Appendix 5. Sample Validation of Quantitative Analysis

In order to demonstrate the validity of quantitative analysis of Shakespeare's sonnets and especially that of effect size calculation of the *sentiment_m* dataset, I choose three sonnets that represent three types of sonnet form: Sonnets 18 (hybrid form); Sonnet 2 (shadow form); and Sonnets 147 (novel form).

Appendix Table 3 illustrates the results of qualitative and quantitative analysis, indicating the line numbers (1) where the volta is supposed to occur according to qualitative analysis and (2) where there is the greatest moving difference, CUSUM value, or Cohen's d for three datasets—*sentiment_m* (shortened as m), *sentiment_v* (v), and *sentiment_r* (r).

Sonnet	Qualitative analysis		Qualitative analysis								
			Moving difference			CUSUM			Cohen's d		
	type	volta	m	v	r	m	v	r	m	v	r
18	hybrid	9	3, 9	2	3	8	2	2	9	12	13
2	shadow	9	3, 4, 9	12, 13	9	8	12	8	9	3	9
147	novel	13	5, 6, 13, 14	14	6	5	14	10	13	3	13

Appendix Table 6. Comparison of qualitative and quantitative analysis: samples (summary)

It is beyond the scope of this article to examine systematically the validity of different statistical methods and the reliability of three different datasets. However, I suggest the possibility that effect size calculation and especially that of the *sentiment_m* could proffer the most consistent and insightful information about the volta that corresponds to the actual reading experience, by examining the significance of Cohen's d of lines 9 and 13 in three sample sonnets—Sonnets 18, 2, 147. For detailed data for each sonnet, see Appendix Tables 7, 8, 9, respectively.

1. Hybrid form: Sonnet 18

Line	Volta's function(s)		Effect size calculation	
	Primary	Secondary	Cohen's d	Rank
9	Reversal	Resolution	1.77	1st
13	Summary	Supplementary	0.49	8th

Appendix Table 7. Comparison of qualitative and quantitative analysis: Sonnet 18

For Sonnet 18, effect size calculation identifies the place of the volta in line 9. Cohen's d is the highest when one divides the sonnet into lines 1-8 and lines 9-14—which reflects the octave-sestet structure of the hybrid form that is influenced by the Petrarchan sonnet. Moreover, Cohen's d in line 13, which measures the difference in sentiment scores between lines 1-12 and lines 13-14, registers the relative weakness of the turn in line 13. As the second volta performs the functions of summary and supplement (i.e., recapitulating the theme of immortality through poetry while suggesting some qualifications), we do not see a dramatic change in theme or tone in the couplet. Hence, Cohen's d in line 13 is low; it ranks the 8th out of eleven Cohen's d values.

2. Shadow form: Sonnet 2

Line	Volta's function(s)		Effect size calculation	
	Primary	Secondary	Cohen's d	Rank
9		Resolution	1.98	1st
13	Summary	Supplement	1.05	7th

Appendix Table 8. Comparison of qualitative and quantitative analysis: Sonnet 2

For Sonnet 2, effect size calculation represents well the structure of shadow form. Like the hybrid form, the shadow form may have the double volta (i.e., in lines 9 and 13) although the octave-sestet division is not as clear as in the hybrid form. As Cohen's d of each line implies, Sonnet 2 embraces a type of shadow form, whose first volta in line 9 is strong compared to the second one in line 13 (a structure that is similar to Sonnet 18 that we examined above). Cohen's d in line 9 is the largest; it marks the ways in which the sestet presents a solution (i.e., posterity) to the problems laid out in the octave (i.e., aging and decay). By contrast, Cohen's d in line 13 is quite small, ranking the 7th out of eleven Cohen's d values. Indeed, the couplet simply reiterates the solution although in a pithy manner, thereby presenting no major change in theme or sentiment.

3. Novel form: Sonnet 147

Line	Volta's function(s)		Effect size calculation	
	Primary	Secondary	Cohen's d	Rank
9			0.11	10th
13	Explanation	Irony	1.21	1st

Appendix Table 9. Comparison of qualitative and quantitative analysis: Sonnet 147

For Sonnet 147, effect size calculation effectively captures the structure of shadow form. In this sonnet, Cohen's d in line 13 is the highest—thereby registering the ways in which the couplet offers an ironical insight into the speaker's relationship with the lover (i.e., the Dark Lady). The speaker now suffers not simply because the lover is vile, cruel, and immoral, but also because he has failed to see her through, having believed her to be "fair" and "bright" (13). His agony is nobody's fault but his, being caused by his misperception and self-deceit. This ironical coda entails a dramatic shift in sentiments because it is one of the few moments in which the speaker dwells on the "positive" qualities of the dark lady only for the purpose of disproving them immediately.