II* on the one hand and *The Jew of Malta* and *The Massacre at Paris* in the repertory of Strange's Men. In the process of transferring the rights of plays to other companies Henslowe's Admiral's Men got hold of *Edward II* and *The Jew of Malta*. *The Taming of a Shrew*, together with *Richard III* and *The Contention* eventually went to the Lord Chamberlain's Men, a company reconstituted from Lord Strange's Men. It may have been Henslowe who gave Marlowe as the author of the plays, in order to secure his claims, and the name of a recently deceased playwright was more than convenient. The delinking of the plays may also have been furthered in February 1594 as Chambers records:

> Alarmed at the further inhibition of plays in February, they [Strange's Men] allowed the revised *Titus* and unrevised texts of *The Taming of A Shrew* and *The Contention* to get into the hands of the booksellers.

It looks very much as if the end of the amalgamation of Strange's and Admiral's was the watershed of plays going one way or the other. The relevant conjecture, however, is that these two plays that have no stylistic correlation to the *Tamburlaines,* were handed down to

posterity as Marlowe's plays due to their having been claimed by Henslowe and his Admiral's Men or / and by the impact of the book trade focussing on lucrative names.

The Massacre at Paris

The play was most probably performed on 26 January 1593 under the title *The Tragedy of the Guise* by the Lord Strange's Men before it was taken over by the Admiral's Men in 1594. Even though it is a basic rule in applications of Rolling Delta to rely only on single-authored and well-attributed plays the following table is an exception. It contains *Edward II* and the B text of *Dr. Faustus* as reference texts and returns *Edward II* as stylistically closest play. Following the line of argument that Burrows and Craig had laid down in their determination of *3 Henry VI* this would have been a clear proof of Marlowe authorship.

Table 12 Attribution scheme of Marlowe's *The Massacre at Paris*

	A	B	C	D	E	F	G	H
1	words	**Rolling delta attributions of**					**Scenes**	**Words**
2	0	***The Massacre at Paris***						
3	250							
4	500	Window size: 5000 words					1	449
5	750	Step size: 250 words						
6	1000	Culling value: 70 %						
7	1250						2	1253
8	1500						3	1538
9	1750							
10	2000						4	2063
11	2250							
12	2500	27,6	**26,6**	28,2	28,2	27,9	5	2568
13	2750	27,0	**26,5**	27,7	28,5	27,8	6	2665
14	3000	26,9	**26,3**	27,8	28,3	27,8		
15	3250	27,1	**26,2**	27,8	28,3	27,9	7	3342
16	3500	27,1	**26,1**	28,3	28,1	27,9	8	3572
17	3750	27,7	**26,3**	28,7	28,1	28,3	9	3930
18	4000	27,8	**26,3**	28,4	28,0	28,3	10	3987
19	4250	27,9	**26,3**	28,3	27,9	28,3		
20	4500	27,9	**26,3**	28,3	27,8	28,3	11	4400
21	4750	28,3	**26,6**	28,9	28,3	28,8		
22	5000	28,4	**26,9**	29,1	28,4	29,1	12	4944
23	5250	27,9	**26,3**	28,9	27,8	28,5	13	5275
24	5500	28,4	**26,6**	29,5	28,4	29,4	14	5641
25	5750	28,3	**26,6**	29,7	28,7	29,6		
26	6000	28,4	**26,3**	29,6	28,6	29,5	15	6005
27	6250	28,1	**26,6**	29,6	28,9	29,5	16	6158
28	6500	27,9	**26,5**	29,4	28,7	29,3		
29	6750	28,2	**26,5**	29,7	28,6	29,5		
30	7000	28,1	**26,7**	29,4	28,5	29,2	17	6954
31	7250	B	C	D	E	F	18	7183

32	7500		19					
33	7750	15			4			
34	8000	4		2	10	3		
35	8250					%	19	8432
36	8500	B = Kyd. Spanish Tragedy					20	8547
37	8750	C = Marlowe. Edward II				100	21	8807
38	9000	D = Marlowe. Dr. Faustus (B)						
39	9250	E = Rowley. When You …						
40	9500	F = Shakespeare. Hamlet						
41	9750						22	9684

But Pervez Rizvi provides a remarkable link between *Edward II* and *The Massacre at Paris* in accounting for the rank and length of n-grams and matches of collocations.

Table 13 Extract from Pervez Rizvi's Edward the Second: N-gram Search Results

RANK	N-GRAM length	TEXT	TEXT IN MATCHING PLAY	MATCHING PLAY	NO. OF PLAYS FOUND IN
1	6	thy crazed buildings, and enforce **The papal towers, to kiss the** lowly ground, With slaughtered priests	his I'll buildings and incense, **The papal towers to kiss the** holy earth. Navarre, give me	The Massacre at Paris [1593]	2
9	8	me down, **Come** Edmund **let's away, and levy men, 'Tis war that must** abate these baron's **pride**. Exit	thousand men. **Come let us away and levy men, 'Tis war that must** assuage this tyrant's **pride**. friar. My	The Massacre at Paris [1593]	2
73	3	take away his weapons. Mor. Thou **proud disturber** of thy country's peace, Corrupter of	these our wars: Against the **proud disturbers** of the faith, I mean the	The Massacre at Paris [1593]	3
152	8	call you these Qu. My gracious **lord, I come to bring you news**. Edw. That you have parled with your	Guise. Enter the Friar. friar. My **Lord, I come to bring you news**, that your brother the Cardinal of	The Massacre at Paris [1593]	2
153	8	there, is't you? Mor. Nay, stay **my lord, I come to bring you news**, Mine uncles taken prisoner by	noble Guise. Enter the Friar. friar. **My Lord, I come to bring you news**, that your brother the Cardinal	The Massacre at Paris [1593]	2
198	4	is, And still his mind **runs on his minion**. Lan. My Lord. Edw. How now, what	pleasantness? His mind you see **runs on his minions,** And all his heaven is	The Massacre at Paris [1593]	2
279	4	my lord, right will prevail. Spen. fa. '**Tis not amiss my** liege for either part, To	like not this friar's look. '**twere not amiss my** Lord, if he were searched.	The Massacre at Paris [1593]	2
289	3	come too late, Edward, alas **my heart relents** for thee, Proud traitor Mortimer	justly challenge their protection: Besides **my heart relents** that noble men, Only corrupted	The Massacre at Paris [1593]	2
290	3	come too late, Edward, alas **my heart relents** for thee, Proud traitor Mortimer	To make the justice of **my heart relent**: Tue, tue, tue, let none	The Massacre at Paris [1593]	2
489	5	live and be beloved, 'Tis **hard**	of France, It will be **hard for us**	The Massacre	2

