

Quantitative Intertextuality

Analyzing the Markers of Information Reuse

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What is intertextuality?

- It has something to do with repetition, similarity, reuse...
- But how do we recognize it? And how do we turn it into meaning?

What is intertextuality?

- Kristeva: “Any text is constructed as a mosaic of quotations; any text is the absorption and transformation of another.”
- *loci similes*: Two-word pairs are the most basic and common form of text reuse.
- Hinds: A “poetic of corresponding inexactitude, which draws on but also distances itself from the rigidities of philological and intertextualist fundamentalisms alike.”

Allusion: meaning from similarity

“Si licet,” exclamat, “Romani maxime rector
nominis et ius est, veras **expromere voces.**”

*“If it is permitted,” he cries, “greatest leader of the Roman
name, and if it is right to speak true words” (BC 1.360-361)*

Ultro flens ipse videbar
compellare virum et maestas **expromere voces**

*I myself, weeping spontaneously, seemed
to address the hero and to speak sad words (Aen.
2.279-280)*

Computational approaches

Tesseractae

tesseractae.caset.buffalo.edu/cgi-bin/check-recall.pl?session=00002341;cache=rec

Total results returned by Tesseractae: 27761

type	tesseractae returned	benchmark has	recall rate	mean score
1	376	490	0.77	5.19
2	1896	2284	0.83	5.42
3	327	423	0.77	6.22
4	82	113	0.73	6.61
5	69	100	0.69	6.66
comm.	263	414	0.64	6.72

Sort results decreasing by tess score Change Display

Target Loc	Target Phrase	Source Loc	Source Phrase	Parallel Type	Tess Score	Commentators
1.359	Si licet, exclamat, Romani maxime rector / Nominis et ius est, veras expromere voces;	2.279	Ultro flens ipse videbar / Compellare virum et maestas expromere voces:	4	9.721	R
1.367	Duc age per Scythiae populos, per inhospita Syrtis / Litora, per calidas Libyae sitientis arenas.	4.41	Hinc Gaetulae urbes, genus insuperabile bello, / et Numidae infreni cingunt et inhospita Syrtis;	4	9.343	V,R
1.132	totus popularibus auris / Impelli, plausuque sui gaudere theatri:	6.816	Quem iuxta sequitur lactantior Ancus, / nunc quoque iam nimium gaudens popularibus auris.	5	9.247	V,R
1.38	scelera ipsa nefasque / Hac mercede placent:	7.317	Hac gener atque socer coeant mercede suorum:	5	9.020	TB,V,R
1.237	Constitit ut capto iussus deponere miles / Signa fore, stridor lituum clangorque tubarum / Non pia concinuit cum rauco classica cornu.	11.192	It caelo clamorque virum clangorque tubarum .	4	8.883	R
1.237	Constitit ut capto iussus deponere miles / Signa fore, stridor lituum clangorque tubarum / Non pia concinuit cum rauco classica cornu.	2.313	Exoritur clamorque virum clangorque tubarum .	5	8.883	R
1.450	Et vos barbaricos ritus moremque sinistrum / Sacrorum , Druidae, positis repetistis ab armis.	12.836	Morem ritusque sacrorum / adiciam faciamque omnis uno ore Latinos.	3	8.838	R
1.185	Ut ventum est parvi Rubiconis ad undas, / Ingens visa ducl Patriae trepidantis imago / Clara per obscuram vultu moestissima noctem, / Turrigero canos effundens vertice crines, / Caesarie lacera, nudisque adstare lacertis, / Et gemitu permixta loqui:	11.64	Catillus lolian / ingentemque animis, ingentem corpore et armis / deicit Herminium, nudo cui vertice fulva / caesaries nudique umeri, nec vulnera terrent:	3	8.836	
1.230	Sic fatus, noctis tenebris rapit agmina ductor / Impiger, et torto Balaeris verbere fundae / Oclor, et missa Parthi post terga sagitta ;	12.856	Non secus ac nervo per nubem impulsa sagitta , / armatam saevi Parthus quam felle veneni, / Parthus sive Cydon, telum immedicabile, torsit , / stridens et celeris incognita transilit umbras:	4	8.735	V
1.210	tum, torta levis si lancea Mauri / Haereat, aut latum subeant venabula pectus, / Per ferrum , tanti securus vulneris, exit.	4.131	retia rara, plagae, lato venabula ferro , / Massylisque ruunt equites et odora canum vis.	2	8.735	

Benchmark Set

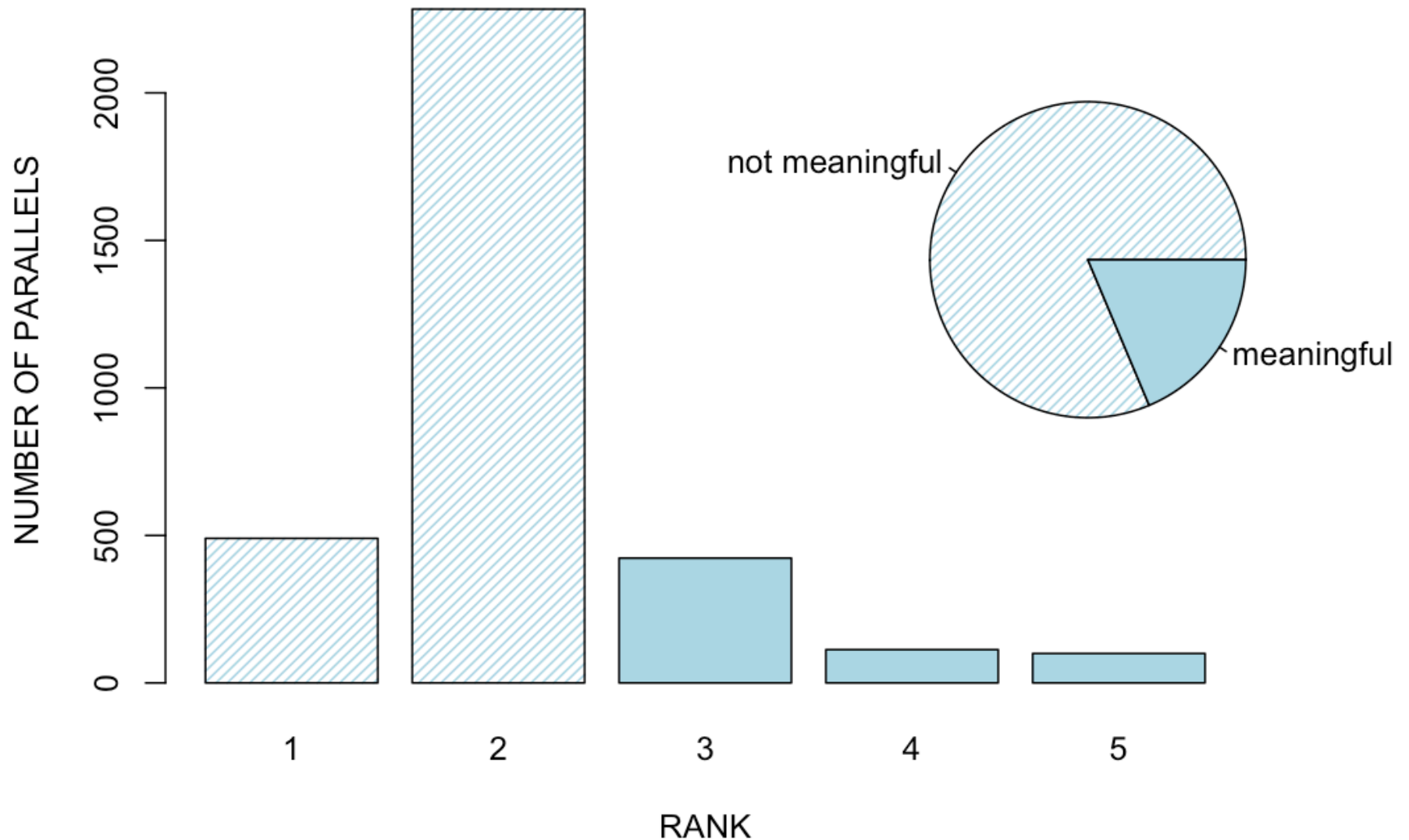
- 3,000 phrases from Lucan *Bellum Civile* 1
- Each shares two or more words with a phrase from Virgil's *Aeneid*
- Shared words may be differently inflected
- 400 additional allusions were drawn from professional commentaries on Lucan
- Each phrase pair evaluated by graduate and faculty readers

