

Linguistic Value Construction in 18th-Century London Auction Advertisements: a Quantitative Approach

Alessandra De Mulder^{1,*}, Lauren Fonteyn² and Mike Kestemont¹

¹University of Antwerp, Antwerp, Belgium

²Leiden University, Leiden, the Netherlands

Abstract

Georgian England was characterised by a buzzing consumer society in which advertising played a progressively important role when it came to the (linguistic) value construction surrounding material goods. Increasingly, the perceived value of goods was not only determined by the intrinsic quality of the goods, but also by the socio-commercial discourse used to characterise them. Linguistic modifiers, such as adjectives, must have played an important role in this process – reflecting these socio-economical trends in text while also reinforcing them. Here, we focus on a diachronic corpus of over 5,000 pages of London auction advertisement pages, digitised via automated transcription and divided across four sample periods between 1742-1829. Prime methodological challenges include: (1) the noisiness of the available data because of imperfect transcription; (2) the coarseness of the available time stamps, and (3) the lack of suitable NLP software, such as lemmatizers or (shallow) syntactic parsers. Through the use of word embeddings, we try to alleviate the issue of spelling variation with reasonable success. We find that, over time, subjective or ‘evaluative’ modifiers have become more prominent in these advertisements than their objective or ‘descriptive’ counterparts – but there are different temporal patterns for different types of advertised objects

Keywords

advertisements, linguistic modification, frequentist statistics, spelling normalisation, time series

1. Introduction

In Georgian England, a certain group, known as the *beau monde*, procured their place in society by publicly demonstrating their ties to one another, both in personal relationships and material expressions [17].¹ They are considered the trailblazers of a new, fast-paced consumer society, although volumes have been written discussing the time, place and pace of consumer (r)evolution(s) [24, 36]. In any case, the interaction between people and their possessions altered on an unprecedented scale in eighteenth-century England. This translated into many

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*Corresponding author.

✉ alessandra.demulder@uantwerpen.be (A. De Mulder); l.fonteyn@hum.leidenuniv.nl (L. Fonteyn); mike.kestemont@uantwerpen.be (M. Kestemont)

ORCID 0000-0002-2612-420X (A. De Mulder); 0000-0001-5706-8418 (L. Fonteyn); 0000-0003-3590-693X (M. Kestemont)

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¹All code and data that were used for the preparation of this paper are available from the following repository under a CC-BY-NC-SA license: <https://doi.org/10.5281/zenodo.7252695>.

changes in terms of how people behaved in and thought about the empire of things they lived in. Language immediately followed – or might even have preceded – these shifts; a whole new repertory emerged to name the new material world and to distinguish between quality and rubbish, luxuries and necessities, and between what was fashionable and what was not [40, 19]. This was especially important when assessing the intrinsic value, i.e. material, and extrinsic value, i.e. design of objects.

Previous research has shown the rising importance of design rather than material when acquiring, for example, silverware, a household staple that had lost many functions due to chinaware's rising popularity [7]. It makes sense to favour design over material durability when buying goods meant for display rather than intensive usage. However, this does not explain both the popularity and centrality of design as the decisive factor in an inherent breakable and yet daily used household good such as chinaware. This may be because the value of objects went beyond their external features: much value can be derived from how it was used by particular owners, known in certain circles for their good taste [17, 16]. The well-heeled middling sorts would have invested in an extensive assortment of patterned and customised chinaware to serve tea and other refreshments in their well-furnished matching drawing room to their peers. The guests would have noted the decorative lexicon on their hosts' porcelain and attributed value according to the *beau monde's* unwritten rules to structure their society. The hypothetical hosts would have done as well when picking out china patterns which had already been confirmed as genteel by peers or opting for – slightly – diverging motifs emblazoned with their family crest to reinforce their own position as 'tastemakers'. The cultural value of these objects played a crucial role in setting a price, even when their vanguard, previous owners passed, and their goods were auctioned off to settle any remaining bills.

Research into the ever-growing language of consumption has already shown that the emergence of advertising, in general, played a crucial role. Newspaper content, including adverts, created an imagined community of all stakeholders in the world of goods, from producer to seller to consumer [4]. Unlike nowadays, the language in advertisements reflected consumer sensitivities in this imagined community rather than instilling in readers what they should consume [22]. The language in notices became increasingly specialised [39], communicating about and valuing luxuries in order to consume them appropriately (i.e., so that they would be recognised and appreciated by peers). This implied that advertisers tapped into a vocabulary directly linked to dominant consumer values. Sellers had limited space to convey what set their wares apart from others on the market; for new products, this meant introducing what they did and why one needed to buy it. Second-hand household goods up for auction, however, needed little to no introduction, which allowed auctioneers to focus on the unique qualities of the goods: intrinsic material, certain fashionable finishings or the previous owner, who would have been recognised as a tastemaker by peers [39]. This reveals the dominant consumer values of the time, much like how buzzwords such as *sustainable* and *organic* have become an indispensable part of the present-day advertising vocabulary. Hence auction advertisements were more than dry lists of goods and some practical information; regarding them as such would not give them the credit they deserve and the unique insights into changing consumer sensitivities they bring.