		for us to work his overthrow. War. Mark you but	**to work their** deaths. Be gone, delay	at Paris [1593]	
584	5	with venom of ambitious pride, Will be **the ruin of the realm** and us. Enter	Guise I fear me much will be, **The ruin of that** famous **Realm** of France:	The Massacre at Paris [1593]	2
585	5	see your love to Gaveston, Will be **the ruin of the realm** and you, For	Guise I fear me much will be, **The ruin of that** famous **Realm** of France:	The Massacre at Paris [1593]	2
610	3	seal, To gather for him **throughout the realm**. Lan. Your minion Gaveston hath taught	head again, And disperse themselves **throughout the Realm** of France, It will be	The Massacre at Paris [1593]	3
702	5	horse. Lan. My lord, will **you take arms against the king**? Bish. What need I, God himself	France, That the Guise **hath taken arms against the King**, And that Paris is revolted	The Massacre at Paris [1593]	2
822	5	see thou shalt not want. Bald. **I humbly thank your majesty**. Edw. Knowest thou him Gaveston? Gau. I	hold take thou this reward. Pothe. **I humbly thank your Majesty**. Exit Po. Old Qu. methinks the gloves	The Massacre at Paris [1593]	3
905	3	my speech. Bish. Why are **you moved, be patient** my lord, And see what	the D. of Guise is **moved.** King. **Be patient** Guise and threat not Epernoune,	The Massacre at Paris [1593]	2
1095	3	seest by nature he is **mild and calm,** And seeing his mind so	And Epernoune though I seem **mild and calm**, Think not but I am	The Massacre at Paris [1593]	3

In 15,601 ranking positions there are 101 mentions of *The Massacre at Paris*, a ratio of 0.647, but among the rankings just listed *The Massacre* turns up 17 times, a ratio of 1.55. Furthermore there are 23 unique matches between *Edward II* and *The Massacre* (see Table 7 , H11), a top number that is surpassed only by Peele's *Edward I* with 28 matches (not displayed here). Nominally all these figures would have been in favour of Marlowe because of their traditional scholarship attributions, the beginning of a catena followed by other doubtful attributions.

When a validated reference list was used a clear preference for George Chapman became visible as shown in the brief summary of attributions.

Table 14 Evaluation section of attribution table

31	7250	B	C	D	18	7183
32	7500	**18**				
33	7750		16	2		
34	8000		2	16		
35	8250	100%			19	8432
36	8500	*Bussy d'Ambois*			20	8547
37	8750		*The Revenge of*		21	8807
38	9000		*Bussy d'Ambois*			
39	9250			*Spanish*		

40	9500	*Tragedy*		
41	9750		22	9684

The lowest deltas are given back by Chapman's *Bussy d'Ambois* and *The Revenge of Bussy d'Ambois*. Chapman finished Marlowe's poem *Hero and Leander* (printed 1598) and in theory, considering his age, it is possible that he wrote *The Massacre*. But his biography and the period when *The Massacre* was written do not really match, and the reference texts that cover the crucial period return the following attributions.

Table 15 Evaluation section of attribution table (single-authored plays only)

31	7250	B	C	D	E	18	7183
32	7500	15		4			
33	7750	4		10	5		
34	8000		3	2	14		
35	8250					19	8432
36	8500	B = Kyd. Spanish Tragedy				20	8547
37	8750	C = Marlowe. Tamburlaine 2				21	8807
38	9000	D = Rowley. When You …					
39	9250	E = Shakespeare. Hamlet					
40	9500						
41	9750					22	9684

Kyd references are dominant, followed by Rowley. Only three third-lowest delta values out of nineteen measured 5000-word windows have a link with *Tamburlaine 2*. It is therefore indispensable to record that in the testing of reference texts the elimination of Chapman's plays due to Rizvi's database brought about an uncontested stylistic similarity to *Edward II*.

Doctor Faustus

In comparison with *Edward II,* probably Marlowe's most famous play, *Doctor Faustus* is less prominent as far as the ranking and length of n-grams and matches of collocations are concerned. All in all there are only 32 occurrences and within the range of the rankings listed above *Doctor Faustus* has only 1 count. This is far below what is required to account for what Dr Barber has called diversity of style (Barber, p.2). This is a discrepancy as the following discussion of Rolling Delta results proves and as Refat Aljumily assesses the situation.

> *Doctor Faustus* exists in two early versions (1604 and 1616), both printed long after Marlowe's death and known to have been subjected to revision by other hands (Henslowe's Diary records payments made for them). It is therefore not exclusively Marlowe's, and cannot be included to generate his authorial profile. (2015, p. 765)

Table 16 Attribution scheme of Marlowe's *Doctor Faustus* (A text 1604)

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	words	**Rolling delta attributions of**										**Scenes**	**Words**
2	0			**Dr. Faustus (1604)**									
3	250												