Reader-assigned Ranks

Rank	Interpretation
5	Very meaningful allusion.
4	Moderately meaningful allusion.
3	Shared language points meaningfully to a genre or style, but not to a particular passage in the earlier text.
2	Shared words are not meaningful.
1	Error in discovery algorithm, words should not have matched.

Reader-assigned Ranks

Distribution of Benchmark Parallels by Reader Rank



Modeling Reader Response

$$\text{score} = \ln \left(\frac{\sum \frac{1}{f(t_i)} + \sum \frac{1}{f(s_i)}}{d_t + d_s} \right)$$

$f(t_i)$ = Frequency of the i th matching term in the target phrase

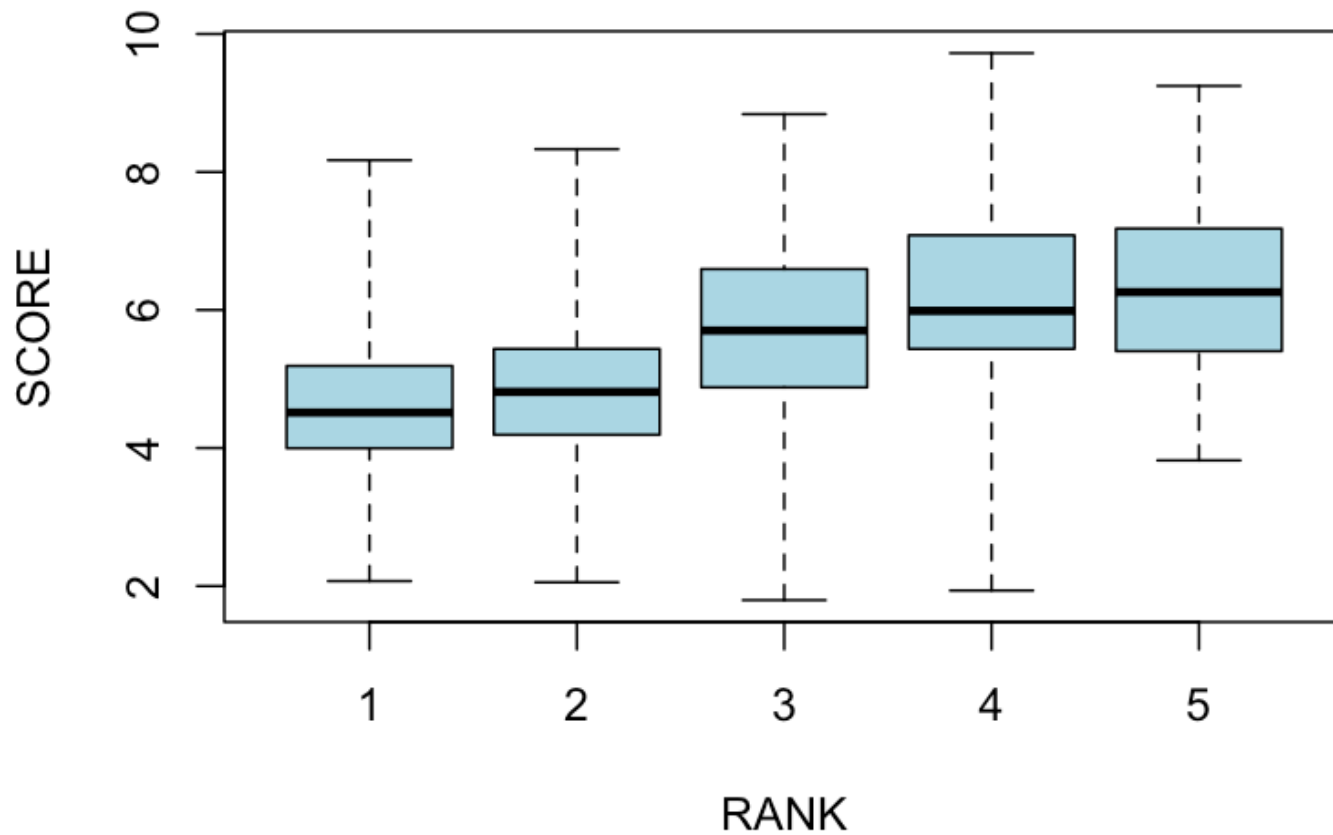
$f(s_i)$ = Frequency of the i th matching term in the source phrase

d_t = Distance between two lowest-frequency matching words in target

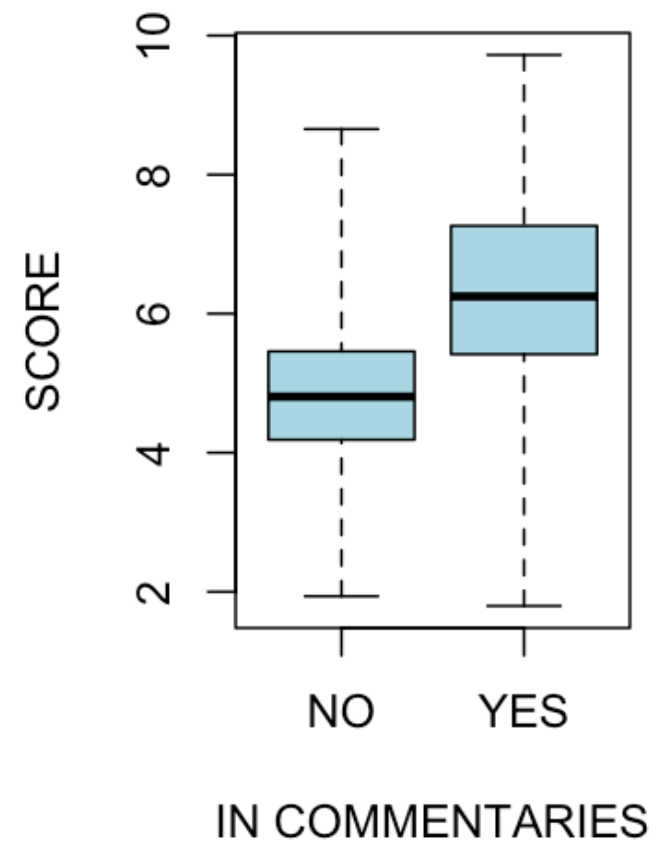
d_s = Distance between two lowest-frequency matching words in source

