

**‘Beauty’ and the ‘beautiful’: a computational enquiry into the eighteenth-century concept of *aesthetics***

Throughout the eighteenth century the word ‘aesthetic’ did not so much change its meaning, as accrue one particular significance which is still with us today. In 1735, when Alexander Gottlieb Baumgarten used the word, it referred mainly to the empirical study of sense perception and the imagination.<sup>1</sup> Gradually over the years, passing through the theoretical hands of Shaftesbury and Francis Hutcheson, from Gottfried Wilhelm Leibniz and Christian Wolff to David Hume and Immanuel Kant, the word (so the usual narrative goes) ended the European century also referring to the study of beauty, whether this encompassed natural or artefactual beauty, or both.<sup>2</sup> Of course, the concept of *beauty* existed prior to the semantic change wrought in and by the word ‘aesthetic’.<sup>3</sup> Nonetheless in the eighteenth century the two words’ semantic evolution were intertwined.

Using computation to study the morphology of the language involved in this historical evolution, however, problematises the story in several fascinating ways. Looking into the different uses of, and lexical environments around, the noun ‘beauty’ and the adjective ‘beautiful’, reveals to us that these two words did quite different kinds of semantic work in eighteenth-century aesthetic discourse. This is to say, that ‘beauty’ inflected the historically bounded concept of *aesthetics* in different ways to how the adjective ‘beautiful’ did. Showing

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<sup>1</sup> Alexander Gottlieb Baumgarten, *Meditationes philosophicae de nonnullis ad poema pertinentibus* of 1735 was published as *Reflections on Poetry* (Berkeley and Los Angeles, University of California Press, 1974).

<sup>2</sup> The most compelling and lucid account of this historical change is provided in the introduction to Peter de Bolla and Andrew Ashfield eds, *The Sublime: A Reader in British Eighteenth-Century Aesthetic Theory* (Cambridge: Cambridge University Press, 1996). Mary J Gregor also provides a fine historical account of Kant’s critique of rationalist aesthetics and the provenance of aesthetics in logic, in ‘Baumgarten’s “Aesthetica” in *The Review of Metaphysics*, Vol. 37, No. 2 (Dec. 1983), pp. 357-385

<sup>3</sup> Italics will denote references to concepts as opposed to words as they appear in the ECCO corpus.

how this is true and unpacking the implications of this for how knowledge was structured, are this article's main objectives.

Below, the two different semantic profiles of 'beauty' and 'beautiful', across the corpus Eighteenth-Century Collections Online (hereafter ECCO), will be made visible for the first time. Using custom-designed word co-association measures, this study will present the lexical company that these words kept at various points throughout the eighteenth century. The results will be presented numerically at first, and then in the form of semantic networks; diagrams that show how not only the semantic contents of these words' lexical surroundings altered through time, but how structured relations between these words and their co-associating terms were also susceptible of dramatic historical shifts.

It is crucial to note that the terrain of enquiry in this article is the common, aggregated stock of printed writing as held by ECCO, and decidedly, intentionally not what was written by individual actors, be they authors or editors. Investigating knowledge as it is held in the impersonal, aggregative repository of the historical corpus, differences in word type will be used apertures onto different ways of knowing in the most common sense.<sup>4</sup> What will be made visible are the knowledge structures that obtained across the vast, impersonal whole of the ECCO corpus and invisible to close readers, no matter how many these number or how assiduously they read. Associations between many, many words, the semantic communities

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<sup>4</sup> Of course, the argument could be presented with the agency inverted. Reversing the dynamic, one could begin with the position: the contours of what was known about art and the sublime, truth and knowledge, were in part shaped by the different grammar employed in signifying the human experience of art and the sublime. Different word types produced distinctive forms of language use and, by extension, particular structures of conceptualisation. In regarding a corpus as a repository of knowledge, one cannot consider the corpus as a kind of brain to which mental representations (concepts) are made. Starting with the idea of concepts as shared, common entities, language use does not merely give the historian of ideas signals of conceptuality; it constitutes and shapes that conceptuality. The author does not necessarily eschew this position, but in plain terms it is not the concern of the current enquiry.

which are generated, by these, the patterns and forces within them, and the structures of knowledge which come about as these are used by many authors, are indissolubly linked. The processes of historical reconstruction in this study would be impossible without the affordances of digital technology.

The conclusion will discuss the results presented here in light of some of the key currents in eighteenth-century aesthetic philosophy, and with reference to recent critical discourse on these.

For Review Only

### 1- Different, evolving lexical environments for 'beauty' and the 'beautiful'

In all forms of linguistic expression, certain words are more likely to appear in proximity to one another, than others. The word 'parliament' is more likely to occur in sentences with the word 'Thames' than with 'golf', for example. Several methods in corpus linguistics have

<b>'logarithm' 1700-1750, distance 5</b>	
logarithm	427663
logarithms	110737
semidiameter	78565
arithmetical	51014
index	47886
complement	42554
ratio	42293
fluxion	40377
parallax	33959
quotient	29321
log	29064
decimal	26170
secant	25645
fraction	23509
divisor	21338
tangent	19959
numerator	18813
proportional	18537
dividend	17470
corresponding	16728
cube	16528
radius	16435
denominator	16391
number	16062
remainder	14492
seconds	13339
product	12850
fluent	11081
abating	10318
integer	9972

grappled with, and in their own ways solved, the problem of accounting for the likelihood of words co-associating. We may now quantify how much more likely 'parliament' and 'Thames' are to occur than 'parliament' and 'golf', in historical corpora. This article uses a measure that was custom-built for this research by the author, called *Distributional Probability Factor* (hereafter *dpf*). As much information about how *dpf* works as is feasible within the space provided, will be given in the footnotes here.<sup>5</sup>

The table to the left shows the words most likely to occur at a distance of five from the word 'logarithm' in the decade 1770-80 in the ECCO

<sup>5</sup> As in many measures of this kind, for *dpf*, the 'observed' number of co-associations between words in the corpus is compared with an 'expected' baseline. This baseline is in fact an artificially-contrived comparator in which no word is more or less likely to co-associate with any other word. In other words, the actual binding between words in natural language is compared with an artificial 'expected' number in which all terms in the corpus are randomised, to calculate strength of binding between words. The headline benefit of the method used here in particular, is that it nullifies the impact of a word's frequency in the corpus as a factor determining its *dpf* score. This means that very infrequent words don't immediately get very high *dpf* scores, and very frequent words don't get low *dpf* scores.

corpus.<sup>6</sup> These are in ranked order, with the most-likely at the top. The top thirty words are shown here, giving a good impression of what most authors who published texts in this discursive environment would have written in sentences with this word.<sup>7</sup> Viewing the company that words keep is important, because a large part of how meaning is constructed is through words' relations with other words. Words which tend to occur relatively close together in lexical space produce communities in which semantic content is produced and inflected.<sup>8</sup>

In the above case of 'logarithm', the language we find inflecting its meaning could, perhaps, have been predicted. It is not particularly surprising. But when the objects of enquiry are not words surrounded by such predictable, contextual or disciplinary vocabularies, interesting things can be recovered from the historical record. 'Beauty' and 'beautiful' are two such objects of enquiry. The following two tables contain the binding lists at distance ten for 'beauty' and 'beautiful'. Because we are interested in historical semantic change, each

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<sup>6</sup> The list is curtailed- the full list would run for tens of pages. One of the perennial problems of the user of data in enquiries such as these is to decide how much to use, where to threshold. There is no settled view on how many words are available to the individual thinker as they undertake the various forms of linguistic communication. But more pertinently, this study does not concern individual thinkers but in fact wishes precisely to escape their cognition, to recover, historically, what a vast polity of writers wrote. There is certainly no theory of how many words should make up a list such as this, therefore, and I have used my discretion (and sense of page size) to make the cut off at thirty words.

<sup>7</sup> In the overwhelming majority of cases, the word most likely to occur with 'logarithm', is 'logarithm'. This is a phenomenon known to corpus linguists as 'burstiness', and this is particularly pronounced here. This is to say, that 'logarithm' recurs over and over again near itself in mathematical writing in this time slice of ECCO data.