4	500		Window size: 5000 words											
5	750		Step size: 250 words											
6	1000		Culling value: 70 %											
7	1250		single-authored										I,1	1183
8	1500		well-attributed										I,2	1511
9	1750													
10	2000													
11	2250												I,3	2340
12	2500	25,5	26,6	25,1	25,6	**24,4**	25,9	27,4	28,0	27,4	29,0			
13	2750	26,2	26,7	25,4	26,1	**25,1**	26,4	27,6	28,1	27,4	29,4			
14	3000	26,1	26,6	25,4	26,4	**25,1**	26,2	27,5	27,6	27,0	29,1		I,4	2971
15	3250	26,0	26,5	**25,2**	26,5	25,4	26,1	27,2	27,3	26,5	28,5			
16	3500	26,4	26,5	**25,7**	26,8	26,0	26,0	27,3	27,2	26,4	28,4			
17	3750	26,4	26,4	**25,3**	26,6	26,0	25,8	27,0	26,8	25,8	28,1			
18	4000	26,3	26,3	**25,1**	26,4	25,5	25,7	26,8	26,9	25,6	28,2			
19	4250	27,0	26,5	**25,7**	26,8	25,8	26,4	27,2	27,2	26,1	28,7			
20	4500	26,7	26,0	25,7	27,0	25,8	26,2	27,0	26,8	**25,3**	28,2		II,1	4319
21	4750	26,6	25,2	26,0	27,2	25,9	26,1	26,7	26,5	**25,0**	27,6			
22	5000	26,2	24,8	26,0	27,0	25,6	25,9	26,4	26,1	**24,7**	27,3			
23	5250	26,0	25,0	25,8	26,8	25,4	25,9	26,5	26,3	**24,9**	27,5			
24	5500	25,6	24,7	25,1	26,2	24,9	25,4	26,3	26,0	**24,5**	27,2		II,2	5713
25	5750	25,4	24,7	25,1	25,8	25,1	25,2	26,2	25,9	**24,4**	26,9		II,3	5792
26	6000	24,5	24,1	24,6	25,1	24,4	24,6	25,1	25,0	**23,8**	25,6			
27	6250	24,3	**23,8**	24,6	25,6	23,9	24,7	24,9	25,0	23,9	25,3		III,1	6191
28	6500	24,7	**23,7**	25,2	26,0	24,0	24,7	24,2	24,6	23,9	24,8		III,2	6539
29	6750	25,1	**23,7**	25,5	26,2	24,4	24,6	23,9	24,5	24,1	24,3			
30	7000	25,4	23,8	25,5	26,3	24,5	24,2	**23,5**	24,2	24,4	23,8			
31	7250	25,5	24,1	25,4	26,3	24,5	24,0	**23,2**	24,3	24,7	23,9		III,3	7370
32	7500	26,2	24,0	25,1	25,9	25,6	24,6	**23,6**	24,4	24,2	23,7			
33	7750	26,0	23,9	24,9	25,9	25,4	24,7	**23,6**	24,4	24,1	23,9			
34	8000	25,9	23,9	25,0	25,8	25,7	24,9	**23,9**	24,5	24,2	24,3			
35	8250	26,2	24,6	25,2	26,0	25,9	25,0	**24,5**	24,5	24,5	25,0		IV,1	8231
36	8500	26,5	24,7	25,5	26,4	26,0	25,2	24,7	**24,6**	24,7	25,2			
37	8750	26,7	24,8	25,3	26,4	26,4	25,1	25,0	**24,6**	24,8	25,1			
38	9000	B	C	D	E	F	G	H	I	J	K		IV,3	8925
39	9250		**3**	**5**		**3**		**6**	**2**	**7**			IV,4	9246
40	9500		8	4		4		1	1	4	4			
41	9750	3	4	1	1	8	3			6				
42	10000										%			
43	10250	B =	Dekker. Old Fortunatus										V,1	10147
44	10500	C =	Dekker. Satiromastix							3	11,5			
45	10750	D =	Kyd. Soliman and Perseda							5	19,2			
46	11000	E =	Kyd. The Spanish Tragedy (pure)										V,2	11097
47	11250	F =	Nashe. Summers Last Will and…							3	11,5		V,3	11161
48		G =	Shakespeare. Hamlet											
49		H =	Shakespeare. King Lear							6	23,1			
50		I =	Shakespeare. Othello							2	7,7			