Modeling Reader Response

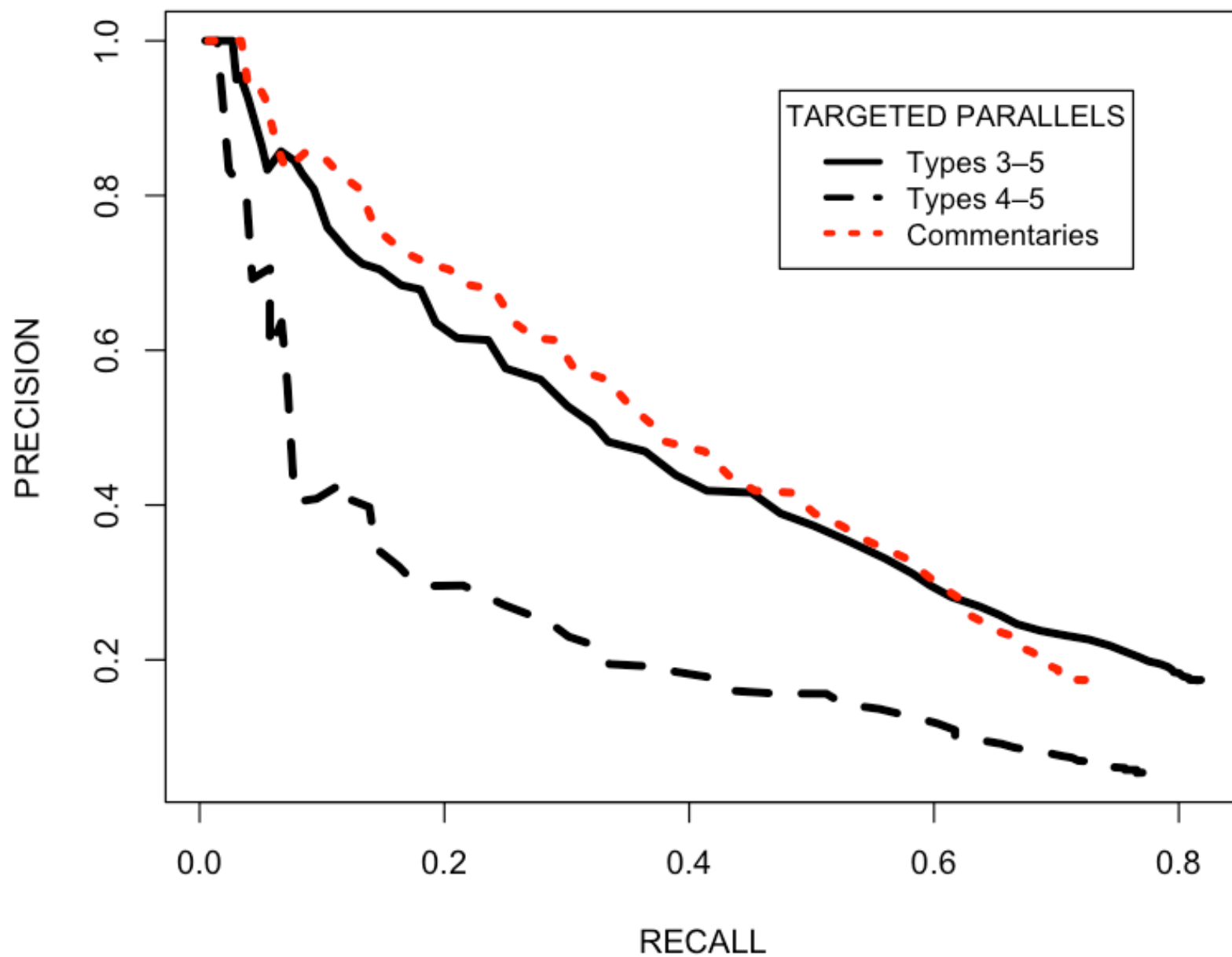
Score Distribution by Reader Rank



In Commentaries



Initial Results



The experience of intertextuality

As a clever man once told me, we make peace with our enemies, not our friends.

— Tyrion Lannister (2016)



Image: © HBO

Image: Pete Souza



You don't negotiate deals with your friends, you negotiate them with your enemies.

— Barack Obama (2015)

We only make peace with our enemies, My Lord. That's why it's called "making peace."

— Littlefinger (2011)



Image: © HBO

Poniewozik, J. (2016) 'Game of Thrones': Tyrion, Daenerys and the Art of the Deal.

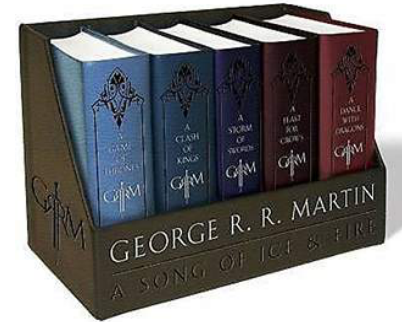
<http://www.nytimes.com/2016/05/16/arts/television/game-of-thrones-season-6-episode-4-daenerys-tyrion.html>



“That way lies madness and disaster”



A Song of Ice and Fire



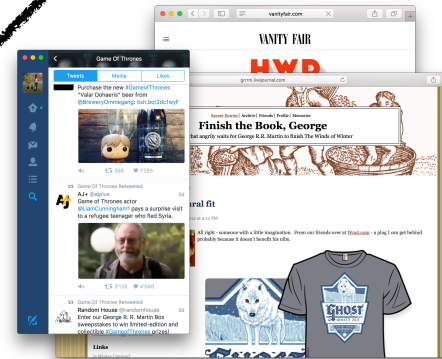
George R. R. Martin

Audience

HBO show runners



“Game of Thrones”



Traditional *loci similes*?


	Target	Source	Score
1	... I've just realised that Wilko Johnson plays Ser Ilyn Payne !!!	... since Ilyn Payne snipped your daddy's neck	9.58
2	Daario Naharis : meet the new face of the man the Mother of Dragons fancies ... via @guardian	The Second Sons are yours and so is Daario Naharis .	9.49
3	Daario Naharis : meet the new face of the man the Mother of Dragons fancies ... via @guardian	Daario Naharis .	9.49
4	Daario Naharis : meet the new face of the man the Mother of Dragons fancies ... via @guardian	And Daario Naharis ?	9.49
5	@Jamie_Obertelli What's the name of the one you were telling me about?	Why are you telling me ?	8.83
6	... Either I had it, or Ill be having it, within 48 hours of any given moment. -@louisck	You could have had either .	8.74
7	Not sure about the video but these girls can sing: ... - HAIM - Don't Save Me	Didn't you marry one of these Frey girls ?	8.71
8	"The Lannisters send their regards! ". #GOT	The Lannisters send their regards .	8.48
9	@JLuxfordFilm "The Lannisters send their regards! "	The Lannisters send their regards .	8.48
10	There's a storm coming : ...	There's a storm coming .	8.44

Word tri-grams

	Target	Source	Score
1	"The Lannisters send their regards! ". #GOT	The Lannisters send their regards.	8.53
2	@JLuxfordFilm "The Lannisters send their regards! "	"	8.53
3	...You're right. Where do you think the expression 'wet wipe' came from?	- Is that the Blackwater? - Where do you think I'm taking you?	6.71
4	There's a storm coming : ...	There's a storm coming.	6.62
5	Mexican boy: Viene la tormenta! ... Gas Station Attendant: He said there's a storm coming in.	There's a storm coming.	6.62
6	Just finished watching #Archer, right in time for the new season of #ItsAlwaysSunnyInPhiladelphia	Got to get this salt pork to the Twins in time for the wedding.	5.94
7	... with the back of your hand it's ok. With the palm you run the risk of picking up diseases.	...I'm gonna put a sword through your eye and out the back of your skull.	5.59
8	Sharon Needles - Why Do You Think You Are Nuts?	- What do you think? - You leave tonight.	5.20
9	... I said, I'm not afraid anymore. Do you hear me? I'm not afraid anymore!" #KevinMcCallister	Do you hear me?	5.20