As opposed to present-day publicity, the tone of eighteenth-century adverts was above all, polite. Criticism of false promises in advertisements almost exclusively applied to those for

new products, which is also quite plausible since one did not have to explain to anyone what a chair was for, unlike the latest silver bullet for the “French disease” [42, 13]. On top of that, a good reputation was a seller’s most prized possession; it ensured long-term client relationships and, thus, their livelihood. The notices tended to focus on the professionalism and knowledge of the retailer and were mainly informative to underline this to potential customers [9, 22]. In turn, potential buyers put their best foot forward to show that they could pay, on the one hand, and had enough knowledge to value the goods, on the other. Tapping into the appropriate language repertoire, from the initial contact through an advertisement to any subsequent interactions between buyer and seller, was the ideal way to assure the other party of your good intentions [11, 12, 39]. Previous studies have already exploited the potential of these rich sources through keyword searches but were faced with regrettably poorly OCR’ed databases or resorted to limited manual sampling [18, 38]. This manual approach is time-consuming and allows most of these studies to cover only one or, at best, a few core concepts used to explain the typical consumer. We apply digital text analysis to – still very poorly – OCR’ed auction advertisements to contribute insights into eighteenth-century buyers’ buying habits.

Research hypotheses This paper uses a bottom-up corpus linguistic approach over +5,000 pages of auction advertisements pages to examine the relationship between the objects (noun phrases) and their descriptors (modifiers) in the adverts through four sample periods between 1742-1829. We specifically examine the modification process because modifiers such as adjectives are an important way to express appreciation or value assignment in language. Below, we shall describe how we applied a categorisation scheme to a selection of modifiers and objects. Following the historical research described above, we advance the following hypotheses:

- H1: We expect clear diachronic shifts in the prominence of certain objects. Real estate will have become more frequent, for instance, due to the emerging practice of selling houses together with their household goods;².
- H2: The presence of modification, taken as a proxy for linguistic value construction, will have increased over time;
- H3: The use of subjective or ‘evaluative’ modifiers will have increased relatively more strongly over time in comparison to their objective or ‘descriptive’ counterparts;
- H4: Instances of (pre)modification will likely have become more complex (i.e. longer) over time through the process of ‘modifier stacking’.

2. Materials

2.1. Origin

This paper’s source material mainly consists of advertisements from the *Daily Advertiser* and the *Morning Chronicle*. These are supplemented by pages from other London newspapers, which also contained auction advertisements and were available for the same period. The used auction advertisements were manually selected from 5 newspapers in the Burney Collection

²This was due to rising duties on specific goods and changing market functioning because of an oversupply after the French Revolution amongst other reasons, which made solely selling one type of good less profitable[21]

and the British Newspaper Archive across four sample periods: 1742-1743 (SP1), 1773 (SP2), 1799-1800 (SP3) and 1828-1829 (SP4). Pages contain one to 51 advertisements, and the corpus comprises ~9.6M tokens (~640K of which are unique).

Table 1

Overview of advertisement page counts across newspapers and advertisement pages for all sample periods. Abbreviations: DA (*Daily Advertiser*), MC (*Morning Chronicle*), DP (*Daily Post*), LDP (*London Daily Post*) & GA (*London Daily Post & General Advertiser*), PL (*Public Ledger*). * = only 1743 included.

Sample period / newspapers	DA	MC	DP	LDP & GA	PL	Row total
SP1 1742-1743 (Burney)	583		513	260*		1,356
SP2 1773 (Burney)	763	323				1,086
SP3 1799-1800 (Burney)	630	778				1,408
SP4 1828-1829 (BNA)		625			701	1,326
Column total	1,976	1,726	513	260	701	5,176

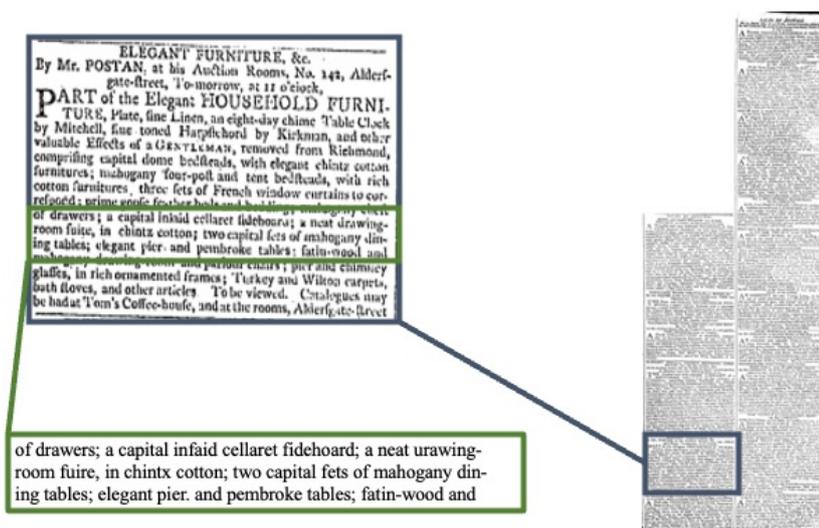


Figure 1: Morning Chronicle 03/07/1800 with an excerpt of the automatic transcription

