Two tough nuts to crack: did Shakespeare write the 'Shakespeare' portions of *Sir Thomas More* and *Edward III*? Part II: Conclusion

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Abstract

Part I of this series, [doi:10.1093/llc/fqp029], applied our 'new-optics' methodology to the 'Shakespeare' scenes in *STMO* and concluded that it had too much Shakespeare discrepancy to fit comfortably into the Canon. We considered it an improbable, but not impossible Shakespeare ascription for the 1600s and placed it for now in the High Apocrypha. We thought it extremely improbable that the whole of STMO could be by Shakespeare, or that the 'Shakespeare' parts could have been written in the 1590s. Part II, published here, addresses the 'Shakespeare' scenes of *Edward III*. Taken separately, four of the five 'Shakespeare' blocks of *Edw3* fall inside our Shakespeare ballpark. So does a sixth block, scenes 4.05–4.09. If we followed the consensus strictly, all five Shakespeare blocks, taken as a group, would not make a probable solo Shakespeare ascription. However, if we switched 4.04 to 'non-Shakespeare,' and 4.05–4.09 to 'Shakespeare,' the revised Shakespeare blocks would be a plausible Shakespeare ascription even as a group, justifying the inclusion of *Edw3* in the Canon as partly Shakespeare's: 1.02; 2.01–2.02; and 4.05–4.09. The odds that the 'non-Shakespeare' scenes, collectively, or individually (except for 4.05–4.09) could be his are vanishingly low. The full article may be found online at http://www.claremontmckenna.edu/facultysites/govt/FacMember/welliott/UTConference/2ToughNuts.pdf

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6. *Edward III*: Is Any of It Shakespeare's?

What about the 'Shakespeare scenes' from *Edward III*? We have had a longer involvement with it than with Hand D-plus, starting with observing its fatal thirteen rejections as a whole play in 1994 (Table 2) and responding to G. Blakemore Evans' request to analyze its 'Shakespeare scenes' separately, in 1996, before we had our validated profiles for 1,500-word Shakespeare blocks. Fortunately for us, *Edw3* is almost all verse. It cannot have been written later than 1595, when it appeared in the Stationers' Register. We have seen that it has had a wave of

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Table 4 Highlights of Thirteen Shakespeare Tests on All-Verse Blocks from *Edward III*

Scene	Grade level	Proclitics	Rare words	Total Rej.	Discrete probability	Continuous probability
Shakespeare range/threshold	4–9	235–561	(–40) –116	0–1	2.52E–01	2.03E–01
'Shakespeare' scenes or blocks						
1.02	7	192	–12	1	2.90E–01	3.85E–02
2.01a	8	271	23	1	2.90E–01	3.06E–02
2.01b	9	212	82	1	2.90E–01	1.07E–01
2.02	7	199	48	1	2.90E–01	5.57E–01
4.04	12	200	8	2	4.36E–02	1.29E–03
'Non-Shakespeare'						
1.01	10	89	–73	4	2.71E–04	5.17E–06
3.01	11	171	–101	4	2.71E–04	6.43E–08
3.03	11	118	–49	3	4.13E–03	4.20E–06
3.02, 3.04, 3.05	8	167	–65	2	4.36E–02	3.13E–03
4.01–4.03	9	75	18	2	4.36E–02	7.44E–04
4.05–4.09	7	246	3	0	1.00E+00	2.97E–01
5.01	10	223	–51	3	4.13E–03	5.46E–03

Five all-verse 'Shakespeare' blocks of *Edward III* get a total of five Discrete rejections (darker shading, left)—but only one of these has more than one Discrete rejection and gets a composite Discrete rejection (lighter shading, right). But four of the five get composite Continuous rejections (lighter shading, right). Only 2.02 looks like a Shakespeare 'could-be' by both tests. Of seven 'Non-Shakespeare blocks, six get composite 'couldn't-be's' by both Discrete and Continuous analysis. 4.05–4.09 passes both Discrete and Continuous. Stylometrically, it is the least Shakespeare-discrepant block in the play.

recent Shakespeare ascribers, including a few who think that all of it could be by Shakespeare, with no corresponding wave of recent naysayers—though the available evidence has changed very little since E.K. Chambers' time. *Edw3*'s admission to the Low Canon looks much more like a change of heart than like a response to new evidence.

Nevertheless, there is significant new *ex post* evidence, ours and Tarlinskaja's; ours seems roughly consistent with Tarlinskaja's, and mostly, but not completely, in line with what we take to be the current consensus. It is not too late, nor too soon, to consider it. *Edw3* offers much more material to analyze than Hand D, and that, we shall see, can make a big difference. Its 'Shakespeare scenes,' taken one by one, in statistical terms are vastly more Shakespearean than its 'non-Shakespeare scenes' and are hard to rule out individually by our tests. Taken as a group, their anomalies rise and their Shakespeare plausibility falls to unlikely levels. On the other hand, if the group were revised slightly, by reclassifying the pre-battle scene, 4.04 as 'non-Shakespeare,' and the battle scenes, 4.05–4.09 as 'Shakespeare,' the discrepancy falls, and the aggregate becomes an arguable, though still not an open-and-shut Shakespeare could-be. Table 4 gives the highlights.

To get to Table 4, and Appendices A2 and A3, we put aside our old Lou Ule-edited *Edward III* and scanned the 1997 *Riverside Edward III* from scratch, seeking the closest match we could find to the spelling and punctuation practices of our 1974 *Riverside* baseline. Beyond that, we actually changed seventeen words to spellings more in conformity with the *Riverside*, for example, 'loath' in place of 'loth.' This may sound presumptuous, but measuring discrepancy is our stock in trade, and it is important to make sure it is Shakespeare's, not the editor's. We made up a fat, searchable *Riverside* lexicon twenty years ago, and a custom *Riverside* spellchecker, and have used them since to help commonize spelling with the *Riverside*. Evans's co-editor for *Edward III*, J.J.M. Tobin, had no such templates, and let some alternative spellings creep in. Since in this case we were acting as Evans's research consultants, we saw no good reason to leave editorial artifacts in *Edward III* that could make it look less Shakespearean than it actually was; and we dutifully reported our extra precautions to him. We then divided or aggregated 'Shakespeare' and 'non-Shakespeare' scenes into

easily comparable all-verse blocks, each roughly 1,500 words in length, and gave each block the thirteen tests we had validated for such blocks. *Edw3* offered more and longer blocks and more usable tests than Hand D. It yielded some probabilities low enough to require scientific notation.