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Unless I'm very much mistaken, the Red Wedding is less than 24H away. Jaime Lannister sends his regards. [#asoiaf](#) [#HBO](#)
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GBM are a four piece band from North London. For more? facebook.com/thehorrorofane...
+ youtu.be/mhuXpIY5a7U

Joined April 2009

Limitation of lexical matching

Tesserae Benchmark:

Lucan's *Civil War* Book 1 vs. Vergil's *Aeneid*



A bust of Vergil in Naples (cc) BY-SA 2.5 A. Hunter Wright

Bi-gram matching
necessarily misses
33% of human
identified parallels



Bust of the Roman poet Lucan (cc) BY 3.0 Cruccione

What is the connection?

Fie on't! ah fie! 'tis an unweeded
garden,
That grows to seed;
things rank and gross in nature
Possess it merely.

(Hamlet, Act 1, Scene 2,
lines 135-137)

Thorns also and thistles shall it
bring forth to thee;
and thou shalt eat the herb of
the field;

(Genesis 3:18)

Similarity in meaning

“Thus, by judicious transfers and imitation he brought it about that, in what we read from another source in his work, we prefer his version or we marvel that it sounds better than its source. Let me say that he took from others from a half to about a full line of verse, then full passages slightly changed and rewritten, but with their meaning left intact, so that their source might be obvious...”

— Macrobius on Vergil, *Saturnalia*

The process of reading

How did we identify the Shakespeare / Genesis parallel?

1. Examination of semantic content
 - Plant life → Gardens
2. Examination of sentiment
 - Something has gone wrong
3. Search of an internalized corpus
 - Eureka! **Garden of Eden**



Semantic Analysis

- Popular strategy in natural language processing
 - Designed around the notion of word co-occurrence
 - Deerwester *et al.* 1990, **Latent Semantic Indexing**
 - Blei *et al.* 2003, Latent Dirichlet Allocation
 - Pennington et al. 2014, GloVe
 - Commonly deployed over large corpora
 - Jockers 2013, *Macroanalysis*

Semantic analysis of small samples

We don't always have the luxury of a lot of text:

“Thy brother's blood the thirsty earth hath drunk.”
(King Henry VI, Part 3.)

“And it came to pass, when they were in the field, that Cain
rose up against Abel his brother”
(Genesis 4:8.)

Training set

1. And God said, Let there be light: and there was light.
2. And God said, Let there be lights in the firmament of the heaven
3. And God said, Behold, I have given you every herb bearing seed,
4. And on the seventh day God ended his work which he had made;
5. And the woman said, The serpent beguiled me, and I did eat.
6. And Adam called his wife's name Eve; because she was the mother of all living.
7. And it came to pass, when they were in the field, that Cain rose up against Abel his brother,
8. And Cain said unto the LORD, My punishment is greater than I can bear.
9. And Cain went out from the presence of the LORD, and dwelt in the land of Nod,
10. And to Seth, to him also there was born a son;




LSI Matching

Query: “Thy brother’s blood the thirsty earth hath drunk.”

- 0. And God said, Let there be light: and there was light.
- 0. And God said, Let there be lights in the firmament of the heaven
- 0. And God said, Behold, I have given you every herb bearing seed,
- 0. And on the seventh day God ended his work which he had made;
- 0. And the woman said, The serpent beguiled me, and I did eat.
- 0. And Adam called his wife’s name Eve; because she was the mother of all living.
- 1. And it came to pass, when they were in the field, that Cain rose up against Abel his brother,
- 2. And Cain said unto the LORD, My punishment is greater than I can bear.
- 3. And Cain went out from the presence of the LORD, and dwelt in the land of Nod,
- 0. And to Seth, to him also there was born a son;

Bag-of-Words model

7. And it came to pass, when they were in the field, that Cain rose up against Abel his brother
8. And Cain said unto the LORD, My punishment is greater than I can bear.
9. And Cain went out from the presence of the LORD, and dwelt in the land of Nod,

Documents					
				How did the Shakespearean phrase "Thy brother's blood the thirsty earth hath drunk" match these three bags?	
Terms					
abel	1	0	0		
★ brother	1	0	0	←	Only one shared word
cain	1	1	1	←	Word Co-occurrence
field	1	0	0		
pass	1	0	0		
rose	1	0	0		
bear	0	1	0		
greater	0	1	0		
lord	0	1	1	←	Word Co-occurrence
punishment	0	1	0		
dwelt	0	0	1		
land	0	0	1		
nod	0	0	1		
presence	0	0	1		

LSI Algorithm: Training

1. Define a window to slide around the texts we want to match against (“documents”)
2. Apply stoplist to documents
3. Sample with window to collect a bag-of-words
4. Group bags into a document-term matrix
5. Reduce dimensionality with Singular Value Decomposition (SVD)
 - ▶ Free parameter: choose the number of “topics” to retain
 - ▶ This produces the model we’ll use for matching

LSI Algorithm: Testing

1. Project a query in the model space, yielding a vector A
2. For all of the document windows:
 - a. Project the window into the model space, yielding a vector B
 - b. Compute cosine similarity between A and B
3. Rank all of the similarity scores (higher is better)

96

The first Part of Henry the Sixth.

Actus Primus. Scena Prima.

Deed March.

Enter the Funerall of King Henry the Fifth, attended on by the Duke of Bedford, Regent of France; the Duke of Gloister, Protector; the Duke of Exeter War-
mster; the Bishop of Winchester, and
many the Duke of Somerset.

Deed.

Yong be's beavens with black yeld day to night;
Cometh importing change of Times and States,
And thus your crystal Tresses in the Skie,
And with them scourge the bad revoluing Stars,
That have confited unto Henries death:
King Henry the Fifth, too famous to be long,
England we've lost! King of to much worth,
Glois. England we've lost! King of to much worth,
Yet he had, desiring to command,
His brandish'd Sword did blinde men with his beanes,
His Armes spred wider cheere than Dragon Wings;
His sparkling Eyes, replest with wrathfull fire,
His sparkling Eyes, replest with wrathfull fire,
Then mid-day Sunne, fierce beate a gaind their eyes:
What should I say! his Deeds exceed all speech:
He've lift up his Hand, but conquered.
He's moune in black, why mourne we not in blood!
He's dead, and neuer shall revive:
Henry is dead, and neuer shall revive:
Vpon a Wooden Coffin we attend;
And Death dishonourable glorie,
We with our floure vertue glorie,
Like Captives bound to a Triumphant Carre.
What shall we curie the Planets of Misshap,
That plotted down our Glories out of heav'n?
Or shall we thinke the fables, uttered French,
Coniurers and Sorcerers, that afraid of him,
By Magick Verbes have contrid his end.
Wench, He was a King, blis of the King of Kings.
Vnto the French, the deadfull Iudgement-Day
So dreadfull will not be, as was his light.
The Battailies of the Lord of Hosts he fought:
The Churches Prayers made him so propitious.
Glois. The Church? where is it?
Had not Church-men pray'd,
His third of Life had not so loose decay'd.
None doe you like, but an effeminate Prince,
Whom like a Schoole-boy you may out-awe.
Wench, Glois, what are we like, thou art Protector,
And to seek to command the Prince and Realme,
Thy Wife is proud, the holdest she is awe,
More then God or Religious Church-men may,

Glois. Name not Religion, for thou loost the Fleth,
And ne're throughout the yere to Church thou go'st,
Except it be to pray against thy foes,
And cease, cease these larses, & tell thy mind in peace:
Let's to the Altar: Henris way on vs,
In lead of God, we'll setle off v'r Armes,
Since Armes maye not now that Henry's dead,
Patiently await for wretched yeeres,
When at their Mothers mollified eyes, Babes shall suck,
Our Ile be made a Nourish of sick Teares,
And none but Whomen left to wayle the dead,
Henry the Fifth, thy Gloit I inuocate:
Proper thy Realme, keep it from Cruell Boyles,
Combat with aduers Plancers in the heauens;
A farr more glorious Starre thy Soule will make,
Then false Caesar, or bright—

Enter a Messenger.

