Findings from Statistical Analyses of Dee and Harvey's Marginalia in the Archaeology of Reading (AOR)
January 2019

Now that AOR includes two readers, Dee and Harvey, a key objective of our statistical analyses of the transcription data has been to quantitatively **compare** their respective marginal notes.

1. Understanding AOR "Concept Groups"

AOR "concept groups" were formed by combining single words (that appear at least five times in the corpora of transcribed marginal notes) that are **related in meaning to one another**, whether as synonyms or antonyms. These include both English and Latin words, since the vast majority of marginal notes by both Dee and Harvey were written in these languages. An example is the concept group: *Truth/Falsehood/Doubt*. All forms of each word were included in the concept group (e.g., plurals, tenses for verbs, etc.).

The AOR content specialists identified 56 concept groups, whose validity were then verified through statistical analyses ("confirmatory factor analyses"). Though not entirely empirical, this process of grouping terms provides a preliminary basis for analyzing the large body of AOR manuscript transcriptions as sets of data, and for subjecting these data to statistical methods. The findings from these statistical analyses could not be revealed simply by reading through the marginal notes in these books. By exploring the data in this way, the AOR team offers another way of looking at historical annotations and reading strategies. The formatted data files are available through the AOR website, and present another way to look at historical annotations and reading strategies.

2. Frequency Comparison of Concept Groups

The AOR data analysis team began by looking at how often different concept groups are mentioned in each reader's marginal notes. In other words: **what concepts do each of these readers mention most often**?

However, Dee made many more marginal notes than Harvey, across a larger number of books, so simply comparing the **number** of mentions of each concept group isn't very enlightening—Dee mentions just about everything more often than does Harvey. Instead, the statistical team looked at the **percentage** of each reader's marginal notes that mention a particular concept group (so the base is 100% for both readers, rather than 21,760 marginal notes for Dee and 5,417 marginal notes for Harvey).

We found four concept groups that occur frequently in **both** Dee's and Harvey's marginal notes. These four concept groups are in the top 5 (out of 56) most frequently mentioned concept groups for Dee, **and** the top 8 for Harvey. In other words, they are common concepts for both readers:
- *virtuous, virile, vigorous, robust, man, manliness, strength, power, courage, fortitude, bravery, valor*
- *king, kingdom, sovereign, emperor, prince, principality, leader*
- *time, temporal, age, era, generation*

- *soul, spirit*

The remainder of Dee's most common concept groups are:
- ***Truth, Falsehood, Doubt***
- *note, annotation, notable*
- ***nature***
- ***Reason, Reasoning***
- ***Genealogy***
- *Man, mankind*

The four items in **bold**, above, are mentioned frequently **uniquely within the Dee corpus,** and in fact, are among the <u>least</u> mentioned concept groups for Harvey.

Two other concept groups—*Death, Dying, Slaughter* and *Sea, Ocean, Water*—have significantly higher shares of mentions in Dee than in Harvey, though they did not rank among the 10 most frequently mentioned concept groups. For example, *Death, Dying, Slaughter* ranks #11 in Dee, while *Sea, Ocean, Water* ranks #17.

Conversely, Harvey's other most common concept groups are:
- *art, skill, skillful, faculties, facility, experience*
- *world, globe, orbit (of heavenly spheres)*
- ***Rome, Roman***
- ***individual, alone, unique***
- ***Caesar, Anti-Caesar, Hyper-Caesar***
- *eloquence*

Again, the items in **bold**, above, are mentioned frequently **uniquely within the Harvey corpus,** and are among the <u>least</u> mentioned concept groups for Dee.

A few other concept groups have significantly higher shares of mentions in Harvey than in Dee, though they did not rank in the top 10 for Harvey (ranks in Harvey, below, are in parentheses):
- *Eutrapelus (#15)*
- *worthy, deserving, dignity (#11)*
- *act, action (#16)*
- *politics, political, polity (#20)*

3. How Concept Groups are Related in the Marginal Notes of Dee and Harvey (Correlations and Factor Analysis)

We then asked: **"Which of these concept groups do each of the readers relate to each other?"** Statistically, we looked at how often each concept group was **mentioned in the same marginal note** as each other concept group (separately for Dee's marginal notes, and for Harvey's marginal notes). For example, we found that 72% of the time, when *Body* was mentioned in a marginal note of Harvey,

Harvey also mentioned *Soul/Spirit* in the same marginal note. In the instance of these two concept groups, we calculated a correlation of 0.44 for Harvey. Note that correlations theoretically range from 1.00 to -1.00 (i.e., ranging from positive to negative correlations). A correlation of 1.00 would mean every time one item is mentioned in a marginal note, the other item is also mentioned in that same note. A correlation of 0.00 would mean there is no relationship between the two concepts. Negative correlations would indicate a systematic pattern where the mention of one concept in a marginal note means another concept is correspondingly NOT mentioned in the same note.

We also conducted factor analyses to find **larger groupings** of concepts (since correlations can only be calculated between two concepts at a time). Again, we looked for similarities and differences between Dee's and Harvey's larger groupings of concepts in their respective marginal notes.

The most striking similarity is the close relationship, for both readers, between *Body* and *Soul/Spirit*. However, Harvey also relates *Fortune/Fate/Chance* to *Body* and *Soul/Spirit*, while Dee does not.

Also, while both Dee and Harvey relate *King/Kingdom/Sovereign* (&c.) with *Rome/Roman*, Harvey also relates *Law/Justice/Judgment* and *God/Divinity* to these concepts. In contrast, for Dee, *Law/Justice/Judgment* stands alone, while *God/Divinity* is more closely related to *Man/Mankind* and *World/Globe/Orbit (of heavenly spheres).*

Dee and Harvey also differ in the concepts that they relate with *Industry/Diligence/Assiduousness*:
- Dee: *Industry/Diligence/Assiduousness +Work/Labor*
  - In contrast, Harvey relates *Work/Labor* to *Art/Skill/Faculties, etc.*
- Harvey: *Industry/Diligence/Assiduousness + Virtuous/Virile/Vigorous etc. + Temperance/Prudence/Self-Control*

Although both Dee and Harvey relate *Gold* with *Secret/Arcane*, the two readers also relate *Gold* to other, different concepts:
- Dee: *Gold + Daily/Everyday + King/Kingdom*
- Harvey: *Gold + World/Globe*

Harvey relates *Politics/Political/Polity + Philosophy + Economy*, whereas *Economy* rarely appears in Dee's marginal notes. For Dee, *Philosophy* is most highly correlated with *Secret/Arcane.*

Harvey also groups *Politics/Political/Polity + Shrewd/Cunning* (&c.) + *Act/Action*, whereas none of these terms appears very often in Dee's marginal notes.

Similarly, Harvey groups *Books/Pamphlets/Manuscripts + History + Memory/Mnemonic/Forgettable*, whereas again, none of these terms are very common in Dee's marginal notes.

Conversely, several of Dee's groupings are of terms that appear infrequently in Harvey's marginal notes:
- *Sea/Ocean/Water + Earth/Field*
- *Genealogy + Death/Dying/Slaughter*
- *Lord/Master/Govern/Subdue/Rule + House/Household/Residence*