For example, it showed that, apart from one block, 4.05–4.09, all of the old-consensus 'non-Shakespeare' blocks have much too low Shakespeare probabilities to pass as Shakespeare's. Table 2, above, makes a macrocase that the odds that Shakespeare could have written the whole of *Edward III* by himself are fifty-three billion times lower than those for Shakespeare's own most discrepant baseline block, not a close call. Table 4 and Appendix A2 show that the collective odds of Shakespeare authorship of the non-Shakespeare blocks are absurdly low, even if they include 4.05 through 4.09, which is an easy Shakespeare could-be block by our rules. Six of these seven 'non-Shakespeare' blocks fall outside Shakespeare's range for proclitic microphrases. The odds of this, at the regular 3.7% rejection rate found in the Shakespeare baseline for 1,500-word blocks, are about eleven billion to one, many orders of magnitude worse than the 'Shakespeare' blocks. This is not a close call either.

The 'Shakespeare' blocks and 4.05–4.09, taken by themselves, are not so easily dismissed. Four of the five 'Shakespeare' blocks have just one rejection each, not enough for a composite Discrete rejection. 4.05–4.09, though not conventionally ascribed to Shakespeare save by those who give Shakespeare the whole play, has no Discrete rejections at all. 4.04 gets two Discrete rejections and is outside the Shakespeare ballpark, but in the same city. Every 'Shakespeare' block but one, 2.02, and every 'non-Shakespeare' block but one, 4.05–4.09, gets a Continuous rejection, the 'Shakespeare' ones narrowly, most of the 'non-Shakespeare' ones decisively. Of all the scenes, only 2.02 and 4.05–4.09 get a composite pass by both tests. This means that four out of five 'Shakespeare' blocks pass Discrete Composite, and four out of five fail Continuous Composite, three narrowly.

On this evidence, in the hypothetical quiz show, we would not hesitate to bet our thousand pounds that most of the non-Shakespeare scenes are, in fact, non-Shakespeare. We would not bet big money against the 'Shakespeare scenes,' taken individually, because all but one of them are Shakespeare could-be's, or close to it, by our rules. We would guess that the one exception, 4.04, may not be pure Shakespeare, and that 4.05–4.09, counter to scholarly consensus, may be close to pure Shakespeare, and we would be troubled by the large number of Shakespeare rejections in the consensus aggregate, large enough to argue that the conventional aggregate probably has some non-Shakespeare in it somewhere.

Where the call is close, the quality of the disqualifying evidence needs closer scrutiny, especially here, where just one Tarlinskaja test, proclitic microphrases per thousand lines, accounts for four of the six rejections found for the five 'Shakespeare' blocks.[50] If this test is misconceived or misapplied, the case against the five blocks, which we already think could be made a close call by reclassifying 4.04 as non-Shakespeare and 4.05–4.09 as Shakespeare, could collapse altogether. However, we think the test is neither misconceived nor misapplied and should explain why.

A short, low-tech explanation of why we find Tarlinskaja's proclitic counts persuasive would go straight to our baseline and comparison charts for all tests at 1,500 words.[51] These show very high Shakespeare consistency in proclitic frequencies and exceptionally high discrimination between Shakespeare and non-Shakespeare. Of 100 Tarlinskaja-counted 1,500-word Shakespeare verse blocks in our records, only three (3%) have proclitic scores under 235. Of thirty-eight such blocks not by Shakespeare, 58% scored lower than 235, just like 80% of *Edward III*'s 'Shakespeare' blocks and 86% of its 'non-Shakespeare' blocks. Eighty-three percent of our *Edward III* blocks fall below 97% of our Shakespeare baseline blocks on this test, not a strong support for a Shakespeare ascription for most of *Edward III*. All these counts are Tarlinskaja's own counts.

A longer, more technical discussion would note that enclitics and proclitics are just two of many verse tests on offer from the leading authority, Marina Tarlinskaja. For examples of others, see

her *Shakespeare's Verse*, and her unpublished article, 'Shakespeare Among Others' (her 2006), which, like ours, was held over from the 2005 Apocrypha volume of the *Shakespeare Yearbook*, which, sadly, may turn out to be its last. Enclitics and proclitics are the ones we tried hardest to replicate and validate for samples of varying sizes, including those at issue here. Shakespeare's rates did not change much during his lifetime; they did not vary between his poems and play verse, and they are not sensitive to editorial variances. Both tests are slower, more complicated and judgmental than our other tests, and harder than our other tests to replicate perfectly. But rough replicability is enough for most purposes, and tight replicability was often available for critical counts, such as those cited here, simply by our asking for Tarlinskaja's help, which she has given us generously.[52] We acknowledge that three quarters of the 'Shakespeare-scene' rejections are from one test only, proclitic microphrases per thousand lines, and that for *Edward III*'s many Shakespeare-ascribers, the quickest way to put *Edward III* more firmly in the Shakespeare could-be column would be somehow to limit or discredit the test. But we are doubtful that they will find this an easy task, not only from our own years of experience with the test, but also from our successful efforts to validate it against scores of text samples of varying size. As always, we are open to alternative views, but, from what we know now, these tests, and the rejections they show, seem to us solid ones.

That brings us to aggregate analysis of the Shakespeare and non-Shakespeare sections. Again excepting 4.04–4.09, the last three columns of Table 4 offer too many rejections per block, and too many zeroes after the decimal for even the individual non-Shakespeare blocks to have much Shakespeare plausibility. The odds that six out of seven of them would have proclitic scores lower than 97% of Shakespeare's baseline blocks are worse than daunting. The odds of this happening by chance, at our normal 3.7% overall baseline rejection rate for all thirteen tests on blocks of this size, are about two in a hundred million, many orders of magnitude lower than the 'Shakespeare' blocks. Bottom line: except for 4.05–4.09, the per-block probabilities are too low for Shakespeare, and the aggregate odds for all the blocks are far too low.