<sup>8</sup> Many features of these communities contribute to how meaning is generated. These include the semantic contents of the words which constitute them, strengths of binding between those words, most and least frequent words in the community, and several other factors. An important innovation in lexical collocation or several words is Stefan Evert's 2005 thesis *The Statistics of Word Cooccurrences Word Pairs and Collocations*, a link to which is here: <https://elib.uni-stuttgart.de/bitstream/11682/2573/1/Evert2005phd.pdf>. Also, Chapter 5 of Manning & Schütze's *Foundations of Natural Language Processing* (MIT Press, Massachusetts, 2005) has a clear explanation of various measures, and contains a very clear explanation of why low-frequency words cause a problem for PMI in section 5.4. Finally, a brief but nonetheless useful guide has been written by the author's two colleagues Gabriel Recchia and Paul Nulty and published in the CogSci journal: <https://pdfs.semanticscholar.org/c5e8/95600465165a6aeb7096c65fd515d7d6e848.pdf>

column shows what lexis was bound to that word in each of three decades, 1720-30, 1750-60 and 1790-1800. These have been chosen to give an insight into the beginning, middle and end of the eighteenth century.<sup>9</sup>

<b>'Beauty' 1720-30, distance 10</b>	<b>1750-60</b>	<b>1790-1800</b>
rebukes 4605	rebukes 4615	deformity 5019
charms 3529	charms 3818	rebukes 4943
deformity 3484	deformity 3415	beauty 4759
arrangements 3408	beauty 3080	charms 4678
beauty 3263	symmetry 2968	symmetry 3804
bloom 258	bloom 2295	bloom 2974
symmetry 2432	fade 2195	fades 2971
lovely 2341	fades 2182	lovely 2766
captivated 2252	charm 2056	blooming 2700
similarity 2239	features 1940	enamour 2612
charm 2176	lovely 1828	features 2590
features 2038	charming 1768	heraldry 2554
fade 1876	beholders 1738	softening 2536
charming 1844	fairest 1663	fade 2370
verdure 1793	blooming 1613	canker 2367
feature 1745	fair 1597	charm 2323
fading 1681	provident 1595	graces 2299
enamour 1677	cleanliness 1579	graceful 2265
blooming 1643	garment 1509	fair 2067
deform 1640	graceful 1495	complexion 2050
elegance 1625	battlements 1467	admiration 1946
surpassed 1614	fading 1460	sweetness 1925
fades 1593	bright 1451	elegance 1914
doat 1554	gardens 1449	enchancing 1866
fair 1544	unmov 1444	her 1855
helen 1509	moth 1405	venus 1849
nymph 1497	ornaments 1363	nymph 1828
dazzled 1479	attractive 1355	turbid 1819
beautiful 1404	enamour 1342	deformed 1819
her 1402	withers 1342	adorn 1813
cheeks 1396	cupid 1330	charming 1803

<sup>9</sup> All such decisions (about which time periods to choose, how long to make lists of bound terms etc) are based on the discretion of the researcher. There are benefits and drawbacks to every choice made.

<b>'Beautiful' 1720-30 distance 10</b>	<b>1750-60</b>	<b>1790-1800</b>
descriptive 3385	perennial 2873	elegant 2796
vivid 2420	paintings 2060	beautiful 2475
allusions 2237	granite 2017	ornamented 2458
deformed 1975	adorned 1972	variegated 2442
blossoms 1856	marble 1922	plumage 2442
adorned 1822	variegated 1911	adorned 2438
symmetry 1714	allusions 1847	scenery 2380
drawings 1655	flowering 1764	symmetry 2302
examines 1625	stalk 1716	deformed 2237
paintings 1576	gardens 1704	verdure 2179
spotted 1521	elegant 1646	delightful 2137
holly 1496	finest 1639	gardens 2063
abigail 1479	flowers 1613	finest 2060
sparkling 1453	finely 1563	magnificent 2045
beautiful 1445	attitudes 1558	interspersed 2032
stately 1443	gardening 1555	landscape 1858
lovely 1443	delightful 1535	architecture 1827
wildness 1432	symmetry 1514	tints 1813
beauty 1404	tinge 1506	ugly 1810
rainbow 1401	jasper 1500	handsome 1806
imagination 1388	beautiful 1432	paintings 1791
ranged 1385	tops 1393	beauty 1791
ornaments 1377	examines 1393	marble 1760
delightful 1375	ornaments 1346	flowers 1752
clusters 1351	feathers 1336	rainbow 1744
variegated 1325	porphyry 1304	elegance 1714
gardens 1307	charming 1221	villas 1703
allegory 1302	tinged 1212	butterfly 1654
finest 1302	cabinets 1210	charming 1646
deform 1213	ornamented 1182	hills 1626
comely 1207	painted 22331	finely 1623

These tables give an impression of the changing lexical environments in which 'beauty' and 'beautiful' were suspended at different points in the eighteenth century. But the lexis that is common to all three lists is also of interest: the language which binds to these words in all three periods. The words which are common to all three time slices for 'beauty' are:

**beauty bloom blooming charm charming charms deformity enamour fade fades  
fair features lovely rebukes symmetry**

The words which are common to all three time slices for ‘beautiful’ are:

**adorned beautiful deformed delightful finest gardens paintings symmetry  
variegated**

These bolded words provide the historically-immutable picture, while the lexis in the tables show what bound to these two words in different historical periods. And so, with both a diachronic and historically-unchanging picture, we can now begin to make observations about the differing lexical suspensions for noun and adjective.

We may begin with an observation which may seem too baldly indicative to be meaningful. This is that ‘beautiful’ is not found on any of the binding lists for ‘beauty’, and that ‘beauty’ is only found relatively lowly-ranked on the binding lists for the 1720s and 1790s. This means two things. The most obvious is that these words are simply not commonly used together in sentences in these historical tranches of ECCO. Secondly, where they do appear together, there is an asymmetry in the likelihood of readers encountering the noun in sentences containing the adjective, and vice versa.

This is to say, that in general, readers were more likely to encounter the noun ‘beauty’ if the adjective ‘beautiful’ had been used, than the other way round. And across the eighteenth-century corpus, having read the word ‘beauty’, it was surprisingly unlikely that one would then encounter the word ‘beautiful’. The two words simply did not exert much force of attraction upon one another; in fact the weakness of their relation is notable.



But what of the semantic fields within which the two words were embedded across the century? Let us begin with the adjective. In all three times slices, 'beautiful' is surrounded by the language of objects and artefacts. In the 1720s this includes 'paintings' and 'drawings', 'blossoms', 'gardens' and 'rainbows'. Descriptors are suited to things rather than people: 'stately', 'ranged', 'vivid', 'sparkling', 'spotted' and 'variegated'. This is the vocabulary of art and inanimate objects, rather than what is beautiful in the human form. There is a strong feeling of landscapes being described. In the 1750s, and through the 1790s, there is the emergence of a more markedly handmade, artistic conception of the beautiful, in addition to one relating to the environment or landscape. From the mid-century, the adjective is suspended more clearly in architectural and sculptural discursive environments. A type of artistic materiality supervenes: 'granite', 'marble', 'gilding', 'prophyry'. Inasmuch as 'beautiful' is a key tool in the evolving philosophical discourse of aesthetics, these first signs are that this word brings with it the material arts; a vocabulary of tactility and texture.

Considering 'beautiful' in the 1750s and 90s, it seems clear which words are modified by the adjective: 'drawings', 'gilding', 'amphitheatre', 'structure' and 'marble' among others. But the question of which of its other bound terms are cognates, is somewhat less clear. The following could be near or distant synonyms, 'elegant', 'superb', 'polished', but those adjectives relating to ornamentation appear more ambiguous: 'decorated', 'adorned', 'ornamental' and, again, that most riven word in eighteenth-century aesthetics, 'polished'. This word was a site of great contest throughout the proliferation of aesthetic treatises in the century. In poetics alone, the approximately 800 publications on versification, variously used

‘polished’ to describe verse which was overly highly-wrought, too metrically neat, or which relied too heavily on classical allusion and personification.<sup>10</sup>

But this was the view from the late century when neoclassicism, Alexander Pope, John Gay and the long shadow of Dryden, were long gone. While it would be incorrect to assert that these poets and theorists believed that ‘polished’ meant ‘good’ verse, they undoubtedly did live and publish in a poetic milieu in which notions of decorum, balance and proportion, largely derived from Horace’s satires and epistles, were desirable artistic goals. Therefore, ‘polished’ was, in the 1720s, far more likely to refer to the ‘beautiful’ than it would have in the 1790s. The noun ‘rudeness’ underwent a kind of reverse semantic evolution. In Pope’s milieu it named verse which was distended and distorted by extremes of passion and unchecked imagination. But by the end of the century the noun named a redemptive energy; a force which could negate the stultifying learnedness and elegance of the ‘polished’.