51	J =	Shakespeare. Romeo and Juliet	7 | 26,9
52	K =	Shakespeare. Twelfth Night	**57,7**

Table 17 Attribution scheme of Marlowe's *Doctor Faustus* (B text 1616)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	words	**Rolling delta attributions of**															**Scenes**	**Words**
2	0			***Dr. Faustus* (1616)**														
3	250																	
4	500			Window size: 5000 words														
5	750			Step size: 250 words														
6	1000			Culling value: 70 %													I,1	1123
7	1250			single-authored														
8	1500			well-attributed													I,2	1438
9	1750																	
10	2000																	
11	2250																I,3	2251
12	2500	29,6	28,1	25,7	27,5	27,2	26,6	28,2	25,3	28,5	**25,2**	28,9	25,8	27,2	27,5	26,6		
13	2750	29,0	28,0	25,6	27,4	26,8	26,9	27,9	25,4	28,6	25,4	28,8	**25,3**	27,0	27,1	26,2	I,4	2659
14	3000	28,7	28,2	25,8	27,7	26,8	27,4	27,9	25,7	29,0	25,7	28,7	**25,2**	26,9	26,6	26,2		
15	3250	28,3	28,4	26,2	28,3	27,0	28,3	27,6	26,1	30,2	26,1	28,7	**25,0**	26,6	26,1	25,6		
16	3500	28,2	27,9	26,7	28,0	26,7	28,4	27,7	25,8	30,2	26,1	28,5	**24,8**	26,4	26,0	25,2		
17	3750	28,3	27,4	26,2	27,5	26,3	27,7	27,6	25,5	29,2	25,4	28,4	**24,6**	26,5	26,1	24,9		
18	4000	29,0	27,8	26,9	27,7	27,1	28,1	28,4	26,0	29,3	26,0	28,6	25,7	27,3	27,1	**25,6**	II,1	3976
19	4250	29,1	27,9	26,8	27,6	27,2	28,2	28,7	25,9	29,0	26,0	28,6	25,9	27,3	27,5	**25,6**		
20	4500	29,1	27,8	26,9	27,3	27,5	28,2	29,0	26,2	28,3	**25,9**	28,8	26,0	27,6	27,9	26,0		
21	4750	29,3	27,4	26,8	27,0	27,5	27,5	28,7	26,4	27,9	**25,7**	28,6	26,0	27,5	28,2	26,1		
22	5000	29,9	27,3	27,0	26,7	27,8	27,3	29,3	26,6	27,2	**25,5**	28,6	26,4	28,2	28,9	26,6		
23	5250	30,9	27,8	27,4	27,0	28,5	27,4	30,0	26,8	27,1	**26,3**	29,3	27,0	28,8	29,5	27,2	II,2	5332
24	5500	30,0	27,0	26,8	26,3	27,4	26,5	29,2	26,3	26,7	**25,6**	28,3	26,3	28,0	28,7	26,7		
25	5750	29,6	26,8	26,8	26,0	27,1	26,5	29,2	26,5	26,7	**25,6**	27,7	26,4	27,9	28,6	26,9	II,3	5837
26	6000	28,6	26,0	26,3	25,8	26,8	26,3	28,5	26,7	26,2	**25,3**	27,2	26,1	26,9	28,2	26,3		
27	6250	28,7	26,3	26,8	25,8	27,3	26,7	28,8	27,1	26,1	**25,4**	27,2	26,2	26,9	28,4	26,5		
28	6500	28,5	26,3	26,9	25,5	27,2	26,3	28,8	26,8	26,3	**25,3**	27,0	26,2	26,8	28,1	26,4		
29	6750	28,9	26,2	27,1	**25,3**	27,1	25,8	29,0	27,2	25,9	25,6	26,8	26,4	27,0	28,7	27,1		
30	7000	28,6	26,0	27,4	**25,4**	26,9	26,0	28,9	27,3	26,9	26,3	26,3	26,2	26,8	28,5	27,0		
31	7250	28,7	26,2	27,4	**25,6**	27,2	26,4	28,9	27,7	26,9	26,8	26,5	26,3	26,8	28,7	27,3	III,1	7309
32	7500	28,9	26,1	27,3	**25,6**	27,2	26,1	28,9	28,0	26,9	26,8	26,1	26,4	27,0	28,8	27,5		
33	7750	29,3	26,5	27,6	**25,9**	28,2	26,0	29,6	28,5	27,1	27,5	26,3	26,7	27,6	29,4	28,2		
34	8000	29,6	26,9	27,8	**26,2**	28,6	26,3	30,0	28,8	27,2	27,9	26,5	27,0	28,0	30,0	28,9	III,2	8052
35	8250	30,5	27,3	27,9	26,5	29,2	**26,3**	30,4	29,4	26,7	28,3	26,8	27,5	28,7	30,9	29,6		
36	8500	29,9	26,8	27,5	26,5	28,4	**26,2**	29,7	29,0	27,1	28,4	26,5	27,2	28,1	30,0	29,2	III,3	8495
37	8750	28,7	26,3	27,2	26,3	27,7	26,3	29,0	28,8	27,5	28,1	**25,8**	26,8	27,4	29,4	28,8	IV,1	8861
38	9000	27,9	25,9	26,8	26,8	26,9	26,4	28,3	28,5	28,4	27,9	**25,1**	26,5	26,7	28,7	28,6		
39	9250	27,3	25,6	26,7	27,3	26,6	27,3	27,7	28,7	29,5	28,2	**24,9**	26,3	26,4	27,8	28,3		
40	9500	26,6	25,6	26,6	27,7	26,2	27,9	27,3	28,6	30,4	28,1	**25,1**	26,4	26,1	27,1	28,0		
41	9750	25,8	25,6	26,8	28,2	25,6	28,2	26,4	28,2	31,3	28,0	**25,2**	25,7	25,3	26,2	27,4	IV,2	9769
42	10000	25,6	26,2	27,0	28,6	25,3	28,5	25,8	28,4	32,1	27,7	25,5	25,3	**24,9**	25,8	27,1		
43	10250	25,1	26,4	27,1	29,2	**25,1**	29,1	25,1	28,7	32,7	27,8	25,3	25,3	25,1	25,5	26,9		
44	10500	**24,5**	26,8	27,4	29,7	25,2	29,6	24,7	29,3	33,4	28,0	25,8	25,4	25,0	25,6	27,1	IV,3	10582
45	10750	**24,2**	26,3	26,6	29,1	24,8	29,0	24,3	28,7	33,0	27,6	25,7	24,8	24,3	25,3	26,9	IV,4	10783
46	11000	24,4	26,0	26,3	28,1	24,8	28,1	24,7	27,7	32,1	26,8	25,2	**24,2**	24,2	24,9	26,3		
47	11250	24,4	25,8	26,4	28,1	24,8	28,5	24,9	27,0	31,7	27,0	25,5	**24,0**	24,1	24,4	26,0	IV,5	11236
48	11500	24,3	24,9	25,6	27,7	24,5	28,0	24,7	26,4	30,6	26,4	25,2	**23,5**	23,6	23,8	25,3		
49	11750	24,2	24,9	25,6	28,4	24,7	28,6	24,9	26,6	31,4	26,7	25,5	**23,4**	23,8	23,5	24,9	IV,6	11774
50	12000	24,8	25,2	25,5	28,7	25,5	28,7	25,3	26,5	31,5	26,3	25,9	23,8	24,1	**23,7**	25,0		
51	12250	25,1	25,7	25,9	28,7	25,9	29,0	25,7	26,3	32,0	26,4	25,9	24,4	24,6	**23,9**	24,9		
52	12500	25,8	25,9	26,0	28,5	25,7	29,0	26,0	25,9	32,1	26,3	26,1	24,8	**24,1**	24,2	24,6		
53	12750	25,8	25,9	26,4	28,8	25,6	29,1	26,0	26,0	32,1	26,2	26,4	24,6	24,3	**24,1**	24,7	IV,7	12786
54	13000	25,9	25,9	26,3	29,0	25,4	28,8	25,6	25,6	32,3	26,0	26,8	24,7	24,5	**24,0**	24,5		
55	13250	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P		
56	13500	**2**			**6**	**1**	**2**				**10**	**5**	**9**	**2**	**4**	**2**	V,1	13677

57	13750	1	5		5	1	4	2	4		1	1	7	5	2	5					
58	14000	1	2	1	2	1	2		6	2	3	3	8	8	2	2					
59	14250														%	%					
60	14500	B	=	Chapman. May Day									2		3,1						
61	14750	C	=	Chettle. Hoffman																	
62	15000	D	=	Dekker. Old Fortunatus													V,2	15149			
63	15250	E	=	Greene. Friar Bacon and Friar Bungay									6		9,4		V,3	15301			
64		F	=	Heywood. The English Traveller									1		1,6						
65		G	=	Jonson. Sejanus His Fall									2		3,1						
66		H	=	Jonson. Volpone																	
67		I	=	Kyd. Soliman and Perseda																	
68		J	=	Marlowe. Tamburlaine 2																	
69		K	=	Nashe. Summers Last Will and Testament									10		16						
70		L	=	Rowley. When You See Me You Know Me									5		7,8						
71		M	=	Shakespeare. Hamlet									9		14						
72		N	=	Shakespeare. King Lear									2		3,1						
73		O	=	Shakespeare. Othello									4		6,3						
74		P	=	Shakespeare. Romeo and Juliet									2		3,1	26,6					