What about the five 'Shakespeare' blocks? We have seen that, individually, four of the five are narrow Shakespeare could-be's by Discrete analysis and mostly narrow couldn't-be's by Continuous analysis (Table 3). We are in the process of 'detuning' Continuous to reduce its baseline false negatives to less than 5%, like Discrete. Had we done this for *Edw 3 Sh*, all the Shakespeare blocks but 4.04 would be easy Shakespeare could-be's.[53] As it is, even with no detuning, 2.02 is a could-be by both methods; 4.04 is a couldn't-be by both, but with only one or two zeroes after the probability decimal. All of these 'Shakespeare' blocks but 4.04 seem to us no worse than close calls, taken separately, and all seem to us much more likely Shakespeare than any of the non-Shakespeare blocks except 4.05–4.09.

On the other hand, the consensus is that *all five* of these blocks are Shakespeare's work. What are the odds that *all five* of them would have six rejections between them, bearing in mind that only a third of our 140 Shakespeare baseline 1,500-word play verse blocks have even one rejection? The aggregate Discrete odds are about seven in a thousand—millions of times more likely than the seven 'non-Shakespeare' blocks, taken as a group, since these have eighteen rejections among them, but thirty-six times less likely than our Shakespeare threshold block on this test, which is closer to 2.5 in a hundred (Appendix A2). By this test, the 'Shakespeare' blocks, as a group, are outside Shakespeare's ballpark by an order or two of magnitude—that is, out of the ballpark and city, but still in the same county. We would guess that they contain some non-Shakespeare, but it is a much closer call than the 'non-Shakespeare' blocks.

Aggregate Continuous probability is an even closer call. Taken as a group, the 'Shakespeare' blocks have composite Continuous probability only five times lower than our Shakespeare threshold block (Appendix A2).

To recur to our earlier calendar image, Shakespeare at his peak could have produced a 1,500-word text block every fortnight. From his typical style habits, specifically from the proclitic

microphrase counts discussed above, we could expect about one block a year that tested like most of his *Edward III* 'Shakespeare' blocks,[54] and two to six years to produce four such blocks by chance. From this we would conclude that the consensus 'Shakespeare' blocks are much closer to Shakespeare than the 'non-Shakespeare' blocks but still not convincingly Shakespeare as an aggregate.

What about 4.05–4.09? These scenes have not been traditionally ascribed to Shakespeare except by those who think, contrary to our evidence, that the whole play is Shakespeare's. But, aggregated into one block of 1,963 words, they have no Discrete rejections at all and a Continuous composite probability which is within Shakespeare's range with no detuning. On the numbers, this block and 2.02 are the most Shakespearean on the chart, certainly more Shakespearean than Hand D-plus. Could they be gold? It is not our part to say that they *are* Shakespeare's. We are the silver-bullet people, not the smoking-gun people, the ones whose main stock in trade is disproof, not proof. Moreover, we have five live examples of false composite positives, among our forty-three like-sized blocks of known non-Shakespeare, four Discrete only, one both Discrete and Continuous. The lucky double-pass is Block 4 of Anthony Munday's *John a Kent and John a Cumber*.[55] We are confident enough in our negative evidence to believe that Shakespeare probably could not have written the *other* blocks of *JKJC*, but not so confident in our positive evidence, absent suitable corroboration beyond pure stylometrics, to suppose that Shakespeare could have, let alone must have, written Block 4 of *JKJC*. Nor is it our part to lead the hunt for qualitative resemblances to Shakespeare; after all, we are the new-optics people, not the old. But, if we were old-optics people, we would be strongly tempted to take another look at 4.05–4.09 to see whether a Shakespeare ascription could be argued. Could this dark omen be a Shakespeare precursor to the ones in *Julius Caesar* and *Macbeth*?

> A flight of ugly ravens
> Do croak and hover o'er our soldiers' heads,
> And keep in triangles and cornered squares,
> Right as our forces are embattled.
> With their approach there came this sudden fog
> Which now hath hid the airy flower of heaven
> And made at noon a night unnatural
> Upon the quaking and dismayed world.
> In brief, our soldiers have let fall their arms
> And stand like metamorphised images,
> Bloodless and pale, one gazing on another.
> (4.05.28–38)

If we departed a bit from the consensus, by switching 4.04 to non-Shakespeare and 4.05–4.09 to Shakespeare, it would greatly alleviate the problem of aggregate Shakespeare discrepancy. The revised *Edw3 Sh* would then be only two or three times more discrepant than our Shakespeare thresholds; that is, it would be in the ball park, if not on the field, by both composite tests, and close enough to suppose that it is already a more arguable could-be. A bit of further tweaking might well make it an easy could-be by our rules, as is already true of the individual blocks. We probably have not squeezed every last bit of non-Shakespeare from the 'Shakespeare' portions of *Edw3*, but switching the two blocks gives *Edw3 Sh* 0.8 rejections per block, higher than 93% of the 4–5-block aggregates in our Shakespeare baseline, but lower than any such aggregate in our non-Shakespeare baseline.

As with Hand D-plus, we turned to our Golden Ear Elite Panel for a second opinion on short snippets from the two blocks we switched, but this time they disagreed with both our re-ascriptions. Only 35% of the panel thought the 'ugly ravens' passage above sounded like Shakespeare; and 57% thought that a passage from 4.04 *did* sound like Shakespeare. So much for our vaunted tweaked intuition! Or could it be so much for our new optics? Our initial inclination is to go with the new optics in both cases, rejecting 4.04 under our normal rules, because its excessive negative evidence still outweighs the additional positive, and keeping 4.05–4.09 as a could-be, as if the Golden Ear Panel were the equivalent of a well-validated new-optics negative, but the only one we could find in fourteen tests, and not quite enough, by itself, to rule out the block. But it's only a first reaction. We would be very interested in other evidence and perspectives on these two blocks.