Focusing now on the noun ‘beauty’, immediately a clear distinction can be made between the lists for the noun and the adjective. A great deal of the language across all time slices appears to articulate a certain version of feminine beauty: ‘fair’, ‘charming’, ‘enamoured’, ‘captivated’, ‘Helen’. The pronounced lexical binding between ‘beauty’ and ‘charms’ in all three time periods indicates something significant- that ‘beauty’ was something being considered under the desirous male gaze. Of course, ECCO is overwhelmingly a male-authored domain. It is difficult, surveying all three period lists, to surmise anything other than that a male sense of feminine beauty is constructed using this lexis, and that the female is not agential in choosing this language. One interesting feature here is how unchanging this picture is compared to the

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<sup>10</sup> For a fuller investigation of the different directions of travel for ‘polished’ and ‘rudeness’ in eighteenth-century aesthetics see John Regan *Poetry and the Idea of Progress 1760-1790* (London: Anthem Press, 2018).

binding lists for 'beautiful'. The fact that 'beauty' is suspended in a more stable lexical environment throughout the century of printed texts, is indicated by the fact that its list of common terms across all three decades is longer. But even where the exact vocabulary changes across the three historical lists, the same semantic sense is very strong: that this is an enamoured male perspective onto female beauty.

Surveying the search results across the whole century of ECCO data, it becomes clear that indeed 'beauty' and 'charms' are very-commonly yoked together, particularly in publications whose objectives are the refinement of ladies' appearances and deportment. Examples are too numerous to mention, and this study does not aim to close read. Nonetheless one extract, from the preface to *The art of beauty, or, a companion for the toilet. In which the charms of the person are considered and explained* by the intriguingly-named Eminent English physician at the Russian Court, captures the morally prescriptive tenor of much of the writing that places the two words in textual proximity:

Altho' piety, modesty, virtue, good sense, and ingenuity, ought to be the chief objects of every woman's attention; yet since the frailty of human nature inclines men, rather to listen to their senses than their judgment, it must be allowed an innocent at least, if not an [sic] necessary care in the fair sex to cultivate beauty.

For this purpose was the following book written; namely, to enable the ladies to cultivate, and illustrate the charms which Nature hath given them [...]<sup>11</sup>

There is, in the above text and in the lists above, an intriguing intersection between language naming the development of flora and that describing the female object. One may chart the concurrent flourishing and decline of the flower and the woman: 'bloom', 'blooming', 'deformity', 'fade', 'fades'. Some other interesting features occur further down the lists such

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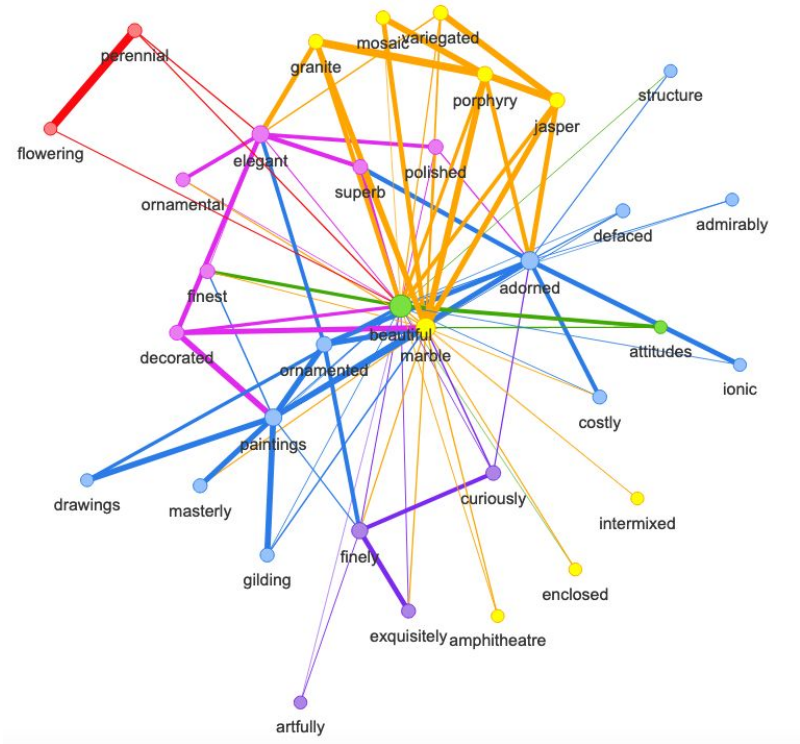
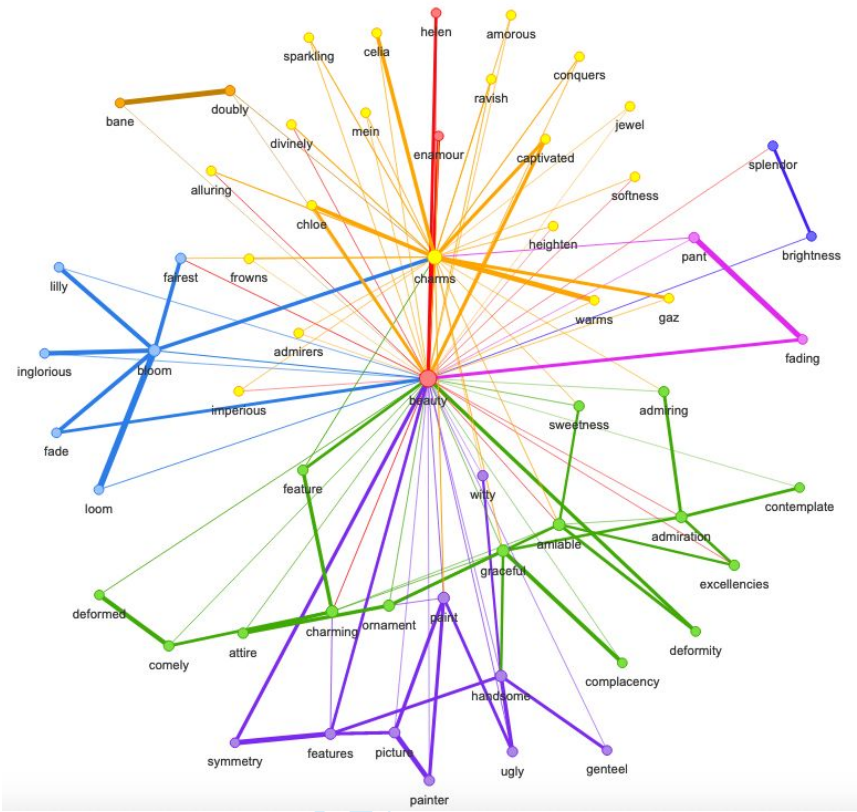
<sup>11</sup> Eminent English physician at the Russian Court, *The art of beauty, or, a companion for the toilet. In which the charms of the person are considered and explained* (London: J. Williams, 1760), p. iv.

as ‘garment’ and ‘cleanliness’ in the list for 1750s. The high ranking of ‘rebuke’ in all lists shows that beauty was certainly embedded in an ethics of sorts. The intention of this article is not to close read, but one can imagine how beauty is something to suffer, rather than to enact, rebuke. We are in the era of Jonathan Swift’s vituperations against female vanity and it appears likely that ‘beauty’ would form a locution with ‘rebuke’ in the sense that a woman’s too-great interest in beauty would (by some lights) require chastening.

These lists, produced by each single word, are inadequate if the aim is to reconstruct the structures of knowledge within which the noun and adjective were embedded in the eighteenth century. We may now, by computation, take each set of terms in which a word is embedded in each time period, produce binding lists for all of those words, and visualize the binding connections between many terms. Doing so will reveal the structure of the discursive environments which dominate the ECCO corpus in a range of historical periods.

On the following page we find the first diagrammatical representation of this binding. The following two graphs are the semantic networks for ‘beauty’ and ‘beautiful’ respectively in the 1720-30 time slice through ECCO:

*Note to editor- please allot a separate single page for these two diagrams*



A clarifying note before interpreting- if words on these graphs are connected by a line, they appear on one or another's binding lists. This is known as first-order collocation or binding.<sup>12</sup>

The thickness of connecting lines indicates the strength of binding, quantified here as the *dpf* number between these terms. A thicker line indicates a higher *dpf* number.<sup>13</sup>

These semantic network diagrams straightaway confirm what was indicated by the initial binding lists, and expand the picture that they provided. Firstly, we find a clear visual representation of the fact that 'beauty' was indeed strongly yoked to 'charms', and that these two words were focal points for the majority of this lexis in the 1720s tranche of ECCO. *Dpf* uses what is called a community detection algorithm to group words according to those which occur in proximity to one another most frequently in texts in this time slice. These communities are given colours. Looking at the large yellow and green communities that largely connect to both 'charms' and 'beauty' gives a clear impression of just how similar their lexical environments were in this time. This evidence points to the fact that where 'beauty' occurred, so did 'charms', and that both words were surrounded by the same kind of lexis.