The authorship attribution of the A and B texts of *Doctor Faustus* (Table 16, Table 17) is indeed an intricate endeavour, as the relationships between the two texts and an alleged play text (the so-called foul paper) have always been much debated. As there is no concrete evidence of the existence of the foul paper, only the A and B texts could be analysed and here the question was which of the two was more authentic. Michael H. Keefer (2006) has ably summarised much of the debate, which does not need to be repeated here, but some indications may arise from Rolling Delta analyses of the quarto of 1604 (A text) and that of 1616 (B text). Both texts were downloaded from Peter Farey's Marlowe homepage where they appear in carefully concordanced tables in modern spelling. Unfortunately both prologues give Wittenberg as a seat of learning, thus avoiding a theological argument that should not be missed. Originally the A text refers to Wertemberg which is a corruption of the German region of "Württemberg", a Calvinist stronghold in the Reformation, whereas Wittenberg refers to Luther and his theological doctrine of 'solus gratia'. Predestination or the grace of God, that is the topical question right at the beginning of the play. A difficulty for any Rolling Delta analysis is the window size that has to be employed to yield reliable results, and here the differences in the length of acts and scenes are sometimes small, but in other cases enormous, so that overlapping windows can result in impaired references. One has to keep in mind that a 5000-word window with its delta value located at 2500 words each time has a large forerun and a large trail. This does in fact mean that smaller text segments added by a co-author may not be recorded. Nevertheless, as the windows roll through the text with an overlapping step size, stylistic changes should become evident. In order to have a wider basis of judgement, the second- and third-lowest deltas have to be taken into account as well as they might qualify for authorship under the circumstances just described. Their shares can be seen in Tables 14 and 15.

If we look at the lowest deltas only, Rolling Delta gives the following names of playwrights whose texts are stylistically closest to the A and B texts:

Text A: Dekker, Kyd, Nashe, Shakespeare.
Text B: Chapman, Greene, Heywood, Jonson, Nashe, Rowley, Shakespeare.

The underlined authors turn up in both texts, and Dekker and Kyd are not present in the B text if we look at the lowest deltas. As far as the authorial authenticity of the texts is concerned, biographical dates play a role. Greene died in 1592, Marlowe in 1593, Kyd in 1596 and Nashe in 1601. Their text segments would be older than the printing of the quartos of 1604 and 1616. The very fact that Greene can be found in the B text, but not in the A text, may be indicative of its superior claim. This would support W.W. Greg's view that the 1604 quarto was of a derivative and secondary nature, possibly memorially reconstituted by actors. Then we also have the diary entry by Philip Henslowe of 22 November 1602 in which he recorded a £4 payment to Samuel Rowley and William Bird for additions. These additions can be found in the B text, but not in the A Text. In Table 18, columns A and B refer to the A text of 1604, columns C and D to the B text of 1616. Columns A and D return the attributions of the 5000-word windows, and it becomes obvious that there are not only discrepancies in the lengths of scenes, but also adverse attributions caused by textual changes, reductions and extensions of text.

Table 18 Comparison of *Doctor Faustus* A and B text

	A	B	C	D
1		**1604**	**1616**	
2				
3				
4				
5				
6				
7		I,1	I,1	
8		I,2	I,2	
9				
10				
11		I,3	I,3	
12	Nashe			
13	Nashe			Nashe
14	Nashe	I,4	I,4	Shakespeare
15	Kyd			
16	Kyd			Shakespeare
17	Kyd			Shakespeare
18	Kyd			Shakespeare
19	Kyd			Shakespeare
20	Shakespeare	II,1	II,1	Shakespeare

21				Shakespeare
22	Shakespeare			Nashe
23	Shakespeare			Nashe
24	Shakespeare			Nashe
25	Shakespeare	II,2	II,2	Nashe
26				Nashe
27	Shakespeare	II,3	II,3	Nashe
28				Nashe
29				Nashe
30				Nashe
31				Greene
32	Shakespeare			Greene
33	Dekker	III,1	III,1	Greene
34				Greene
35				Greene
36	Dekker	III,2	III,2	Greene
37	Dekker			
38	Shakespeare			Jonson
39	Shakespeare	III,3	III,3	Jonson
40	Shakespeare			
41	Shakespeare			
42	Shakespeare			
43	Shakespeare	IV,1	IV,1	Rowley
44				Rowley
45				Rowley
46				Rowley
47			IV,2	Rowley
48				Shakespeare
49	Shakespeare			Heywood
50	Shakespeare	IV,3	IV,3	Chapman
51		IV,4	IV,4	Chapman
52				Shakespeare
53			IV,5	Shakespeare
54				Shakespeare
55			IV,6	Shakespeare
56				Shakespeare
57				Shakespeare
58				Shakespeare
59			IV,7	Shakespeare
60				Shakespeare
61				
62		V,1	V,1	
63				
64				
65				
66				
67				

68	V,2	V,2
69	V,3	V,3

Nashe seems to have been responsible for the beginning of the play as both A and B text demonstrate down to I.4. But then Kyd's part has apparently undergone changes in II.1 whereas II.2 indicates a shift from Shakespeare to Nashe, prompted by lengthened scenes. III.1 and III.2 which record Greene in the B Text can be surmised to be older than the Dekker A text down to III.2. As to content, these scenes show the Pope's humiliation of Saxon Bruno, and Faustus's rescue of Bruno takes place as he makes a fool of the Pope under cover of his magician's cloak of invisibility in III.2 (the subsequent banquet). It is probably IV.1 of the A text that was shortened a lot in the B text, but caused a shift in the attribution of III.3 from Shakespeare to Jonson. Both IV.1 (the Benvolio sub-plot, comprising the introductory conversation between Martino, Frederick and Benvolio) and the newly added IV.2 (their plan and attempt to get revenge on Faustus) in the B text suggest Samuel Rowley. Apart from textual changes in IV.3 (Faustus's subsequent retaliation) and IV.4 (The clowns' meeting with the horse-courser in the tavern) and likewise authorial changes from Shakespeare to Heywood and Chapman the remainder of the play both in the A and in the B text is exclusively given to Shakespeare, particularly scenes

IV.6: The clowns' subsequent humiliation at the court of the Duke of Vanholt;

V.2: The appearance of Lucifer, Beelzebub and Mephistopheles at the beginning;

V.2: The reappearance of Mephistopheles, the Good Angel and the Bad Angel in the moments before Faustus's damnation;

V.3: The final scene featuring the scholars' discovery of Faustus's remains.