7. Conclusions

How close have we come to cracking the tough nut of *Edward III*? The odds seem overwhelmingly against the whole play being Shakespeare's work. But they are quite favorable to most of the 'Shakespeare' scenes individually, and they now seem to us, with a couple of blocks reattributed, closer than not to an aggregate Shakespeare could-be. This is a much more hopeful prognosis for *Edw3 Sh* than we had from following the strict consensus, and we consider this tough nut several steps closer to being cracked. We are relieved to have gotten this far after many years of struggling with *Edward III*, and sorry we couldn't get it done before the death of G. Blakemore Evans, who started us on this quest, to let him know in broad terms that it looks like he, and the many other scholars of late who thought Shakespeare had a hand in *Edward III* could well be right.

Like *Edward III*, we thought that *Sir Thomas More* was an easy nut to crack as a whole play. It has far too many rejections and composite Shakespeare probabilities far too low for Shakespeare to have written it. Whether the Hand D addition was written in 1592–93 also seems to us an easy nut to crack. It likewise has too many rejections and too low composite Shakespeare probabilities to have come from Shakespeare in the 1590s. Whether it was written by Shakespeare in the early 1600s is a closer call, and not such an easy nut to crack, but, by our best calculation, the odds against Shakespeare authorship seem to be seven to twenty-six times stronger than the odds for it. Blocks as discrepant from the rest of Shakespeare as Hand D/1600s are not unknown, but they are very rare.

8. Cautions and Caveats

How would you go about challenging our new-optics evidence? The first and most important thing to say about methods like ours is that they don't directly measure authorship. All they measure is discrepancy from the baseline works of a given author, in our case, typically Shakespeare. Not all discrepancy is authorial. If some can be explained away as a function of subject matter, dating, editorial or other non-authorial quirks, it should be discounted. We have tried in many ways to control for all of these, but who is to say we have exhausted all the possibilities? The second is that we see our methods as a complement to old-optics analysis, not a substitute. Unsurprisingly, new optics reveal some things that the old optics miss, but, also unsurprisingly, they can miss or bypass much that the old optics have revealed and should continue to reveal in the future. The world is better off with both than with just one or the other, especially where there turns out to be a lot of convergence, but enough divergence to make things interesting. Where divergence persists, as it seems to with at least ten of the 137 blocks addressed in our fringes working paper, it permits a tighter focus on the ones that are most problematic. In general, where one set of optics shows Shakespeare discrepancy, and the other doesn't, we, as silver-bullet, negative-evidence people, would go with the one that does, whether it's ours or not. We can think of two blocks from *Henry VI, Part I* where two of Gary Taylor's couldn't-be's could supersede our could-be's, and these are not the only ones which raise the question.

The third is methodological strengths and weaknesses. We have given many admonitions about where we think our analysis is at its strongest—where our baseline and sample blocks are clean and single-authored, our sample size is ample, our evidence is the kind that comes from authors themselves, and so on—and where, when these elements are not present, we think it is weakest. We think we have taken several steps toward cracking some of the toughest nuts in the Shakespeare Fringes, but all you have to do to make the nut uncrackable again is to cut it into pieces so small that they can't be tested with our methods, or show that the scenes we thought were single-authored were, in fact, double- or multiply authored, or that we picked the wrong starting and stopping points to test. We can easily rule out solo Shakespeare by the pound, but it's harder for us with ounces.[56]

A favorite argument with Oxfordians to counter evidence like ours has been the 'caterpillar' argument, that, yes, the candidate's verse might not match Shakespeare's, but caterpillars don't match

butterflies either. Couldn't the young Oxford/Shakespeare have had a Blue Period of drastically different style, like the young Picasso, but never recorded? A variant of this is the 'magpie' or 'chameleon' argument that some authors are clever and compulsive mimics picking up bits and scraps from other writers and never developing a consistent style of their own. None of these theories fits what we know of Shakespeare, most of whose stylistic quirks that we count were extremely consistent during his life time. The ones that changed, such as line endings and midline speech endings, changed consistently, with very little backtracking, so that you can say with confidence that Hand D-plus might possibly have been written in 1603, but not in 1593.[57]

Could there be a plausible 'co-author chameleon' argument that collaborators, in particular, try to blend their stylistic habits to match each other? We haven't seen much sign of it, either among features that Shakespeare and his contemporaries were aware of, such as feminine endings or open lines, or features they were not aware of, such as semantic bucketing, though it is true that it is much easier to tell Shakespeare from Peele when we hybridize two single-authored plays than when we try to disentangle one co-authored play like *Titus Andronicus*. But we would guess that the difference is more likely to be a matter of co-authored scenes than to a matter of mutual imitation. Some authorities who are quick to see co-authorship of whole plays are much more reluctant to imagine it within a single scene, as if the old co-authors wanted to make it easier for future stylometricians to tell them apart. We are much less inclined to exclude co-authorship at the microlevel, and *Sir Thomas More* is full of it. For other plays it remains more a hunch than a proof, but analysis like ours at least shows which blocks bring such hunches most into play.

Finally, there is the matter of novelty. We have been warning our readers about it for twenty years, saying that you have to be more cautious about something that hasn't been through the mill with critics than with something that has. That is still true of our latest ventures, such as our fancy composite discrepancy measures, many of our current Fringe studies, our new Badges tests, and our Golden Ear Panel. But it is no longer quite so true of the basic premises of our New Optics. These are now twenty years old and have not just been put through the mill with gentle, courtly, but diligent and discerning critics like MacDonald Jackson, they have also been put through the Shakespeare Wars against not-so-courtly adversaries who told us to expect a public whacking and did their best to deliver it with pages and pages of 'demolition' of our position. When the dust settled, the reports of our demolition turned out to be greatly exaggerated, and it was our findings which were still standing unscratched, while our adversaries' ascriptions lay abandoned or in ruins. It was a real trial of fire for our New Optics, and we can't help feeling more confident in them after the trial than before.

On the other hand, tried or not, they are still new to most people, and many of them are too new to have gone through the old trials. Certainly, many tough nuts remain to crack, ten of them listed in note 6. And there is this further question about Hand D and the non-Shakespeare scenes of *Edward III*: if not Shakespeare, who? We are not among those who feel that, if you can't find any other author to fit a passage that might be Shakespeare, it therefore must be by Shakespeare by a process of elimination. But we do hope to have a small role in examining one or two of these questions, and we hope that others will try some of our methods before we or our platforms evaporate. We don't claim to have solved forever the question of whether Shakespeare wrote Hand D or the 'Shakespeare part' of *Edward III*, but we hope we've helped narrow the possibilities a bit, as to *when* Hand D could have been written, *how likely* it is to be Shakespeare's, and *which parts* of *Edward III* could be Shakespeare's.