<sup>12</sup> What we are being shown in these graphs is the likelihood of word use among a great many writers in a given time period. Each word-node is like a junction on a road map. As in most road maps, we see a delimited terrain and a limited number of moves that one may make given where one is situated. The many thousands of eighteenth-century writers are the travellers in this environment, and the graphs reflect the many thousands of decisions that they made about word choices in their writing. If there is a line between two words, a great many writers chose to use one word in a sentence with another.

<sup>13</sup> These interpretations of network diagrams, collocations and network theory in relation to knowledge are informed by the following: M. Stubbs, 'Collocations and Semantic Profiles' in *Functions of Language*, (1995) 2(1), 23-55. And M. Philips, *Words and Phrases* (2001). London: Blackwell. *Aspects of Text Structure: An Investigation of the Lexical Organisation of Text*. Amsterdam, Netherlands: North-Holland. Phillips, M. (1989). *Lexical Structure of Text*. English language research. Birmingham: Birmingham University. Brezina, V., McEnery, T. and Wattam, S. (2015) Collocations in context: A new perspective on collocation networks. *International Journal of Corpus Linguistics*. 20(2), 139-173. Church, K. W., & Hanks, P. (1990). Word association norms, mutual information, and lexicography. *Computational Linguistics*, 16(1), 22-29. Durrant, P. and Doherty, A. (2010), 'Are high frequency collocations psychologically real? Investigating the thesis of collocational priming.' *Corpus Linguistics and Linguistic Theory* 6 (2): 125-155.

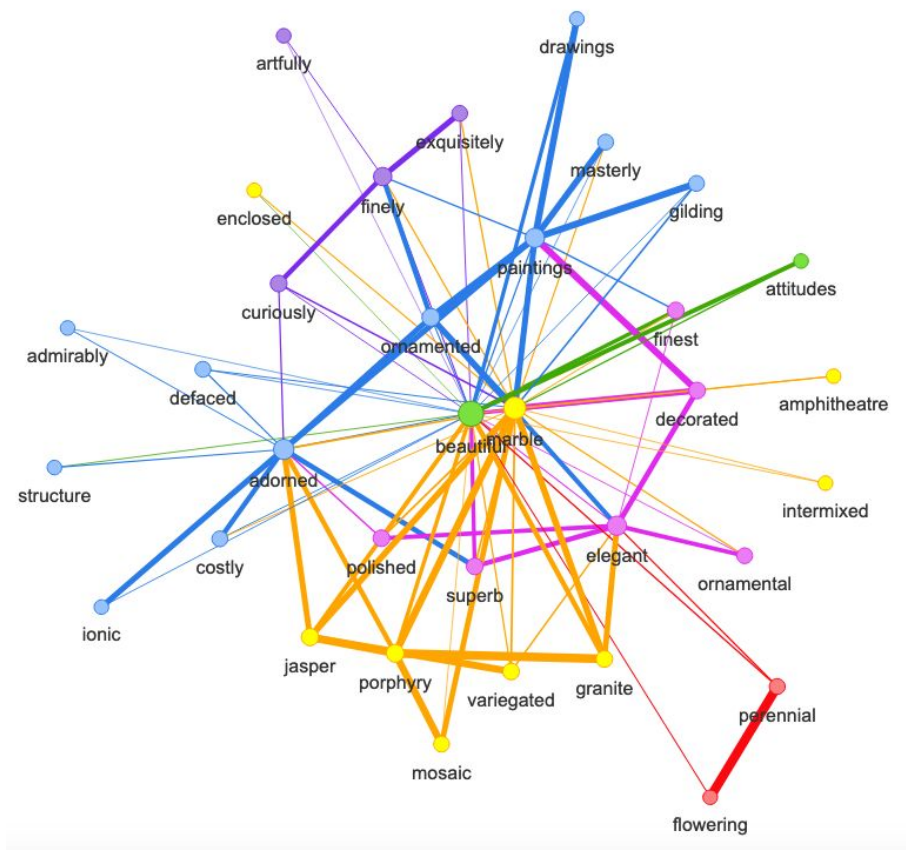
Beauty is indexed to 'charms', and this relation of the singular to the plural appears significant. Lexis connected to both words is a list of the accoutrements and features of female deportment and the facets of male seduction. Again the gaze is highly gendered: 'Chloe', 'mien', 'ravish', 'softness', 'captivated' and 'amorous'. The community in green is less overtly gendered but still indicates sexual desire, male pursuit: 'features', 'witty', 'sweetness', 'admiring', 'admiration', 'attire', 'charming', 'ornament', 'graceful' and 'amiable'. That 'deformed' appears in this community indicates its embeddedness in a discourse of female cosmetic and sartorial appearance.

Turning to visualisations of lexical co-association for the ECCO decade 1750-60, two features may be observed immediately. Firstly, the structured relations between words in each semantic network, broadly retain the shapes that we observed in the earlier time slice. The semantic networks for 'beauty' are shaped markedly differently to those for 'beautiful':









These diagrams provide further evidence not only of the semantic separateness of the noun and the adjective, but of the ways in which the lexis around them is connected and structured. Again, as in the earlier time slice, ‘beauty’ and ‘charms’ constitute two focal points for a wide range of words, and these words, on the whole, are not interconnected themselves. Contrast this with the network structure for ‘beautiful’, and we may note how the lexis binding to ‘beautiful’ and ‘marble’ is itself interconnected, visualised in the criss-crossing lines between nodes. We will go into the implications of these different structures in the next section, and argue that these shapes signify differences in how knowledge was structured in these time periods of ECCO data. But for now, we will conclude on some points on the semantic, rather than the structural, contents of these networks.

While it would be misleading to suggest that the domain of male and female romantic desire and pursuit, the world of cosmetic and sartorial charms, were unrelated to aesthetics in the anglophone eighteenth century, there is no significant overlap in these mid-century graphs and those for the 1720s, between an overtly artistic, artefactual lexis, and the vocabulary of the female toilet. We are again faced with a stark semantic distinction between the materiality of sculpture and landscape, and that which is endearing, dazzling, captivating and enamouring. It does seem somewhat remarkable how little of the world of artistic affect and aesthetic effect makes its way into the lexical purview of ‘beauty’.

What is fascinating is that *beauty* seems to operate, in the early and mid-century semantic networks, as what Peter de Bolla has called a ‘containing concept’.<sup>14</sup> That is, along with ‘charms’ with which it is lexically yoked, it seems to encompass and be comprised of, the paraphernalia of heterosexual courtship, as viewed from the male perspective. This is to argue, that *beauty* does not contain a typology; it is not comprised of a list of types of beauty. Rather, it functions taxonomically, arranging and structuring the apparatus and facets of male ideas of feminine attractiveness.

By contrast, *beautiful* is surrounded if not by versions of itself as such, then at least by the materials from which ‘the beautiful’ could conceivably be fabricated. The lexical surroundings of the adjective are things which humans make which are beautiful, and the materiality of such things. It has already been noted that its lexico-semantic surroundings articulate the tactile, physical arts of landscaping and sculpture. Painting seems subordinate to an aesthetics of the malleable; that which can be refashioned. That these are the arts which

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<sup>14</sup> This theory of containing concepts, along with a more fully realised typology of concepts generally, is developed in Peter De Bolla, *The Architecture of Concepts: The Historical Formation of Human Rights* (Fordham University Press, 2013).

subordinate all others is perhaps a part of the history of the concept of the *aesthetic* that had hitherto remained invisible.

Finally in this section, before moving on to a study of the structures rather than the semantic contents of these semantic networks, we will use a method of enquiry that is common in network science, to cast further light on which parts of these semantic networks were the busiest. This is to say, that not all word-nodes in these graphs were used equally. We may now discover the most-used parts of these historical pictures of word use: the binding relations which were most commonly employed. In plain terms, this means a measure of how many times word were used together (say ‘beautiful’ and ‘marble’ compared with ‘beautiful’ and ‘paintings’). We can do this by employing a method of computational analysis called betweenness centrality.

Betweenness centrality highlights the amount that a given node is likely to be used, no matter where one is and where one wishes to get to in the map.<sup>15</sup> In terms of this study, betweenness centrality tells us which word is most-used in a given discursive environment. It is important to remember that, even if a given word-node in a semantic network has many lines heading in and out of it, this is not necessarily an indication of intensive use. Rather, if a word node’s connections to others are extensive, this may only indicate a wide range of binding links without intensive, frequent use by the authors writing the texts in ECCO.