Mess. My honourable Lords, health to youall:
Good things befall the King and out of France,
Of losse of slaughter, and discomfure;
Guyen, Champagne, Rheims, Orleans,
Paris, Guyen, Poictiers, are all quite lost,
But, What say'st thou, man, before dead Henry's Corps?
Speake fully, the losse of those good Townes
Will make him burst his lead, and rise from death.
Glois. Is Paris lost? Is Roan yeelded v?
If Henry were recall'd to life againe,
These newes would cause him once more wayle the Ghost.
Ex. Henry were they lost? what trecheerie was 't
Mess. No trecheerie, but want of Men and Money.
Amongst the Souldiers this is mustered,
That here you maintaine feutrell Factions;
And whil' his Field should be discrepant and fought,
You are disputing of your Generalls.
One would have lingring Wartres, with little cost;
Another would fiewt, but wanteth Wings:
A third thinke this, without expence at all,
By gulleifull fawne words, Peace may be obtayn'd;
Awake, awake, English Nobilitie,
Let not fourth dimest your Honours, new begot;
Create as the Flower-de-Luces in your Armes
Of England Coast, one halfe is cut away,
Ex. Were our Teares wanting to this Funerall,
These Tidings would call forth her flowing Tides.
Bedf. Methen conceit, Regent I am of France:
Giuen me my freed Coast, fight for France.
A way with this disgracefull wayling Robes;
Wounds will I lend the French, in stead of Eyes,
To weepe their interminuall Miteries.

Enter

L. i. l. i. 88

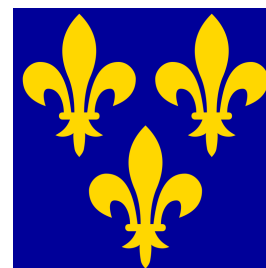
450



“War”



“England”



“France”

Vector of Topics

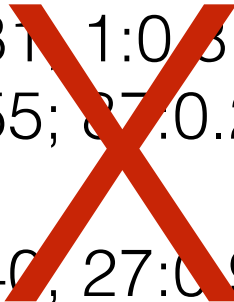
Why not try LDA?

“Thy brother's blood the thirsty earth hath drunk,
Broach'd with the steely point of Clifford's lance;
And, in the very pangs of death he cried,
Like to a dismal danger...”

500 Character query; 1000 character documents

Gensim (Rehurek and Sojka, 2010) and MALLET (McCallum, 2002)

Run 1: 45:0.981; 1:0.311; 31:0.725
Run 2: 66:0.455; 37:0.221; 45:0.156
...
Run n : 10:0.940; 27:0.931; 54:0.922



Validation

- Small sample sizes
- Different languages
- Can we find new thematic matches?
- Can this tool help to produce new criticism?

Case Studies

Study #1: Latin Poetry

- Back to our Lucan / Vergil benchmark
 - *Civil War* Book 1: 685 hexameter lines
 - *Aeneid*: 9,896 hexameter lines
 - Parallels from four commentaries:
 - ▶ Heitland and Haskins (1887), Thompson and Bruère (1968), Viansino (1995), and Roche (2009).



TESSERAE

35 Missing Parallels
(1/3 of total)

Algorithm parameters

- Gensim (<https://radimrehurek.com/gensim>) LSI implementation
- Query window: 500 characters around and including a target line of text
- Document window: 1,000 characters around and including a line to match against
- Stoplist: 250 most common words
- Bag-of-words: inflected form of each word replaced with the set of all possible stems
- Number of topics: 10, 15, 20
- Count a hit in the top 50 results as a “match”

Top match between a Query and Aeneid 3

qualis, cum turbidus Auster
reppulit a Libycis immensum Syrtibus aequor
fractaque veliferi sonuerunt pondera mali,
desilit in fluctus deserta puppe magister
nauitaeque et nondum sparsa conpage carinae
naufragium sibi quisque facit, sic urbe relicta
in bellum fugitur. *nullum iam languidus aevo*
evaluit revocare parens coniunxve maritum
fletibus, aut patrii, dubiae dum vota salutis
conciperent, tenere lares; nec limine quisquam
haesit et extremo tunc forsitan urbis amatae
plenus abit visu: ruit inrevocabile volgus.
o faciles dare summa deos eademque tueri
difficiles!

(Civil War 1.498 – 511)

postquam res Asiae Priamique evertere gentem
immeritam visum superis, ceciditque superbum
Ilium et omnis humo fumat Neptunia Troia,
diversa exsilia et desertas quaerere terras
auguriis agimur divum, classemque sub ipsa
Antandro et Phrygiae molimur montibus Idae,
incerti quo fata ferant, ubi sistere detur,
contrahimusque viros. vix prima inceperat aestas
et pater Anchises dare fatis vela iubebat,
litora cum patriae lacrimans portusque relinquo
et campos ubi Troia fuit. *feror exsul in altum*
cum sociis natoque penatibus et magnis dis.

(Aeneid 3.1-12)

Top match between a Query and Aeneid 3

Just as when the swirling south wind drives the vast sea back from the Libyan Syrtes, and the shattered mass of the mast, with its sail, groans, the helmsman abandons the stern and leaps into the waves; and though the fittings of the hull are not yet strewn apart, each sailor fashions his own personal shipwreck; so too they desert the city and flee into war. Parents, frail with age, cannot call back their sons, nor wives, by their tears, their husbands; nor the ancestral homes, so long as they place their hopes on an unlikely salvation. No one hesitated on his threshold, to depart, perhaps, with a final look, filled with the love of his city. The crowd rushed on, heedless. How easily the gods give everything, how little they care to preserve it.

(*Civil War* 1.498 – 511)

After the gods saw fit to overturn the affairs of Asia and visit undeserved punishment on the race of Priam, after proud Ilium had fallen and all of Troy, built by Neptune, was a smoking ruin, we were driven by signs from the gods to seek exile far away and find vacant lands. Near Antander and the mountains of Phrygian Ida we constructed a fleet, though we were unsure where the fates were taking us, where we were to settle, and we gathered our men together. Summer had only just begun and my father Anchises ordered us to give sail for our destiny. I wept as I left the shores and harbors of my fatherland, and the plains where once was Troy. I was cast, an exile, onto the high seas, together with my companions, my son, the spirits of my household and the great gods above.