Quite a few once-tough-looking nuts are not so tough once you are willing to look at their sheer discrepancy from Shakespeare's baseline. These numbers say that many of the ones we *have* tested are on a different statistical planet from Shakespeare, and that the odds of his authorship are in many cases lower than those of getting struck by lightning. We acknowledge that our methods are still novel to most literature-department regulars, and, indeed, that our latest findings on

shorter, co-authored passages are still new territory for us. But we hope the net result is a much clearer notion of what you can bet on, and with what degree of confidence. Where the passages are many and long, our confidence is high enough to support our big wager. We have yet to find a taker.

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Notes

50 In any kind of verse, iambic pentameter, for example, the poet seeks to fit words with their own natural, spoken syllabic stress into lines with their own natural metric stress. The two stress patterns don't always coincide. If they did, the lines would look like neat rows of bricks with each brick's heavy end placed exactly where it belongs in the row, ta *DAH* ta *DAH* ta *DAH* ta *DAH* ta *DAH*, where italics indicate natural spoken stress and capitals indicate metric stress. Where they don't coincide, metric stress prevails over natural; some of the bricks lose their natural stress for metric reasons; and their naturally heavy ends get bent out of stress by meter and treated as if they were light: ta *DAH* *ta DAH* ta *DAH* ta DAH *ta DAH*. To see an actual Tarlinskaja example of the two odd bricks in the last line, consider the underlined microphrases in the following line: 'Or WHAT *strong* HAND could HOLD his SWIFT *foot* BACK (Sonnet 65, line 11, see her (1987, p. 203). *Strong* and *foot* are 'clinging monosyllables' which lose their natural stress for metric reasons. Where the stress-losing monosyllable precedes the word to which it clings, for example, *strong* HAND, it is called a *proclitic* microphrase, from the Greek προκλινειν, 'leaning forward.' Where it follows the word to which it clings, for example, SWIFT *foot*, it is *enclitic*, from ενκλινειν, 'leaning backward.' Every poet we know uses at least a few such odd, stress-losing bricks, but some use them much more abundantly than others. For example, Shakespeare seems to have had three to five times as many enclitic phrases per thousand lines of iambic verse as Marlowe or Pope, and perhaps half, or a quarter, as many as Beaumont, Fletcher, Chapman, or Massinger (her 1987, pp. 215–6).

51 See our (2004, pp. 431–7), including both poems and play verse.

52 Further technical discussion of her methods may be found in our (1996, p. 201), and in her (1987, pp. 208–22).

53 We have also detuned our Continuous composite scoring for aggregates of several blocks, from the direct raw scores indicated in the Appendices to a score based on geometric means, which is less sensitive to selection bias.

54 That is, twenty-six fortnights a year times a no-better-than 3% rate of occurrence in Shakespeare's baseline = 0.78 expected occurrences a year of proclitic rates as low as those observed in *Edward III*'s 'Shakespeare' scenes.

55 See our (2004, p. 437).

56 Though not so hard, it seems, for our Golden Ear Panel, which has been remarkably accurate with very short samples.

57 See our (2004, pp. 390–6).

Appendix One: Riverside STM Hand D Only Verse and Hand D-plus Verse versus Shakespeare Baseline, Blocksize = 750

Verse Block	Words	Lines	Grade Level	Fem Endings*	Open Lines**	Enclitics /1000 lines	Proclitics /1000 lines	BoB5	BoB7	BoB8	Buckets Block	Number of Tests	Discrete Rejections	Discrete Composite Probability (4.0%)	Ratio: Threshold to DCP	Continuous Composite Error	Continuous Composite Probability	Ratio: Threshold to DCP
Hand D only																		
Early - auto	660	81	12	12	43	49	321	762	556	-739	5.08	9	3	4.482E-03	75	4.3535	2.5596E-02	5
Late - auto	660	81	12	12	43	49	321	762	556	-739	5.08	9	2	4.777E-02	7	4.3535	2.5596E-02	5
Early - manual	660	81	12	27	28	49	321	762	556	-739	5.08	9	3	4.482E-03	75	4.6145	1.1409E-02	10
Late - manual	660	81	12	27	28	49	321	762	556	-739	5.08	9	2	4.777E-02	7	4.6145	1.1409E-02	10
Hand D-plus																		
Early - auto	832	101	13	13	45	79	317	765	692	-625	9.40	9	3	4.482E-03	75	4.8873	4.4857E-03	26
Late - auto	832	101	13	13	45	79	317	765	692	-625	9.40	9	2	4.777E-02	7	4.8873	4.4857E-03	26
Early - manual	832	101	13	26	33	79	317	765	692	-625	9.40	9	4	2.743E-04	1,222	5.0440	2.5193E-03	47
Late - manual	832	101	13	26	33	79	317	765	692	-625	9.40	9	2	4.777E-02	7	5.0440	2.5193E-03	47

Discrete Discrimination Statistics											*Aggregates*		*Composite Discrimination Statistics*				
Rejections			8	2	3	0	0	8	0	0	0	21		8			8
Percentage			100%	25%	38%	0%	0%	100%	0%	0%	0%	29%		100%			100%
Blocks Tested			8	8	8	8	8	8	8	8	8	72		8			8

Shakespeare Corpus Baseline: Consolidated Discrete Profile													*Composite Thresholds*				
			Grade Level	Fem Endings*	Open Lines	Enclitics /1000 lines	Proclitics /1000 lines	BoB5	BoB7	BoB8	Buckets Block			Discrete			Composite
Global Min			3	3	6	10	152	63	-146	-929	-69			3.352E-01			1.1715E-01
Global Max			10	28	51	157	505	712	1000	-83	81						
Min to 1600				3	6				200								
Max to 1600				23	32				1000					Sh Discrete Rejection Profile (See note in key)			
Min from 1600				12	12				-146					Minimum			0
Max from 1600				28	51				1000					Maximum			1

Note: HCW/20K is omitted from this analysis; see text.
*Ranges given below are for machine counts; FE manual ranges are: 3-20, early; 15-38, late.
**Manual open-line counts are adjusted from Marina Tarlinskaja counts March 2005 and do not always follow Riverside punctuation.