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<sup>15</sup> Betweenness centrality is calculated in a fairly intuitive way. The computer picks two nodes at random and find the shortest path between them. It gives a point to each node that you pass through. It does this very many times. The number of points for each node is its betweenness centrality. This is a good means of address to a data set of such vast aggregation, constructed by the accrual of an almost-unimaginable number of decisions about word uses across a vast number of publications.

<b>Between-ness centrality scores in semantic network for 'beauty' in 1720s</b>		<b>1750s</b>		<b>1790s</b>	
1210.5	beauty	683.5	beauty	288.5	beauty
72.0	charms	18.5	charms	9.0	admiration
5.5	charming	1.5	alluring	7.0	features
5.5	amiable	1.0	heightened	7.0	graces
0.5	pant	0.5	enchanted	6.0	charms
0.5	doubly	0.5	garment	2.5	lovely
0.5	graceful			2.0	charm
0.5	paint			2.0	attract
0.5	witty			2.0	captivated
				1.0	bloom
				1.0	attractive
				1.0	exquisitely
				1.0	transcendent

<b>Between-ness centrality scores in semantic network for 'beautiful' in 1720s</b>		<b>1750s</b>		<b>1790s</b>	
233	beautiful	354	beautiful	187.0	beautiful
6	admirable	23	marble	4.0	delightful
5	agreeable	4	elegant	2.5	elegant
1	ornament	1	finest	1.5	ionic
				1.0	ornamented

These tables give us new perspectives on what was happening in the common uses of the noun ‘beauty’ and the adjective ‘beautiful’ in the eighteenth century of ECCO data. The headline observations which can be made about this centrality data are as follows. Firstly, while ‘charms’ is clearly very strongly-connected with ‘beauty’, and while it is connected to a great many of the terms in the semantic networks shown above, it is far, far less commonly used than ‘beauty’ is in relation to those words. This is observable in the vast differential between the centrality scores of ‘beauty’ and ‘charms’ in all three time periods: in the 1720s, 1210 / 72, in the 1750s, 688 / 18, and in the 1790s, 288 / 9.

So, while the semantic network has been useful in making visible the strong locutional link between ‘beauty’ and ‘charms’, and while the two words do share a significant amount of bound lexis, the lexis in the above graphs is by several orders of magnitude more likely to occur with ‘beauty’ than with ‘charms’. What this means is that while ‘beauty’ is bound strongly to ‘charms’, and ‘charms’ does form connections with a lot of the same lexis as beauty, the main player in the network is ‘beauty’. In the following section we shall reconstruct why the centrality of ‘beauty’ declines through time, but even given this decline, the word is the centre of gravity in the domain of male descriptions of what is charming, amiable and captivating in women. In other words, ‘beauty’ is the real unifying force in these discursive environments. While it co-associates with ‘charms’, the word ‘beauty’ is overwhelmingly the word with which the vocabulary of feminine charm and attractiveness associates.

Looking to the centrality profile for the adjective, again we note that ‘beautiful’ is overwhelmingly the most-used word in this semantic network. The centrality lists above don’t significantly alter the impression that we have gained already: that the word’s semantic

surroundings resemble aesthetics pretty much as we still employ the word and the concept, whereas ‘beauty’, being so rooted in romantic love, does not seem to be an important concept of modern aesthetics. Its semantic contents, historically-bounded as we view them here, have not survived to inflect modern aesthetics. To realise as much is not to say that there is nothing interesting about the semantic components of the aesthetic discourse that ‘beauty’ exists in: what makes the lexical cut, and what does not.

Now, as we turn toward the picture provided for noun and adjective in the late eighteenth century, the focus will turn to the structural characteristics of each, and the remarkable changes that these undergo in the late eighteenth century.

## 2- *From co-association to the knowledge structures of ‘beauty’ and the ‘beautiful’*

To fully grasp the implications of the differences between ‘beauty’ and ‘beautiful’ for aesthetics, attention must be paid not only to the semantic contents of their lexical networks, but to the *structures* of relations within these. In both the 1720s and 1750s networks we observed how ‘beauty’, along with ‘charms’, sat at the centre of a bicycle-wheel type shape of binding connections. These words were crucial convergence points for a welter of vocabulary, particularly, as we have just reconstructed by using a centrality measure, the noun ‘beauty’.<sup>16</sup>

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<sup>16</sup> Arguments about the relation of network motifs to knowledge structures, while not profuse in the literature, have received some attention, as in Alonso, A., Millon, C., & Williams, G. (2011). ‘Collocational networks and their application to an E-Advanced Learners Dictionary of Verbs in Science’ (DicSci). In I. Kosem, & K. Kosem (Eds.) *Electronic lexicography in the 21st century: New Applications for New Users: Proceedings of eLex 2011*, (Bled, 10-12 November 2011), pp. 12-22.

Recognising as much does not necessarily mean that ‘beauty’ or ‘charms’ were any more important than any other terms in these discursive environments of male desire, but that they were undeniably lexical and conceptual presences to which a considerable amount of other vocabulary gravitated. ‘Beauty’ and ‘charms’ were, self-evidently, touchstones without which the uses of the other words and their meanings would lose this particular type of consistency in this particular precinct of eighteenth-century printed knowledge. It falls to each observer what they wish to extrapolate about this structure in terms of what it tells us about knowledge in the time. In the case of beauty, as has been articulated, (and one is aware of stretching a simile rather), ‘beauty’ and ‘charms’ operate almost like make-up bags or toilet cabinets, containing the apparatus of female cosmetics and beauty. The words, and by extension the concepts, contain the tools and characteristics by which female beauty coalesces.

In his pleasingly rebarbative book *Graphs Maps Trees*, Franco Moretti strikes a justly sceptical note at the start of the second chapter:

There is a very simple question about literary maps: what exactly do they *do*? What do they do that cannot be done with words, that is: because if it can be done with words, then maps are superfluous. Take Bakhtin’s essay on the chronotope: it is the greatest study ever written on space and the narrative, and it doesn’t have a single map. Carlo Dionisotti’s *Geografica e storia della letteratura italiana*, the same. Raymond Williams’s *The Country and the City*, the same. Henri Lafon’s *Espaces, romanesques du xiii<sup>e</sup> siècle...* Do maps *add* anything to our knowledge of literature?<sup>17</sup>

This is most definitely not a study of literature. However if, as is the case here, the objective is to provide a new or complementary account of the development and transmission of

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<sup>17</sup> Franco Moretti, *Graphs Maps Trees*, (London, Verso: 2007), p. 35. Equally relevant to this part of my discussion is Moretti’s latest publication at the time of writing, co-authored with Oleg Sobchuk: ‘Hidden in Plain Sight’ in *New Left Review* July / August 2019 (<https://newleftreview.org/issues/II118/articles/franco-moretti-oleg-sobchuk-hidden-in-plain-sight>).

knowledge as viewed across a very large historical data set. To paraphrase, then, what exactly do the above kinds of network diagram do?

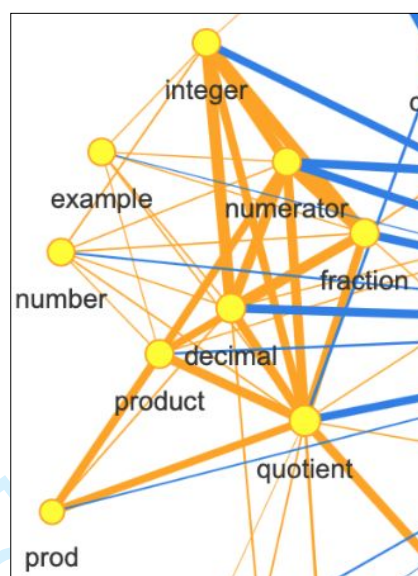
Principally, they orient our attention around structural relations between numerous words. Thinking this way about the above diagrams, what has been made visible by them, is that the words ‘beauty’ and ‘charms’ behave as central points or hubs for related lexis. The words are the unifying forces in a lexical community: other terms qualify, add richness or complexity to, the central term. The lines (called edges in network theory vocabulary) which flow into and out of ‘beauty’ look something like the spokes of a bicycle wheel. This wheel-like structure (hereafter called a degree community) is very common in the network diagrams which are produced from ECCO data, but it is only one shape among several. These patterns are the grammar of impersonal knowledge. They are signals, observable only when one can scan across the whole of ECCO as we can here, about how knowledge was structured. Digital enquiry is allowing us a new view onto a more structural understanding of the vast diachronic shapes and movements of how many people knew.