The change from older to newer substantial text parts starts in the B text with II.1 (from Kyd to Shakespeare) and concerns III.3 (Jonson) and IV.2 (Rowley) to IV.3 (Heywood, Chapman) in particular. In the A Text it is Dekker's III.1 and III.2 that is newer than Kyd's II.1. As to Shakespeare it is hardly possible to distinguish between older and newer parts.

The number of authorial revisions in the B text is apparently much higher than in the 1604 quarto which may have been derived from the authors' foul papers, a position acknowledged by Keefer (p.228) that emerged in the mid-1980s. The A text was then seen as both earlier and more authentic. On the other hand Nashe and Greene cannot be overlooked in the B text. There may have been an 'underlying manuscript [that] could have preserved Marlowe's work in a state closer to the authorial original because it was itself earlier than the manuscript from which A was printed' (Keefer, p. 247). To all Marlovians the appearance of Shakespeare must be utterly disturbing and the notion of unlikelihood seems to be a natural

reaction. But because of Edward Alleyn's move to Strange's Men in 1592 Greg had conjectured that the Earl of Pembroke's Men acquired *Faustus* (Knutson, S. 31/32). As part of Pembroke's repertory, Knutson remarks, 'Faustus joined its authorial sibling, *Edward II*'. This may be possible, but in a different sense than Knutson intended. Both plays are hardly indicative of Marlowe as their author.

Evaluation

Rolling Delta and Rolling Classify, in their extended access to a totality of reference texts and the inherent possibility of assessing the delta values of a large quantity of windows, found a number of plays that are stylistically closely linked with *Tamburlaine*, part 1 and part 2. The anonymous *Tragedy of Locrine*, Kyd's *Cornelia* and Peele's *The Battle of Alcazar* and *David and Bethsabe* are all outside the accepted Marlowe corpus, and there is some substantial evidence that their official attribution is faulty.

The remaining plays of the Marlowe corpus correspond only slightly with the *Tamburlaines*. Remnants of Marlowe's style can be found in *Dido, Queen of Carthage*, and *Edward II*. Each time their shares are pretty low. Just like the attributions of classifiers (Table 6) N-grams and collocations (Tables 7 and 8) confirm the division between the two corpora, supported also by empirical evidence and its reasonable and reviewable conjectures. This paper maintains and confirms previous findings about the Marlowe corpus, namely that his authorial influence is totally overrated. Thomas Dabbs stated in 1995:

> Considering the way in which Marlowe's life and work have been preserved for us, there seems to be less connection between the playwright and the works ascribed to him than many critics have traditionally assumed (p.1).

To this might be added views from Melnikoff's and Knutson's latest critical edition *Christopher Marlowe, Theatrical Commerce, and the Book Trade* (Cambridge, 2018) when for example J.A. Downie comments:

> The circumstances of Marlowe's violent death might be seen as contributing to the rise of a cult of personality in which the author became as important a factor in the marketing of printed playbooks as their popularity on stage. (p.265)

With respect to Marlowe's poem *Hero and Leander* Downie interprets a quote from Thomas Thorpe's dedication to Edward Blount as follows:

> … on the basis of the evidence of these dedications Marlowe's posthumous reputation at the turn of the seventeenth century seems to have been as a poet rather than a playwright. (p.260)

Adam G. Hooks comes to the conclusion:

> The Marlowe we have inherited – the poet, spy, astheist, homosexual, and so on – is almost entirely an invention of the twentieth century. (p.98) […] These books [Marlowe's playbooks] (and their makers) have constructed the author we now know

> as ‘Marlowe’ (p.99) […] his status and reputation were created entirely after his death (p. 100).

We also owe a nice pun to Hooks in which he links the corpse and the corpus. The latter would not be extant without the first.

As already reported in ‘Christopher Marlowe: Hype and Hoax’ (Ilsemann, 2018a) Dabbs gave an extensive account of the editorial history of the nominal Marlowe plays and the centuries-long disregard of Marlowe. Ros Barber apparently acknowledged this earlier development as she complained that by Hype and Hoax ‘a century and a half of traditional scholarship should be overturned, and Marlowe stripped of the majority of his canon’ (Barber, 2018, Abstract). Indeed, even in Melnikoff’s and Knutson’s scholarly edition there is no documentary and empirical evidence that Marlowe wrote the plays in question. Traditional scholarship had the disadvantage that much of their research was based on oral and scholarly culture and learning, in the process of which conjectures and general assumptions prevailed. With the advent of personal computers and sophisticated programs like Eder’s, Rybicki’s and Kestemont’s R Stylo totally new opportunities came into being, and it is just a matter of time to reveal misattributions that had been taken for granted for a long time.

Any appropriate counter-argument is welcome if it is based on irrefutable empirical evidence or if there is a real flaw in R Stylo’s features respectively.