Hand D Verse and D-plus Verse sections of *Sir Thomas More* compared to Shakespeare under various assumptions. (See text.) While only 3% and 11% of our ninety Shakespeare baseline blocks score lower than the listed 'Discrete Probability' and 'Continuous Probability' thresholds, respectively, neither the Hand D nor the Hand D-plus block falls within either Shakespeare envelope. Hand D-plus Verse's best Shakespeare fit is after 1600, when it is seven times less Shakespeare-probable than the Discrete threshold, and twenty-six times less Shakespeare-probable than the Continuous threshold. Shaded regions on left indicate blocks that lie outside of the Shakespeare profile for a given individual test. Absence of shading on the right means that no combination of blocking, testing, or analyzing composite results could quite fit the passage into the relevant Shakespeare profile.

Appendix Two: Edward the Third, Scenes versus Shakespeare Baseline, Blocksize = 1,500

Scene	Grade Level	HCW /20K	Fem Endings (%C)	Open Lines (%C)	Enclitics /1000 lines	Proclitics /1000 lines	BoB5	BoB7	BoB8	T-E Slope Test	T-E Rare Words	T-E New Words	Buckets Block	Number of Tests	Discrete Rejections	Discrete Composite Probability (2.6%)	Continuous Composite Error	Continuous Composite Probability
1.01	10	47	4	16	6	89	517	739	-722	-0.13	-73	-13	7	13	4	2.706E-04	6.9716	5.1666E-06
1.02 (Sh?)	7	61	4	14	36	192	259	1000	-724	-0.11	-12	-8	-58	13	1	2.900E-01	4.8245	3.8483E-02
2.01a (Sh?)	8	78	9	15	71	271	144	1000	-600	-0.10	23	-23	-98	13	1	2.900E-01	4.9044	3.0645E-02
2.01b (Sh?)	9	55	11	20	44	212	300	1000	-889	0.01	82	0	44	13	1	2.900E-01	4.4236	1.0651E-01
2.02 (Sh?)	7	100	15	20	20	199	338	900	-552	-0.08	48	-5	-24	13	1	2.900E-01	3.4122	5.5710E-01
3.01	11	156	4	14	21	171	500	294	-563	-0.24	-101	-21	16	13	4	2.706E-04	7.7142	6.4298E-08
3.03	11	129	4	13	18	118	464	789	-630	-0.21	-49	-18	-9	13	3	4.133E-03	7.0093	4.2006E-06
3.02, 04, 05	8	171	6	16	44	167	410	500	-684	-0.02	-65	-21	-1	13	2	4.360E-02	5.5872	3.1340E-03
4.01-03	9	12	7	17	23	75	464	778	-872	0.03	18	3	70	13	2	4.360E-02	5.9469	7.4379E-04
4.04	12	94	11	22	75	200	596	1000	-867	-0.05	8	-1	43	13	2	4.360E-02	5.8141	1.2890E-03
4.05-09 (Sh?)	7	163	8	22	44	246	349	778	-709	-0.09	3	-18	-24	13	0	1.000E+00	3.8952	2.9670E-01
5.01	10	76	5	17	29	223	524	714	-837	-0.11	-51	0	13	13	3	4.133E-03	5.4365	5.4553E-03
Discrimination Statistics: Full Play														*Aggregates*		*Composite Discrimination Statistics*		
Rejections	5	1	0	0	1	10	0	0	0	1	5	0	1	24		7		10
Percentage	42%	8%	0%	0%	8%	83%	0%	0%	0%	8%	42%	0%	8%	15%		58%		83%
Blocks Tested	12	12	12	12	12	12	12	12	12	12	12	12	12	156		12		12
Discrimination Statistics: Shakespeare Ascriptions																		
Rejections	0	0	0	0	0	3	0	0	0	0	0	0	1	4		0		3
Percentage	0%	0%	0%	0%	0%	60%	0%	0%	0%	0%	0%	0%	20%	6%		0%		60%
Blocks Tested	5	5	5	5	5	5	5	5	5	5	5	5	5	65		5		5
Discrimination Statistics: Other Scenes																		
Rejections	5	1	0	0	1	7	0	0	0	1	5	0	0	20		7		7
Percentage	71%	14%	0%	0%	14%	100%	0%	0%	0%	14%	71%	0%	0%	22%		100%		100%
Blocks Tested	7	7	7	7	7	7	7	7	7	7	7	7	7	91		7		7
														Aggregate Composite Probabilities				
														Sh Ascriptions		8.912E-02		3.3404E-08
														Other Scenes		2.216E-13		<1.0000E-15
														Comparison Ratio		4.022E+11		>3.3404E+07
Shakespeare Corpus Baseline: Consolidated Discrete Profile																*Composite Thresholds*		
	Grade Level	HCW /20K	Fem Endings	Open Lines	Enclitics /1000 lines	Proclitics /1000 lines	BoB5	BoB7	BoB8	T-E Slope Test	T-E Rare Words	T-E New Words	Buckets Block			Discrete		Continuous
Global Min	4	24	3	8	18	235	93	0	-889	-0.22	-40	-24	-77			2.516E-01		2.0299E-01
Global Max	9	243	29	55	123	561	761	1000	-209	0.15	116	12	100					
Min to 1600			3	8				188										
Max to 1600			23	33				1000								Sh Discrete Rejection Profile (See note in key)		
Min from 1600			3	13				0								Minimum		0
Max from 1600			29	55				1000								Maximum		1