To understand this idea of a knowledge structure further, we might imagine the counterfactual- that instead of ‘beauty’, or indeed any word, sitting centrally amidst a host of lexically-bound word-nodes, there was mutual or reciprocal binding between all nodes in a given part of a graph. Instead of one word being a convergence point for many other words’ binding, all word-nodes connect to all others.<sup>18</sup> In fact we do not need to imagine, but may observe what this looks like. This example comes from the already-cited domain of logarithmic mathematics across the data set of 1770-80 in ECCO:

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<sup>18</sup> My understanding of knowledge and networks, with particular emphasis on structural and spatial elements, has been shaped by *Knowledge and Networks*, edited by Johannes Glückler, Emmanuel Lazega and Ingmar Hammer (Springer Open access online, 2017).



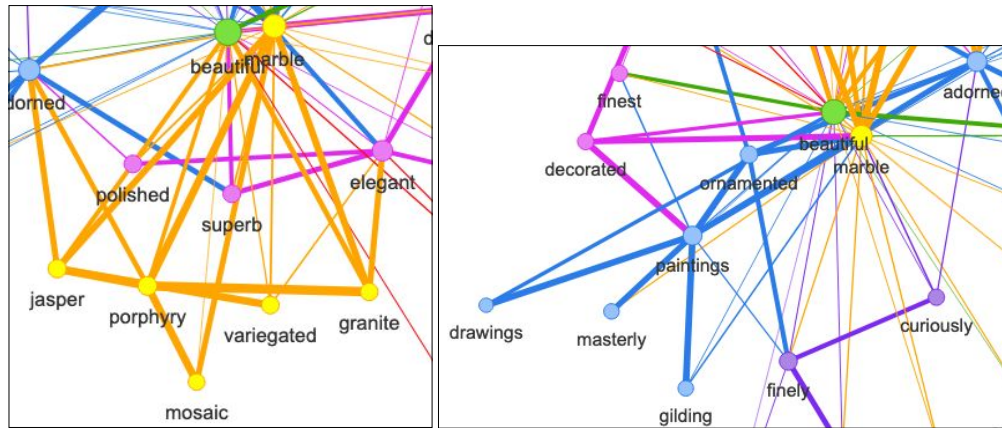


Many, many authors in this historical period of the eighteenth century used this set of words and their meanings, in a pattern of mutual interconnectedness. All words are reliant on all other words: this is an epistemological structure which operates *as a set* rather than with repeated reference to one term in particular (this will be called a ‘relational community’. This structure suggests a more diffuse or equal distribution of use and emphasis across several terms, rather than a reliance on one. The difference in organisation of bound terms forces us think about a difference not only in word-use but in how knowledge was structured.<sup>19</sup> We can chart the development of such structures as these, and others, over the century, and by so doing uncover not only which words were commonly used but the structures within which popular words were used by a great many anglophone authors.

If ‘beauty’ is central to the degree community, along with ‘charms’, then the words around ‘beautiful’ show a far greater tendency toward interrelatedness. The following two images are

<sup>19</sup> Relations between word binding and the structures of knowledge, are discussed suggestively in Paul Baker’s ‘The shapes of collocation.’ *International Journal of Corpus Linguistics* (2016) 21(2): 139-164.

cropped- the first from 1750-60 for ‘beautiful’ and the second from 1720-30. Both contain the criss-crossing that is so pronounced in the above case of mathematical terminology:

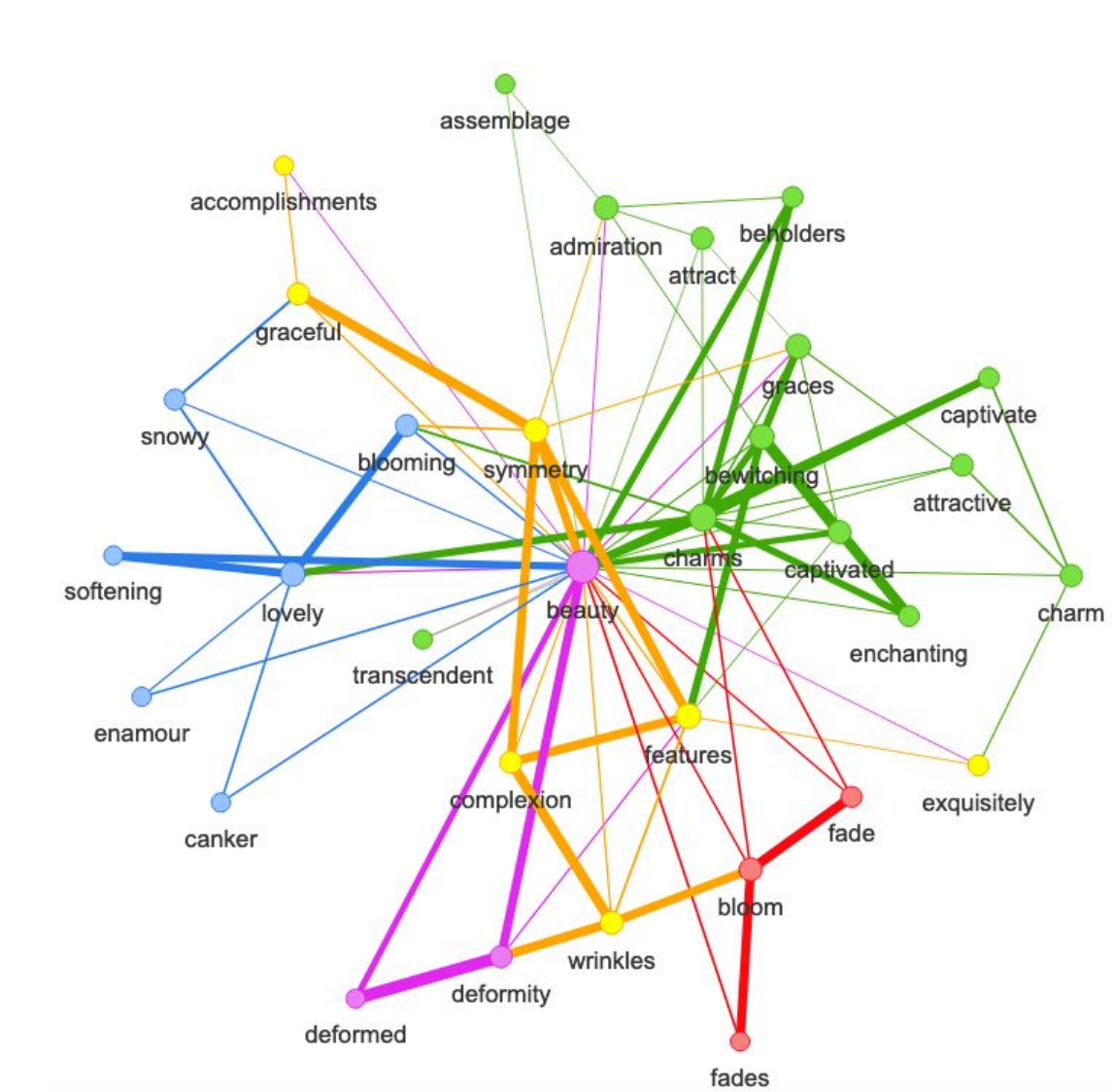


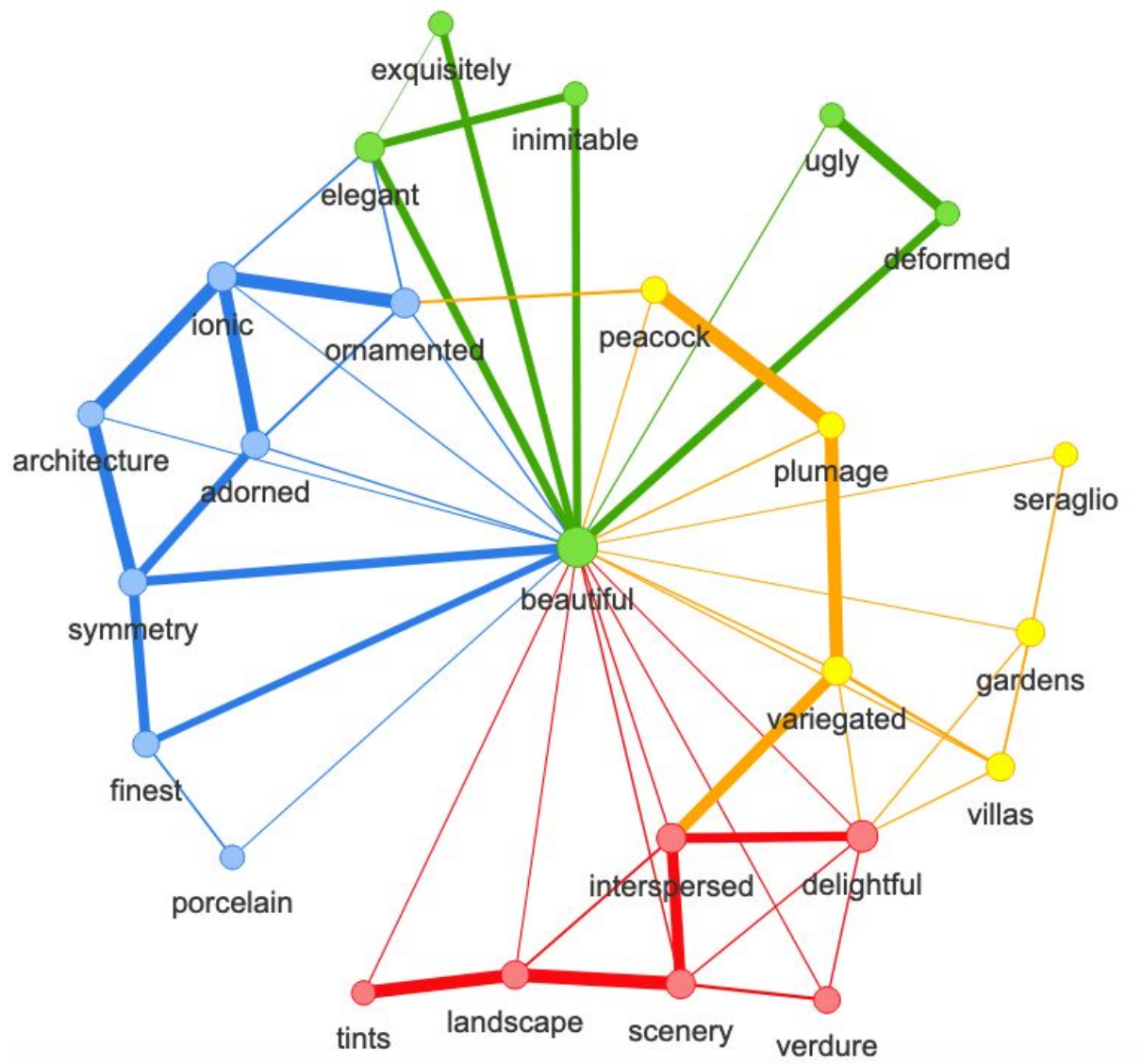
This is clear evidence that ‘beautiful’ in the early and middle century of ECCO data is not only semantically distinct from ‘beauty’, but that the ways in which its co associating lexis relates, is structurally distinct, too. A set of terms which tend to relate to several of the words in that set, as we see in these two cases above, is a different type of language use to that in which numerous terms relate only to one centralising word-node. ‘Beautiful’ was a word surrounded by relational discursive communities of artistic production; the grit and touch and work of sculpture and landscaping. These communities came with their own internal logic and terms of reference, whereas the words surrounding ‘beauty’ and ‘charms’ tended only to need these nouns for certain types of (amorous, cosmetic) sense to be made. We can well imagine how ‘granite’, ‘porphyry’, ‘marble’ and ‘variegated’ combine in a discourse of ‘the beautiful’, without that adjective containing these as such, as we saw in the case of ‘beauty’'s containment of the accoutrements of female appearances.

And because these semantic networks are structured in such distinctive and different ways, it seems at the least arguable that they present us with evidence that knowledge using the

concepts *beauty* and the *beautiful* was structured quite differently. The semantic distinctiveness of both, in addition to and working in agential concert with, the very clear structural differences laid out above, point to two quite different ways of knowing.

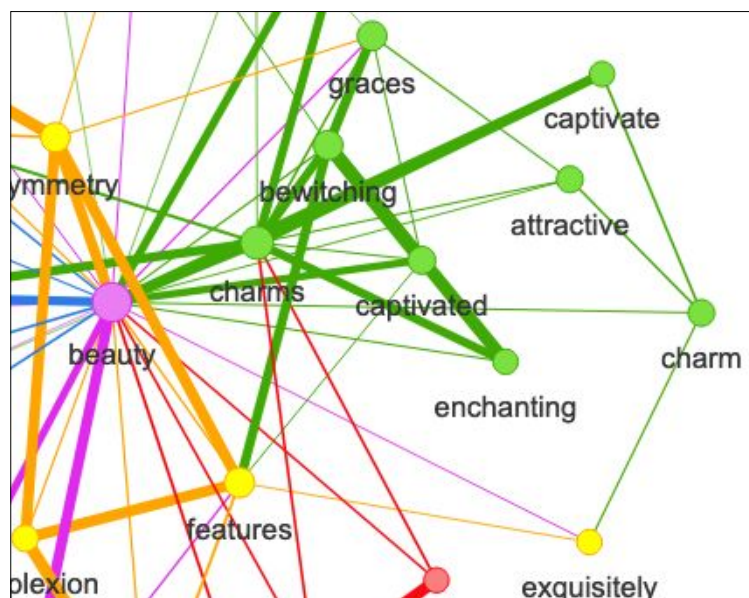
What is perhaps most remarkable, however, is the change that can be observed as we reconstruct the semantic networks for noun and adjective in the final decade of ECCO:





This is nothing less than a virtual reversal of the structural characteristics which were observable in the semantic networks for the early and middle periods of ECCO data. In total contrast to those earlier semantic networks, the words in this environment for 'beauty' are now interrelated to a significant degree, with the green community on the right in particular now forming a set of terms bound to one another in lexical space. Far from seeming a

superordinate focal point, ‘charms’ is now one highly-connected node in a relational community of terms relating to bewitchment and captivation:

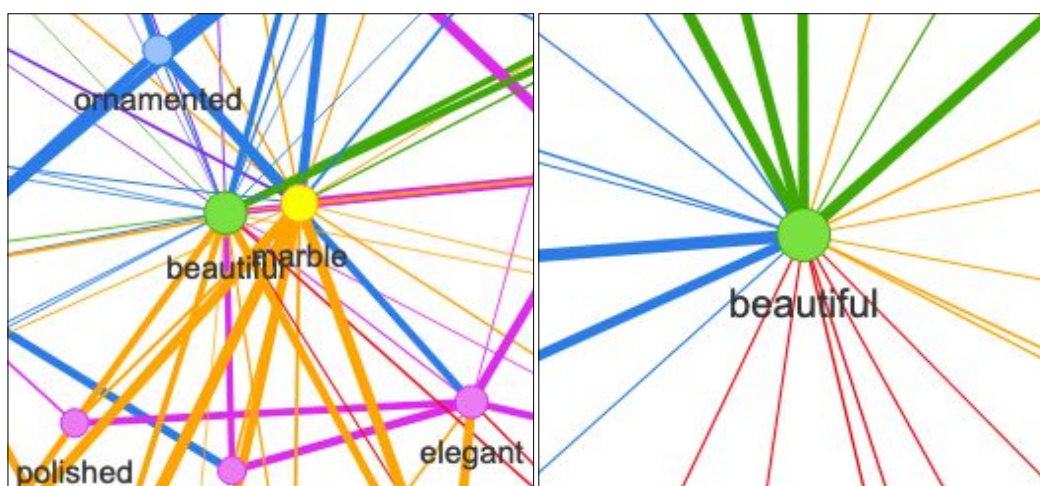


To be sure, this tells us, primarily, more about the new ways in which the vocabulary of attraction related to itself, than it does about ‘beauty’ per-se in the late eighteenth century. However, as aforementioned, the words surrounding the search term, and relations between these, contribute to that word’s meaning; its agency in the structuration of knowledge in a given period. And so in this final decade of ECCO printed material, this precinct of the lexis around ‘beauty’ is self-evidently more internally-related than in previous time slices. The vast polity of authors in this period of print proliferation, have produced texts which, in the aggregated whole, discuss female attractiveness more as an interrelated set of words and concepts, rather than primarily with recourse to, or binding to, the word ‘beauty’. This is a change that we have observed through time: ‘beauty’ is no longer the indispensable touchstone, for this part of the discourse at least.