(*Aeneid* 3.1-12)

Analysis

- Shared themes:
 - Abandonment (*diversa exsilia et desertas quaerere terras, litora cum patria lacrimans portusque relinquo*)
 - Naval imagery (*classem, vela, portus*)
- Roche: *BC* 1.504-7 and *AEN* Book 2; ***AEN* 3.1-12**
 - Contrasting imagery (Aeneas's concern, Roman disregard)

Bag-of-Words Control

- Does dimensionality reduction via SVD actually add anything?
 - Cosine similarity between bag-of-words representations
 - If LSI is better, we should see better match scores for relevant parallels

Recovered *Civil War 1 (BC)* – *Aeneid (AEN)* commentator parallels

BC Line	AEN Line	Shared Context	Topics	LSI Rank	LSI Prec.	BoW Rank	BoW Prec.
1.60	1.291	Destiny of Caesar; peace	10	3	0.18	86	0.00
1.139	4.441	The blowing wind; tree	20	1	0.22	1	0.28
1.141	2.626	The blowing wind; tree	15	1	0.32	45	0.00
1.193	2.774	An apparition	20	33	0.08	47	0.00
1.193	3.47	An apparition	15	42	0.06	145	0.00
1.291	11.492	Horses	20	26	0.02	212	0.00
1.490	11.142	Flight	15	17	0.22	23	0.08
1.504	2.634	Abandonment	15	3*	0.52	70	0.00
1.504	3.11	Abandonment; Navy	15	4	0.16	215	0.00
1.673	2.199	Omens; terror	15	31	0.02	162	0.00
1.676	4.68	Dido as Bacchant	15	1	0.40	2	0.08
1.676	6.48	Prophecy	15	39	0.44	148	0.00
1.695	6.102	Frenzied discussion	20	22	0.20	31	0.20

* also found by Tesseract lexical matching

Recovered 12 missing parallels

Additional recovered *Civil War* 1 (*BC*) – *Aeneid* (*AEN*) commentator parallels with Bag-of-Words approach

BC Line	AEN Line	Shared Context	BoW Rank	BoW Prec.
1.1	4.628	War	48	0.02
1.8	12.313	Hostility	23	0.06
1.226	4.624	Broken treaty	13	0.10
1.226	12.435	Fortune	38	0.04
1.674	4.300	Dido as Bacchant	28	0.02
1.678	10.670	Questioning destination	17	0.16
1.685	2.554	Decapitation; shore	45	0.08

Recovered 7 additional missing parallels

Exploratory work

BC Line	AEN Line	Shared Context	Topics	LSI Rank	BoW Rank
1.1	4.98	War	15	1*	1
1.141	2.252	The blowing wind	15	6	128
1.291	11.291	Conquest	20	1	4
1.353	1.647	City; nation	15	1*	26
1.504	3.639	Abandonment; nautical imagery	20	2	129
1.676	6.809	Bacchus	15	1	81
1.676	4.304	Bacchus	10	36	295

* also found by Tesserae lexical matching

Civil War 1.504 also matched:

sed fugite, o miseri, fugite atque ab litore funem
rumpite.

nam qualis quantusque cavo Polyphemus in antro
lanigeras claudit pecudes atque ubera pressat,
centum alii curva haec habitant ad litora vulgo
infandi Cyclopes et altis montibus errant.

(Aeneid 3.639-44)

But flee, you wretches, flee and slash the cables
from the shore. For as great and tall as Polyphemus
is who lives in his hollow cave, keeps wooly flocks,
and milks their udders, a hundred such other
monstrous Cyclopes live together along the curved
shore, and wander the steep mountains.

Bacchus re-contextualized

nam, qualis vertice Pindi

Edonis Ogygio decurrit plena Lyaeo . . .

(*Civil War* 1.674-5)

nec qui pampineis victor iuga flectit habenis

Liber, agens celso Nysae de vertice tigris

(*Aeneid* 6.804-5)

For just as a Thracian bacchant, filled
with Theban Bacchus, rushes down from
the summit of Mount Pindus . . .

Nor did Bacchus, who in victory guides his chariot
with reins of vine, leading his tigers from the
summit of lofty Nysa, [traverse as much land as
Augustus will rule].

And

BC 1.676 and *AEN* 4.300-3

Discussion

- Recovered 19/35 of the missing parallels
- What can we do better?
 - Algorithms that exploit context more like human readers
 - Revisit LDA? Need a solver that can handle small inputs

Study #2: Fan fiction on the web

wattpad.com:

- 2 million writers
- 100,000 new pieces per day
- 20 million readers

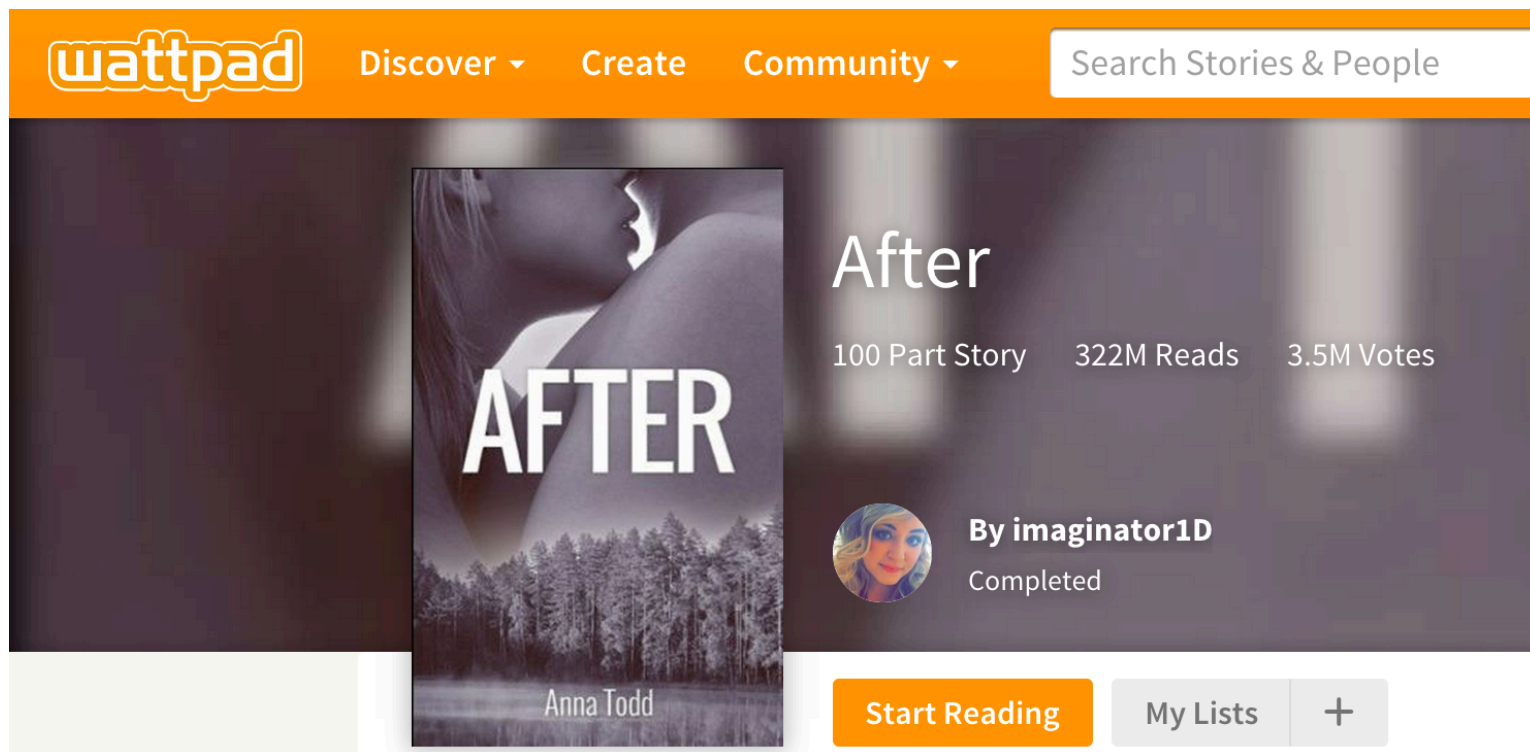


Image Credit: wattpad.com

Song, dialogue, and the novel

“Some novelists draw on their own experience; others borrow from history, mythology or classic literary tropes. Anna Todd, a 25-year-old debut novelist in Texas, found inspiration in Harry Styles, the tousle-haired heartthrob from the British boy band One Direction.”