Appendix
List of reference texts

1. anon_arden.txt
2. anon_ashrew.txt
3. anon_bloodybanquet.txt
4. anon_blurt.txt
5. anon_contention1.txt
6. anon_contention2.txt
7. anon_cromwell.txt
8. anon_deviledm.txt
9. anon_dodypoll.txt
10. anon_edwardiii.txt
11. anon_fairem.txt
12. anon_fvicthv.txt
13. anon_georgegreene.txt
14. anon_guywarwick.txt
15. anon_ironside.txt
16. anon_kingleir.txt
17. anon_locrine.txt
18. anon_mariagewit.txt
19. anon_merlin.txt
20. anon_morus.txt
21. anon_mucedorus.txt
22. anon_nobodysomebody.txt
23. anon_oldcastle.txt
24. anon_parnassus.txt
25. anon_thwoodstock.txt
26. anon_troublejohn.txt
27. anon_truerichiii.txt
28. anon_weakestwall.txt
29. armin_anestofninnies.txt
30. armin_italiantailor.txt
31. armin_osa nest of ninnies.txt
32. beau_pestle.txt
33. brooke_romeus.txt
34. chap_allfools.txt
35. chap_ardenpure.txt
36. chap_blindbeggar.txt
37. chap_bussydambois.txt
38. chap_bussyrevenge.txt
39. chap_daysmirth.txt
40. chap_gentlemanusher.txt
41. chap_mayday.txt
42. chap_msd'olive.txt
43. chapman_daysmirth.txt
44. chettle_hoffman.txt
45. chettle_kind-hartsdream.txt
46. day_bednalgreen.txt
47. dekcoll_patgrissel.txt
48. dekcoll_witchedmonton.txt
49. dek_fortunatus.txt
50. dek_matchme.txt
51. dek_satiromastix.txt
52. dek_shomholi.txt
53. dek_spansold.txt
54. dek_whorebabel.txt
55. dek_whoreii.txt
56. dek_wyatt.txt
57. dekmid_familylove.txt
58. fletch_akingnoking.txt
59. fletch_beggarsb.txt
60. fletch_bonduca.txt
61. fletch_customcountry.txt
62. fletch_humlieut.txt
63. fletch_islandprincesse.txt
64. fletch_lawscandy+.txt
65. fletch_maidstrag.txt
66. fletch_monsthomas+.txt
67. fletch_philaster.txt
68. fletch_rulewife.txt
69. fletch_shepherdess.txt
70. fletch_valentinian.txt
71. fletch_witmoney.txt
72. fletch_womprize.txt
73. fletchmass_falseone.txt
74. fletchmass_spancurate.txt
75. gager_ulyssesRedux.txt
76. gagpeele_dido.txt
77. greene_alphonsus.txt
78. greene_friarbb.txt
79. greene_groatsworth.txt
80. greene_jamesiv.txt
81. greene_menaphon.txt
82. greene_news.txt
83. greene_orlando.txt
84. greene_selimus.txt
85. greene_vision.txt
86. h5prs.txt
87. h5vs.txt
88. heyw_1edw4.txt
89. heyw_2edward4.txt
90. heyw_engtravel.txt
91. heyw_fairmaidwest.txt
92. heyw_hoxton.txt
93. heyw_royalking.txt
94. heyw_womkillkind.txt
95. ireland_vortigern.txt
96. jon_alchemist.txt
97. jon_bartholomew.txt
98. jon_catiline.txt
99. jon_cynthia.txt
100. jon_devilass.txt
101. jon_epicoene.txt
102. jon_inhumour.txt

103. jon_outhumour.txt
104. jon_sejanus.txt
105. jon_volpone.txt
106. kyd_mscornelia.txt
107. kyd_soliman.txt
108. kyd_spanpure.txt
109. kyd_spantrag.txt
110. lodge_lookingglass.txt
111. lodge_mariusscilla.txt
112. lyly_campaspe.txt
113. lyly_endimion.txt
114. lyly_gallathea.txt
115. lyly_motherbombie.txt
116. lyly_mydas.txt
117. lyly_saphophao.txt
118. mar_didoqueen.txt
119. mar_edwii.txt
120. mar_fausta.txt
121. mar_faustb.txt
122. mar_jewmalta.txt
123. mar_massacre.txt
124. mar_tamburlain1.txt
125. mar_tamburlain2.txt
126. mars_antmellid.txt
127. mars_dutchcourt.txt
128. mars_malcontent.txt
129. middle_2ndmaids.txt
130. middle_5gallants.txt
131. middle_changeling.txt
132. middle_cheapside.txt
133. middle_hengist.txt
134. middle_nowit.txt
135. middle_phoenix.txt
136. middle_puritan.txt
137. middle_revengerstrag.txt
138. middle_trickcatch.txt
139. middle_witch.txt
140. middlecoll_famlovepure.txt
141. middlecoll_yorkstrag.txt
142. middledek_roaringgirl.txt
143. middlefletch_nicevalour.txt
144. middlerowl_fairquarrel+.txt
145. middlerowl_oldlaw.txt
146. middleweb_quietlife.txt
147. mix_arden.txt
148. mun_deathh.txt
149. mun_downfall.txt
150. mun_kentcumber.txt
151. mun_kentcumberms.txt
152. mun_mskentcumber.txt
153. nashe_anatomy.txt
154. nashe_parrot.txt
155. nashe_piercepenniless.txt
156. nashe_summers.txt
157. painter_romeo.txt
158. peele_alcazar.txt
159. peele_arraignment.txt
160. peele_davbeth.txt
161. peele_edward1.txt
162. peele_oldwives.txt
163. row_whenysee.txt
164. shak_12thnight.txt
165. shak_1henry4.txt
166. shak_1henry6.txt
167. shak_2henry4.txt
168. shak_2henry6.txt
169. shak_3henry6.txt
170. shak_asyoul.txt
171. shak_caesar.txt
172. shak_coriolan.txt
173. shak_cymbeline.txt
174. shak_errors.txt
175. shak_h5prs.TXT
176. shak_h5vs.TXT
177. shak_hamlet.txt
178. shak_henry8.txt
179. shak_henryv.txt
180. shak_john.txt
181. shak_lear.txt
182. shak_lovelab.txt
183. shak_macbeth.txt
184. shak_merchant.txt
185. shak_mfm.txt
186. shak_midsum.txt
187. shak_muchado.txt
188. shak_noblekinsmen.txt
189. shak_othello.txt
190. shak_peri1-2.txt
191. shak_peri3-5.txt
192. shak_pericles.txt
193. shak_richii.txt
194. shak_richiii.txt
195. shak_romjul.txt
196. shak_shrew.txt
197. shak_sonnets.txt
198. shak_tempest.txt
199. shak_timon.txt
200. shak_titus.txt
201. shak_troilus.txt
202. shak_twokins.txt
203. shak_verona.txt
204. shak_windsor.txt

205. shak_winters.txt
206. sheridan_rivals.txt
207. theobald_doublefalse.txt
208. tourneur_atheists.txt
209. twine_painfuladvent.txt
210. volpone.txt
211. web_duchess.txt
212. web_malfi.txt
213. wever_lustyjuventus.txt
214. wilkins_misenfmar.txt
215. wilson_3ladieslondon.txt
216. wycherley_country.txt