Similarly, in the entangled purple, orange and red communities in the bottom of this diagram, we notice that these words are so interrelated as to cause the community detection algorithm some difficulty. ‘Deformed’, ‘deformity’, ‘wrinkles’, ‘complexity’, ‘features’, ‘bloom’, ‘fade’ and ‘fades’ now relate mutually in a way that they did not in the earlier semantic networks. Therefore, again, neither ‘beauty’ nor ‘charms’ have the same centrality that we observed earlier in the ECCO data: new interrelations have emerged in this last decade, new avenues for knowledge have occurred which do not rely to the same extent on the use of a single word.

And if the picture of ‘beauty’ is more democratic, more relational, the network for ‘beautiful’ moves in the opposite direction. The adjective is now suspended in a semantic network in which it is clearly the central node. Where in the past it was accompanied in this centralising role by the word ‘marble’ in the earlier networks, the adjective now sits alone, less a part of a network of interrelated words than a qualifier for numerous unconnected words. If we compare these cropped images of the terrain around ‘beautiful’ in 1750 and then 1790 we get an immediate impression of the new centrality of the adjective; its late-century function as a word which does not so much sit among many related nodes, but which qualifies many words which may or may not interrelate:



In addition to this new centrality for 'beautiful' the semantic network within which it sits so centrally, is in the late eighteenth century sparser than in the early and middle decade of ECCO. This is in spite of the fact that there are immeasurably more texts in this decade of ECCO than there are in the earlier two time periods. This fact demonstrates how numbers of texts in corpora and frequencies of words per-se, do not necessarily correlate to denser word co-associations. A word can rise massively in use while the semantic domains within which it is used can become more limited. This is the case for 'beautiful', where the numbers of words that it qualifies have certainly contracted despite a surge in publications using the word. In other words, as the number of texts has increased, 'beautiful' has become less diverse in its connections, and connected in a different way to how it functioned before.

The semantic network for the final decade is showing us that the word's function has become more markedly qualificatory. The various domains of artefactual production are adjusted by 'beautiful' but there is less interchange and connectedness between, say, the worlds of landscaping and painting. The communities in this later network are neater and more delineated. It is now easier to observe the separateness of the architectural community in blue in the top right of the network, than it was in previous semantic networks.

Another interesting factor in this view onto the last decade of ECCO, is that the semantic contents of these later graphs are virtually identical to those in the earlier parts of the century. What has changed are structured relations between bound words in each semantic network, not the words themselves. With the addition of some of the language of the decorative arts and a general decline in the semantic diversity over all, the picture for 'beautiful' is still recognisably *aesthetic*. Similarly, 'beauty' is still embedded in the domains of attraction and male desire, even if the communities of terms surrounding this word are marked by a new relationality than they were in the earlier century.

### 3- Conclusion: the agency of word type in how taste was known

The results presented above present historians of ideas with at least two problems. The first is that many narratives of eighteenth-century aesthetics have paid inadequate attention to the extent to which *beauty* was linked to the world of heterosexual desire in the common stock of printed knowledge. Without impugning the word's relations to art and affect, its links are primarily, to the world of female charms rather than artistic, artefactual or natural beauty. And because this is so, narratives of aesthetics and taste in the eighteenth century written by Paul Kristeller, Peter Lamarque, Agnes Heller, Paul Guyer and numerous others, do not allot anywhere near the amount of attention to the concept of *beauty* as female and feminine attractiveness, as is warranted given the evidence above. This is to say, that if one wishes to tell a story about the concept of eighteenth-century *aesthetics*, it is surely incumbent on those doing so to acknowledge the word's most-common semantic fields, before any attempt is



made to argue for its centrality to the study of beauty, truth, sense perception, the sublime or taste.

As historians of the concept of *aesthetics* we are faced with a decision. Either we must accept that the values and paraphernalia of male projections of femininity are important to the concept of *aesthetics* and that that these should be investigated more commonly and thoroughly than they currently are. Or, if these clear semantic associations for ‘beauty’ are deemed unimportant, then it should be made much clearer that one is discussing the ‘beautiful’, rather than ‘beauty’. The world of female attractiveness as projected in texts by male authors, needs to be demarcated from the discrete world of the aesthetically ‘beautiful’. It now seems unfeasible to simply ignore what is overwhelmingly the main semantic environment and suggestiveness of the noun ‘beauty’.

Today, scholars of aesthetics making enquiries about beauty will encounter, in material from text returned by cursory internet searches, to more profound philosophical enquiries, assertions along the lines of ‘Frances Hutcheson’s conception of beauty was that it was ‘uniformity amidst variety’’. They will encounter claims that Anthony, Earl of Shaftesbury was the progenitor of the idea of disinterestedness in aesthetic experience of beauty, and that this idea would undergird assertions of taste from one end of the eighteenth century to the other. It is crucial to note that the preceding work does not aim to discount or rebuff any of these claims, and indeed, there is a great deal to be gained by continuing to engage with the philosophical origins, evolution and ongoing importance of aesthetics as a category of philosophy and artistic expression. Nevertheless, and no matter how small the acts of historical reconstruction above may be, they do present, in bald terms, the facts about how these most important words for the concept of *aesthetics* were actually used in the vast

majority of cases. We may of course reconcile ourselves again to the familiar idea that one great thinker transmitted a theory of beauty to another, and that thus, the concept of beauty was fashioned and refashioned. But it seems perverse not to acknowledge the distance between this narrative of transmission and the story of ‘beauty’ as a way of knowing for most people writing and reading in this century. *Beauty* was, if the printed whole of the anglophone eighteenth century is surveyed, primarily a concept not of wrought artefacts or striking natural phenomena, but of the toilet and the drawing room. That this is true, is simply a logical extrapolation from fairly simple lexical co-association enquiries into the historical textual data set; it is not an ideologically-driven assertion. All assertions about the noun must be understood as relating to a very small number of thinkers who were, evidently, swimming against a common, vast semantic tide which was indifferent to their assertions.

It now appears irrefutable that these two words do different things in discourse. They are clearly semantically distinct. The ways in which their co-associated lexis relates to them, and to other relevant language, are again clearly distinct. Reading the following, from Agnes Heller’s fine discussion of taste in Adam Smith and David Hume, one gains a sense of how much this type of historical account feels insensitive to facts and implications of word type and conceptual discreteness:

One can still detect a dominant concept of the beautiful in Hume since the move of negation- that is, “This is not beautiful, but ...” – occupies a central space in his reflections on the distinction between taste and delicate taste. However, in Adam Smith’s philosophical ruminations, no such concept appears to be preserved or discussed. Smith seems adamant that there is no measurement by which to compare beauty in different things. His primary thesis holds that all kinds of beautiful things are beautiful in and of themselves, by their own intrinsic measure. In other words, the means by which one measures beauty in something like furniture naturally differs from the means by which one measures beauty in nature.<sup>20</sup>

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<sup>20</sup> Agnes Heller, *The Concept of the Beautiful*, (Plymouth, Lexington Books, 2012), pp. 38-9.

In light of the above work, it does not seem particularly exacting to query the slippage between Heller's use of 'the beautiful' and 'beauty'. Heller refers to Smith's thinking on 'beauty in different things' but in fact 'beauty' itself is a different thing, to 'the beautiful'. Given the clear separateness of these two words in terms of semantic embeddedness and structural relations to other associated words, it does not seem secure that 'beauty in something like furniture' would read as meaningful to the majority of readers in the eighteenth century, or that it would feel habitually correct that it would feel right to describe a piece of furniture as 'beautiful'. Each case comes encoded with a set of cultural practices and assumptions which we have only begun to read in the preceding work.

The second adjustment to received knowledge about the role of these words in shaping the concept of *aesthetics* is that there should now be a more historically-accurate realisation of the art forms which had prominence in the lexical space around the adjective 'beautiful'. The word 'beautiful' is surrounded by the language of sculpture, architecture and landscaping. Language which seems specific to painting, dance, music and poetry, does not feature in these lists of bound terms. The claim here is not that painting, dance, music and poetry were unimportant to *aesthetics*. Rather, it is that these do not appear, on this not unsubstantial first evidence, to inflect discourse of the 'beautiful' to anywhere near the same extent as sculpture, architecture and landscaping. If the 'beautiful' is a concern in *aesthetics* then, again self-evidently, it is the case that the art of marble and granite, that which is stately and variegated, that is described using that word across the eighteenth century of publications.

Again, as aforementioned in relation to existing narratives of the evolution of the concept of *aesthetics*, the objective is not to eschew the roles of poetry or music in the history of the

study of the beautiful. However, a recalibration does seem warranted, with the material arts above recognised as integral to how the aggregated whole of published authors wrote about the 'beautiful'.

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