“Fantasizing on the Famous,” The New York Times, Oct. 21st, 2014



One Direction, Scottish Exhibition and Conference Centre (SECC)  BY-SA 2.0 Fiona McKinlay

Why fan fiction?

- Emerging literatures
- Direct participation in a popular narrative
- Interactive engagement with a text
- Which new texts will be successful?

Publishers want to know

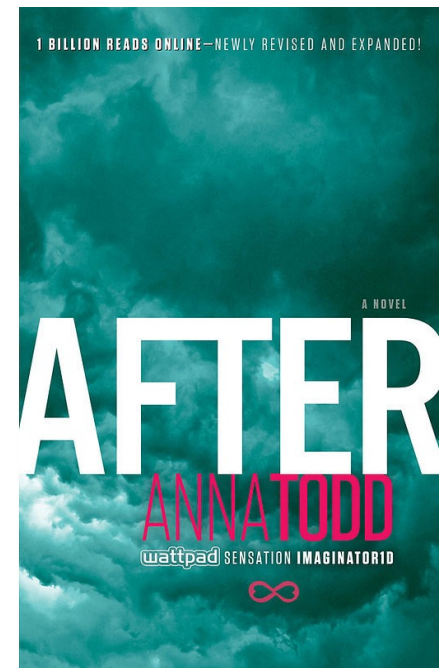


Image Credit: Gallery Books

After

- Atypical style for a romance novel
 - Conversational first person narrative reminiscent of social media
- Obvious intertexts signaled via direct citation

Does the novel
share something
more with a broader
literary culture?

Recent Comments

[Table of Contents](#)



Itziar_vr

a day ago

This book is incredible I can't stop read it. I'm a fan of it!!
Incredible Job :)



NiallsFreakingPotato

a day ago

this'll be my second time reading it!! so excited to read it again!



namelessgella

a day ago

Reading is fun the second time around lmao round 2 for this trilogy. Lez do dis

Naïve Intertexts in *After*

“Today will be our last day on *Pride and Prejudice*, I hope you all have enjoyed it, for today’s discussion we will be talking about Austen’s use of foreshadowing. As a reader, did you expect her [Elizabeth] and Darcy to end up together in the end?” Professor asks and I raise my hand as always. Liam and I are usually the first to answer, and usually the only.

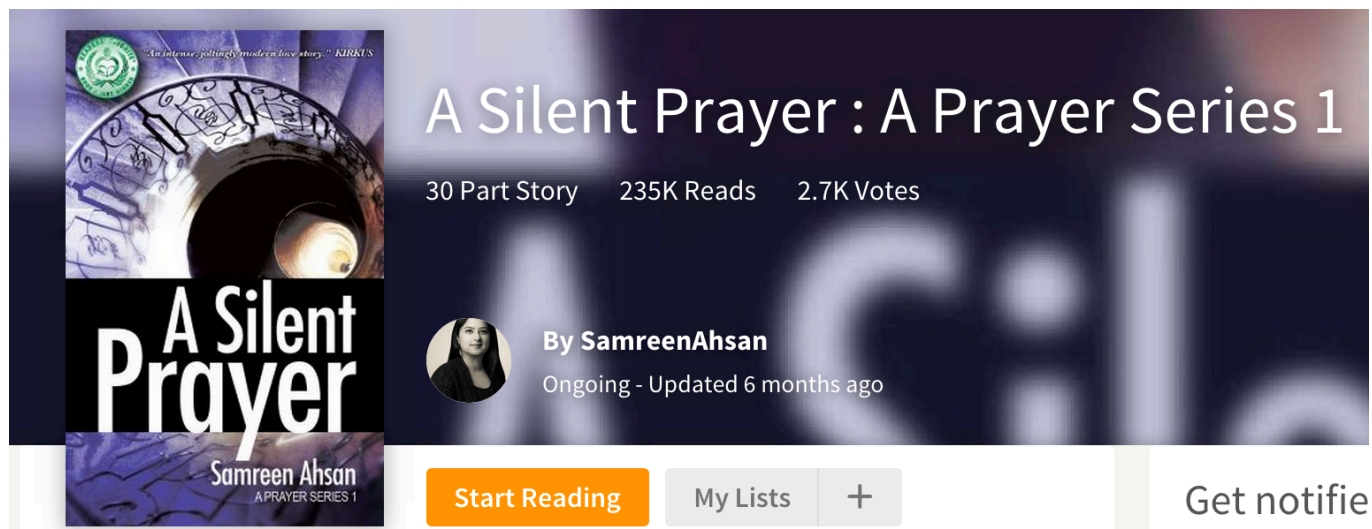
“Miss Young” he calls on me.

“The first time I read the novel I was on the edge of my seat to see whether they would end up together. Even now, as I have read it at least ten times I still feel anxious during the beginning of their relationship. Mr. Darcy is so cruel and says hateful things about Elizabeth and her family so I didn’t know if she would forgive him, let alone love him.” I answer and smile.

(“*After*,” Chpt. 24, Page 2)

A Silent Prayer

- “Supernatural” Romance
- Also a statement on the first generation immigrant experience
 - Conflict between religious tradition and contemporary culture
- Clever use of allusion and a plot framed by the *Qu’ran*



A Silent Prayer and the Qu'ran

“No. there are many, more than the human population. They have a world within our world, but we can't see them unless they want to be seen. There are males and females. There are good ones and bad ones, as well. You know what the interesting part is? Each human has been assigned a Jinni, a demon. We don't see it but it is always there. We recognize it when our soul is not strong enough to protect our body and our demon takes over, which makes us do all of the possible sins.”

(“A Silent Prayer,” Chpt. 16, Page 4)

Yet the foolish among us hath spoken that which is extremely false of GOD; but we verily thought that neither man nor genius would by any means have uttered a lie concerning GOD. And there are certain men who fly for refuge unto certain of the genii; but they increase their folly and transgression: and they also thought, as ye thought, that GOD would not raise any one to life. And we formerly attempted to pry into what was transacting in heaven; but we found the same filled with a strong guard of angels, and with flaming darts: and we sat on some of the seats thereof to hear the discourse of its inhabitants; but whoever listeneth now, findeth a flame laid in ambush for him, to guard the celestial confines.

(The Qu'ran, Chapter 72, 4-9)

A Silent Prayer and the Bible

“Humans are made of clay. God collected seven different kinds of clay from the earth to create Adam. Clay supports and gives life, whereas, fire destroys and burns.” She paused for a moment and continues. “But like Satan, humans also carry pride, envy and arrogance, which sometimes work as a fire. There is a very thin line between humans and Jinn. Though they are invisible to humans, they do exist.