Appendix A2 is organized by 1,500-word blocks in sequential order. As with Appendix A1, lightly shaded blocks in the test results area (left) indicate individual-test scores *outside* the Shakespeare profile. Shaded areas to the right indicate blocks that fall below the *composite* Shakespeare threshold either by rejection count, Discrete probability, or Continuous probability. Such composite-shaded areas fall *inside* our Shakespeare composite profile and count as Shakespeare 'could-be's' by each analyzing convention. Only one 'Shakespeare' block, 2.02, is a Shakespeare could-be by both conventions; so is one 'non-Shakespeare' block, 4.05–4.09. Most of the other 'Shakespeare' blocks, considered separately, are much closer calls than most of the 'non-Shakespeare' blocks. Composite analysis shows that the 'Shakespeare' scenes are collectively beyond the Discrete threshold by a factor of thirty-six and beyond the Continuous threshold by a corrected factor of five (calculated from Appendix A4). However, if 4.05–4.09 were re-assigned to Shakespeare, and 4.04 reassigned to non-Shakespeare, the revised 'Shakespeare' aggregate would be only two or three times more discrepant than our Shakespeare thresholds (calculated from Appendix A4). This is inside our Shakespeare ballpark, and just a bit of further tweaking could well put most of it on the playing field. It is close enough that we consider all the revised Shakespeare scenes to be arguable Shakespeare could-be's. The non-Shakespeare scenes, taken separately, are improbable or worse; as an aggregate, they are wildly improbable; that is, it would take ninety-six years—or forty-four billion years—to produce the average amount of discrepancy found in each of the seven non-Shakespeare blocks. All blocks compared in both appendices are verse-only.

Appendix Three: Edward the Third, Scenes versus Shakespeare Baseline, Grouped by Ascription

Scene	Grade Level	HCW /20K	Fem Endings (%C)	Open Lines (%C)	Enclitics /1000 lines	Proclitics /1000 lines	BoB5	BoB7	BoB8	T-E Slope Test	T-E Rare Words	T-E New Words	Buckets Block	Number of Tests	Discrete Rejections	Discrete Composite Probability (2.6%)	Continuous Composite Error	Continuous Composite Probability
Shakespeare Scenes or Blocks																		
1.02 (Sh?)	7	61	4	14	36	192	259	1000	-724	-0.11	-12	-8	-58	13	1	2.900E-01	4.8245	3.8483E-02
2.01a (Sh?)	8	78	9	15	71	271	144	1000	-600	-0.10	23	-23	-98	13	1	2.900E-01	4.9044	3.0645E-02
2.01b (Sh?)	9	55	11	20	44	212	300	1000	-889	0.01	82	0	44	13	1	2.900E-01	4.4236	1.0651E-01
2.02 (Sh?)	7	100	15	20	20	199	338	900	-552	-0.08	48	-5	-24	13	1	2.900E-01	3.4122	5.5710E-01
4.05-09 (Sh)	7	163	8	22	44	246	349	778	-709	-0.09	3	-18	-24	13	0	1.000E+00	3.8952	2.9670E-01
Composite probabilities for Shakespeare blocks																8.912E-02		3.3404E-08
Ratio of baseline threshold probability to composite sample probability																2.823E+00		6.0769E+06
Ratio of baseline threshold probability to composite sample probability, layman's numbers																3 to 1		6 million to 1
Non-Shakespeare Scenes or Blocks																		
1.01	10	47	4	16	6	89	517	739	-722	-0.13	-73	-13	7	13	4	2.706E-04	6.9716	5.1666E-06
3.01	11	156	4	14	21	171	500	294	-563	-0.24	-101	-21	16	13	4	2.706E-04	7.7142	6.4298E-08
3.03	11	129	4	13	18	118	464	789	-630	-0.21	-49	-18	-9	13	3	4.133E-03	7.0093	4.2006E-06
3.02, 04, 05	8	171	6	16	44	167	410	500	-684	-0.02	-65	-21	-1	13	2	4.360E-02	5.5872	3.1340E-03
4.01-03	9	12	7	17	23	75	464	778	-872	0.03	18	3	70	13	2	4.360E-02	5.9469	7.4379E-04
4.04	12	94	11	22	75	200	596	1000	-867	-0.05	8	-1	43	13	2	4.360E-02	5.8141	1.2890E-03
5.01	10	76	5	17	29	223	524	714	-837	-0.11	-51	0	13	13	3	4.133E-03	5.4365	5.4553E-03
Composite probabilities for non-Shakespeare blocks																2.216E-13		<1.0000E-15
Ratio of baseline threshold probability to composite sample probability																1.135E+12		>2.0299E+14
Ratio of baseline threshold probability to composite sample probability, layman's numbers																1 trillion to 1		>200 trillion to 1
Comparison ratio, Shakespeare composite to non-Shakespeare composite																4.022E+11		>3.3404E+07
Shakespeare Corpus Baseline: Consolidated Discrete Profile																*Composite Thresholds*		
	Grade Level	HCW /20K	Fem Endings	Open Lines	Enclitics /1000 lines	Proclitics /1000 lines	BoB5	BoB7	BoB8	T-E Slope Test	T-E Rare Words	T-E New Words	Buckets Block			Discrete		Continuous
Global Min	4	24	3	8	18	235	93	0	-889	-0.22	-40	-24	-77			2.516E-01		2.0299E-01
Global Max	9	243	29	55	123	561	761	1000	-209	0.15	116	12	100					
Min to 1600			3	8				188										
Max to 1600			23	33				1000								Sh Discrete Rejection Profile (See note in key)		
Min from 1600			3	13				0								Minimum		0
Max from 1600			29	55				1000								Maximum		1

Appendix A3 is similar to Appendix A2, but the blocks are grouped by our best guess as to which are Shakespeare could-be's and which are not.