The reference texts were selected from the complete list of electronic texts that were contained in IDAP (Internet Drama Analysis Program). That list can be inspected under http://www.shak-stat.engsem.uni-hannover.de/referencetextlist.pdf. It also informs of the full title of plays, and their source, whereas the plays listed above use abbreviated author names followed by the underscore and a shortened play title. In some cases collaborations resulted in joined names like for example 'dekcoll' or 'middlefletch' meaning 'Dekker and collaborators' and 'Middleton and Fletcher'. However, both Rolling Delta and Rolling Classify require single-authored and well-attributed texts, which means that all plays written by "anonymous" could not be used and equally plays where more than one author was given were likewise removed. In the course of evaluations more plays were recognised as collaborative works, for example Heywood's *Edward IV* plays, Peele's *Edward I*, Greene's *The Scottish History of James IV* and *Selimus*, but also Munday's *The Downfall of Robert Earl of Huntington* and *The Death of Robert Earl of Huntington*. There may also be a bias for playwrights with a large corpus, which made it necessary to employ only the core plays where no doubts of wrong authorship attributions were given. Furthermore it does not make sense to employ reference texts that came into being after 1598 when the target text was performed already five years earlier. In other words Marlowe's *The Massacre at Paris* for example cannot be analysed properly with reference texts by Dekker, Fletcher and Middleton. But rather than using a small subjective selection of reference texts the aim must be to use a large number of them so that the program features can objectively identify the plays with the smallest stylistic difference or perform attributions with classifiers.

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Notes

[1] This is for example what the Wikipedia summary of Marlowe documents (https://en.wikipedia.org/wiki/Christopher_Marlowe).

[2] Analyses with Rolling Classify largely confirm the findings of Rolling Delta and can be found at http://www.shak-stat.engsem.uni-hannover.de/supplement%20to%20marlowecorpusrevisited.pdf

[3] It is beyond the scope of this paper to give a full account of all the procedures connected with the delta method. But some basic considerations might be helpful, such as Burrows's definition of Delta: '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' (Burrows, 2002a, p. 271). After Delta is calculated for each pair of texts, the primary author who shows the smallest mean difference from the test text, the smallest Delta, is the likeliest author of the text (Hoover, 2004a, p. 454). An important point is the introduction of the culling value, where 70 % turned out to be optimal. This means that 30 % of idiosyncratic and unmatched vocabulary is not taken into account, resulting in a harmonising effect. A test of different types of variables by Grieve opted for character bi-

and trigrams as compared to words due to statistically more reliable numbers of variables. Last but not least Rolling Delta and its use of windows allowed the detection of multi-authored target texts and the employment of a totality of reference texts prevented their subjective choice with possibly erroneous results.

[4] Apart from poems and translations the following plays make up the Marlowe corpus: *Dido, Queen of Carthage*; *Tamburlaine the Great* (part 1); *Tamburlaine the Great* (part 2); *The Jew of Malta*; *The Massacre at Paris*; *Edward II*; *The Tragicall History of Dr Faustus* (A and B texts).

[5] The crucial point, at this stage, was the selection of texts, and even though this key would have been a viable approach, the problem was next overcome by using only the core plays of the prospective authors where no authorship doubts existed.

[6] The texts were originally used in connection with IDAP, the Internet Drama Analysis Program, which provided structural and figure-related statistics about English Renaissance plays (dramenanalyse.de). Unfortunately the program could not be maintained any more when the host upgraded his server, thereby dysfunctioning relevant program features. The texts came from reliable sources like OTA (Oxford Text Archive), The Gutenberg Project, Renaissance Electronic Texts, http://shakespeare.mit.edu/, http://www.archive.org/, Google Books, Peter Farey's Marlowe Page, Thomas Middleton Webpage, Chadwyck--Healey English Verse Drama Full, etc. All texts were relieved of speaker names, secondary text information and program commands so that speeches alone in lowercase were ready for analyses. A complete list of all reference texts and their origin can be inspected under http://www.shak-stat.engsem.uni-hannover.de/referencetextlist.pdf.

[7] I would like to thank Thomas Merriam for his advice to use only the Shakespeare core plays.

[8] See for example section 4.3.3 of stylo_howto.pdf and its evaluation: 'However, it has been shown (Eder, 2013) that character n-grams are impressively robust when one deals with a "dirty" corpus (one with a high number of misspelled characters, or one with bad ocr)' and Sapkota et al. maintain in their 2015 paper: 'Character n-grams are the single most successful feature in authorship attribution' (p.93).

[9] Rather than eliminating plays without a single low delta value recent tests have shown that it is advantageous to move those plays to the end of the table, thus enabling a series of checks in which, for example, stylistic influence on playwrights who did not fit timewise could be found, or collaboratively written reference texts could be seen in their effects on target texts, before authorship attributions were continued.

[10] The number of reference texts, against which the target text is checked, varies as can be seen at the beginning of the tables. This has to do with the number of eliminated texts in the spreadsheet that were not single-authored, but showed low delta values. Their removal revealed the files of single-authored origin that were stylistically closest.

[11] For attribution tables of *The Tragedy of Locrine* and Kyd's *Cornelia* please see Hartmut Ilsemann"Christopher Marlowe: Hype and Hoax", *Digital Scholarship in the Humanities* Volume 33, Issue 4, 1 December 2018, doi/10.1093/llc/fqy001 and Hartmut Ilsemann "Forensic Stylometry", *Digital Scholarship in the Humanities*, Volume 34, Issue 2, 2 June 2019, 335-349, doi.org/10.1093/llc/fqy023.

[12] There was also some criticism of n-gram matches (see Hoover, 'The Rarer They Are the Less They Matter,' but this is closely related to the way Vickers justified Kyd's (falsely attributed) authorship on the basis of just a few rare matches that could not be found anywhere else.

[13] Please note Rizvi's explanation: Search results are shown below in modern spelling. Searches are carried out using the lemmatised forms of words; so, for example, kind heart is matched with kind-hearted. Collocations are searched for in ten-word windows. A collocation is reported only if it contains at least two words which are not among the 154 most common words in the database. The list below shows the top 2.5% of matches, according to a formula that ranks each collocation match between two plays according to the number and commonness of the words in the collocation and how many plays it occurs in. Inferior ranks are given to collocations containing proper nouns. The full 100% of matches, and the constituents of the ranking formula, are provided separately in a CSV file.

[14] See also: 'In 1594 the companies were reforming themselves after a long and disastrous spell of plague ; and in particular the Queen's, Pembroke's, and Sussex's men were all ruined, and their books were thrown in bulk upon the market.' (Chambers, 1923, vol. III, p. 184)