(“A Silent Prayer,” Chpt. 11, Page 1)

- Creation story is retold above
- The character of Adam shares his name with the biblical Adam
 - Emphasizes the genre’s trope of the primal man
- Adam’s sister is named “Eva”
 - Brother and sister are symbolic of temptation

A Silent Prayer and Ismael ibn Kathir

Even after my rudeness, not calling him and thanking him for his kindness, he is still worried about me. After so many years, someone is worried about me. No one would believe that I've seen another side of Adam, which no one knows. *One who is not thankful to a person, is not thankful to God.* The prophet's quote buzzes in my mind and I decide I will call him to say thanks during my journey.

(“A Silent Prayer,” Chpt. 11, Page 1)

“This means respond to the poor with mercy and gentleness.” And proclaim the grace of your Lord. meaning, just as you were poor and needy, and Allah made you wealthy, then tell about Allah's favor upon you. Abu Dawud recorded from Abu Hurayrah that the Prophet said, Whoever is not thankful to the people, then he is not thankful to Allah.

(*Tafsir*, Book 93, 216-225)

Corpus

- Primary works: complete texts of *After* and *A Silent Prayer* from wattpad.com
- Comparison works:
 - The Book of Genesis (Authorized Version, digital text from Project Gutenberg)
 - The Qu'ran (translated by George Sale, digital text from Project Gutenberg)
 - *Tafsir* of ibn Kathir (digital text from the Internet Archive)

Algorithm Parameters

- R “lsa” package
- Query window: 100 words
- Document window: 250 words
- Stoplist: 650 common words (Jockers 2014)
- Thresholds over cosine similarities

Qu'ran Chapter 72 and *A Silent Prayer* Chapter 16

- Three query samples from Qu'ran Chpt. 72
 - All samples from *A Silent Prayer*
 - Threshold: 0.9; 20 topics
 - **Query 1: Chapter 16, Sample 4 (0.906)**
 - **Query 2: Chapter 16, Sample 3 (0.908)**
 - **Query 3: Chapter 16, Sample 3 (0.906)**
 - Control: all samples from *After*
 - No matches
- 100% Precision

Tafsir Chapter 93 and *A Silent Prayer* Chapter 11

- One query sample for *Tafsir*
- All samples from *A Silent Prayer*

- Threshold: 0.75; 10 topics

10% Precision

- Chapter 6, Sample 4 (0.906)

- Chapter 26, Sample 2 (0.817)

- Chapter 7, Sample 3 (0.785)

- Chapter 26, Sample 6 (0.809)

- Chapter 7, Sample 6 (0.802)

- Chapter 26, Sample 7 (0.766)

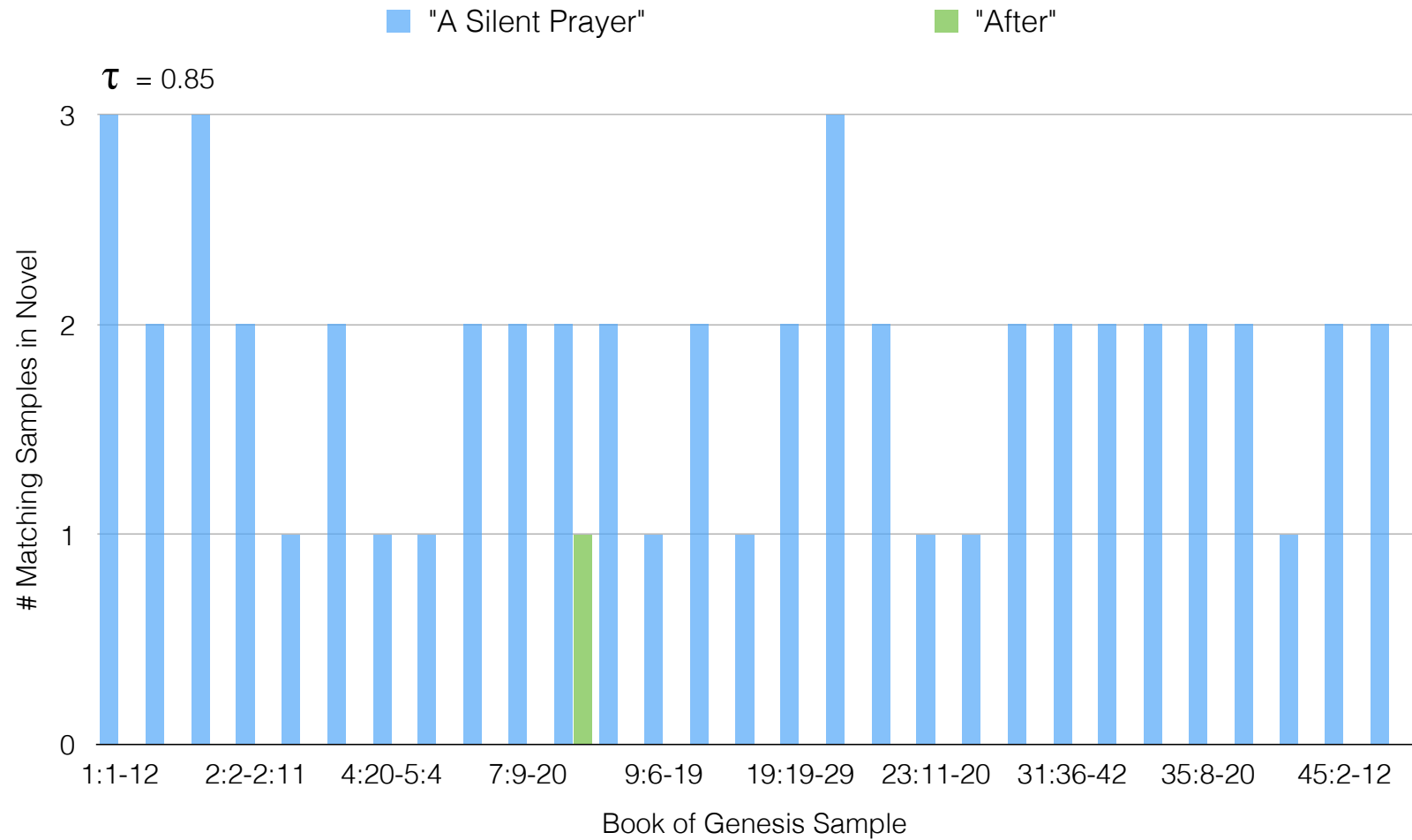
- Chapter 7, Sample 8 (0.772)

- Chapter 28, Sample 3 (0.777)

- **Chapter 11, Sample 1 (0.753)**

- Chapter 28, Sample 4 (0.795)

Matches to Genesis



Discussion

- *After* lacks literary merit compared to *A Silent Prayer*, but is massively popular
- Large scale automated study to understand readership trends
- How can we model an overarching relationship between a novel and its framing material?

Wrapping up...

Resources

- W. Scheirer, C. Forstall, N. Coffee, “The Sense of a Connection: Automatic Tracing of Intertextuality by Meaning,” in *Digital Scholarship in the Humanities*, Vol. 31, No. 1, April 2016
- Already in Tesserae
 - <http://tesserae.caset.buffalo.edu/cgi-bin/lisa.pl>
- R implementation will be on GitHub soon...

Acknowledgements



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Neil Coffee
(U. Buffalo)

Coming Soon...



Questions?