Appendix A4: Edward the III versus Play Verse Baseline, Aggregate Analysis by Geometric Mean

	Shakespeare baseline											Edward III			
Group name	Richard III	Richard II	Romeo	1H4	Hamlet	Troilus	Measure	Othello	Pericles Sh	TNK Sh	H8 Sh	Ed3 Sh	Ed3 Sh Rev	Ed3 NS	Ed3 NS Rev
CCPs by block															
1	2.72E-01	7.63E-01	4.37E-01	1.98E-04	3.73E-01	9.91E-02	8.19E-01	8.88E-01	4.25E-01	1.01E-01	1.30E-01	3.85E-02	3.85E-02	5.17E-06	5.17E-06
2	9.43E-01	6.36E-02	2.56E-01	4.75E-01	2.18E-01	2.52E-04	4.85E-01	8.75E-01	7.33E-01	5.25E-02	7.33E-01	3.06E-02	3.06E-02	6.43E-08	6.43E-08
3	9.90E-01	2.18E-01	8.72E-05	9.98E-01	3.98E-01	2.48E-01	6.16E-01	9.99E-01	7.98E-01	9.45E-01	2.07E-01	1.07E-01	1.07E-01	4.20E-06	4.20E-06
4	7.87E-01	2.07E-01	7.48E-02	2.72E-01	6.48E-01	3.23E-01	9.59E-01	9.33E-01	7.74E-01	3.42E-03	6.32E-01	5.57E-01	5.57E-01	3.13E-03	3.13E-03
5	8.26E-01	7.08E-01	2.60E-01	8.48E-01	3.61E-01	8.90E-01	9.87E-01	5.77E-01		6.36E-01	1.34E-01	1.29E-03	2.97E-01	7.44E-04	7.44E-04
6	5.94E-01	3.89E-01	3.80E-02	7.47E-01	8.26E-01	7.22E-01	8.19E-01	4.34E-01		4.42E-01	1.48E-01			2.97E-01	1.29E-03
7	8.66E-01	3.57E-01	2.29E-09	6.00E-01	7.42E-01	9.57E-01	9.57E-01	5.04E-01						5.46E-03	5.46E-03
8	1.79E-02	2.98E-01	4.79E-02	2.03E-01	7.42E-01	9.75E-01	9.73E-01	1.87E-01							
9	1.87E-01	8.72E-01	1.14E-01			8.28E-01									
10	8.34E-01	9.28E-01	2.83E-02			6.38E-01									
11	2.77E-01	8.66E-01	9.57E-01			3.24E-01									
12	8.80E-01	5.07E-01	1.42E-01												
13	7.07E-01	4.63E-01	4.82E-01												
14	1.90E-01	8.87E-01	6.51E-01												
15	5.98E-01														
16	4.65E-01														
17	6.08E-01														
18	9.32E-01														
Continuous aggregates	Threshold =0.203														
Raw score	4.69E-01	4.37E-01	2.70E-02	1.94E-01	4.92E-01	2.47E-01	8.05E-01	6.02E-01	6.63E-01	1.30E-01	2.50E-01	3.90E-02	1.16E-01	1.76E-04	8.10E-05
Normalized score	2.31E+00	2.15E+00	1.33E-01	9.53E-01	2.43E+00	1.21E+00	3.97E+00	2.96E+00	3.26E+00	6.40E-01	1.23E+00	1.92E-01	5.70E-01	8.68E-04	3.99E-04
Two-week score	8.65E-01	9.28E-01	1.50E+01	2.10E+00	8.25E-01	1.65E+00	5.04E-01	6.75E-01	6.13E-01	3.12E+00	1.62E+00	1.04E+01	3.51E+00	2.30E+03	5.01E+03
Year score	1.66E-02	1.79E-02	2.89E-01	4.03E-02	1.59E-02	3.17E-02	9.70E-03	1.30E-02	1.18E-02	6.01E-02	3.12E-02	2.00E-01	6.75E-02	4.43E+01	9.64E+01
Discrete aggregates	Threshold = 0.252														
Number of failures	5	3	6	2	3	6	1	2	1	3	3	6	4	18	20
Number of blocks	234	182	174	88	88	139	88	88	52	72	74	65	65	91	91
Raw score	7.30E-01	8.54E-01	3.00E-01	6.70E-01	4.02E-01	1.55E-01	9.02E-01	6.70E-01	7.46E-01	2.88E-01	3.02E-01	6.89E-03	8.91E-02	2.27E-11	2.22E-13
Normalized score	2.90E+00	3.40E+00	1.19E+00	2.66E+00	1.60E+00	6.17E-01	3.58E+00	2.66E+00	2.96E+00	1.15E+00	1.20E+00	2.74E-02	3.54E-01	9.01E-11	8.81E-13
Two-week score	6.90E-01	5.89E-01	1.68E+00	7.51E-01	1.25E+00	3.24E+00	5.58E-01	7.51E-01	6.75E-01	1.75E+00	1.66E+00	7.31E+01	5.65E+00	2.22E+10	2.27E+12
Year score	1.33E-02	1.13E-02	3.22E-02	1.44E-02	2.41E-02	6.23E-02	1.07E-02	1.44E-02	1.30E-02	3.36E-02	3.20E-02	1.40E+00	1.09E-01	4.27E+08	4.37E+10

Appendix A4 calculates the aggregate composite Shakespeare probability of multiple blocks from eight baseline Shakespeare plays, the 'Shakespeare' parts of three presumed Shakespeare collaborations, *Pericles, Two Noble Kinsmen*, and *Henry VIII*, and from the 'Shakespeare' and 'non-Shakespeare' parts of *Edward III*, both in the conventional division and in our slightly revised one. 'CCP Aggregate Raw Score' is Continuous Composite Probability, measured by geometric means to avoid sample bias. Any probability greater than 2.03E–1 (that is, greater than 0.203) makes the aggregate look like a Shakespeare could-be by continuous testing (see text). 'Discrete Aggregate Raw Score' is Discrete Composite Probability, measured directly. Any probability greater than 2.52E–1 (that is, greater than 0.252) makes the aggregate look like a Shakespeare could-be by Discrete testing (see text). Other scores listed show in different ways how much more or less discrepant the aggregates are than our Shakespeare composite profile thresholds. All but two of the baseline Shakespeare aggregate blocks listed are could-be's by Discrete and Continuous testing, and the two exceptions, *Tro* and *1H4*, respectively, are close calls for one test, but not the other. The 'Shakespeare' blocks of *Two Noble Kinsmen* Shakespeare, as a group, are could-be's by Discrete testing, and almost could-be's by Continuous. The revised 'Shakespeare' blocks of *Edward III* are almost could-be's by both Discrete and Continuous testing. The 'non-Shakespeare' blocks of *Edward III*, as a group, have vanishingly low Shakespeare probabilities.