Figure 1 shows a typical auction notice where “elegant furniture” that belonged to a gentleman was offered for sale by Mr Postan in the *Morning Chronicle*. The advertisement started and ended with practical information such as the time and place of the sale and where further information like catalogues could be found. The actual listing of the goods always occurred according to a rigid scheme, usually starting with a formulaic sentence such as “elegant household furniture, plate”, followed by what were considered the showstoppers of the upcoming auction, “fine linen, an eight-day chime table clock by Mitchell, fine toned harpsichord by Kirkman”. This could be followed with information about the previous owner, as is the case here, the goods belonged to a gentleman from Richmond. The main course of every auction advertisement was the listing of other goods offered for sale and their descriptions; we can read that

Table 2

Indicative number of tokens (and unique tokens) per newspaper (to be multiplied by 100K).

	DA	MC	DP	LDP & GA	PL	Row total
SP1	6.30(0.41)		1.4(0.12)	0.59(0.07)*		8.03 (0.59)
SP2	23.43(1.15)	2.86(0.25)				26.29(1.40)
SP3	10.38(0.79)	28.23(1.65)				38.60(2.43)
SP4		17.31(2.74)			12.07(1.29)	29.38(4.03)
Total	40.10(2.35)	48.39(4.63)	1.14(0.12)	0.59(0.06)	12.07(1.29)	102.30(8.45)

“capital dome bedsteads, with elegant chintz cotton furnitures; mahogany four-post and tent bedsteads, with rich cotton furnitures, three sets of French window curtains to correspond; prime goose feather beds and bedding” are going under the hammer at 11 o’clock the next day.

We collected the data by manually browsing through all available digital issues of seven volumes of the newspapers mentioned in the tables above (Tables 1 and 2). We selected the pages with advertisements from each issue and manually cropped them, so they only contained auction advertisements. These were quite straightforward to single out as all auction notices started with “for sale by auction”, “to be sold by hand”, “to be sold by the candle”, or other markers such as mentioning “auction room”, “catalogues”, etc., as the example above clarifies. This was done in the Burney Collection for the first three sample periods, 1742-1800, and in the British Newspaper Archive for the last period, namely 1828-1829.

Sample periods were chosen based on the availability of the core newspapers, *Daily Advertiser* and *Morning Chronicle*, to have some consistent data to account for newspaper-specific variations. We opted for three sample periods in the eighteenth century and one at the beginning of the nineteenth to pinpoint which developments can be traced back to the eighteenth century. It is well attested that this was a crucial century for newspapers due to many changes in printing techniques, amongst other developments, and we can see this manifesting in a rise of advertisements before the true boom in the nineteenth century [32].

The 5,176 advertisement pages were automatically transcribed into (unstructured) plain text using *Transkribus* with a model trained for eighteenth-century printed English texts. This CITLAB HTR+ model was trained on 13,083 words and reached a character error rate (CER) of 0.15 % on the training set and 1.89 % on the validation set. The base model was an HTR model called “French18thCPrint” [1], which was trained on 38,487 words with a CER of 0.09 % on the training set and 0.74 % on the validation set. However, the data proved extremely noisy, as there was no segmentation between individual adverts, no distinction between $\langle s \rangle$ / $\langle f \rangle$ due to marginal difference between a printed $\langle s \rangle$ and $\langle f \rangle$ as shown in Figure 2, and spotty layout analysis. A manual check of the 583 pages of the *Daily Advertiser* in 1742-1743 brought to light that there were more significant layout issues (e.g., erroneous column detection) in 8% of the pages and 316 instances of more minor layout issues (e.g., one or two lines in the wrong order).

To be Sold by AUCTION,
On Wednesday the 20th instant, and the following Days,

THE genuine Household Furniture and other valuable Effects of Mrs. Garnier, Relict of Isaac Garnier, Esq; deceas'd, at her late Dwelling House in Pall-Mall; consisting of rich crimson Genoa Damask and Needlework Furniture, in Beds, Window-Curtains, and Chairs; variety of Cabinet-Work, in Manchianeel, Mahogany, and Walnut-Tree; large Chimney and Pier Glasses, and Sconces; Tapestry Hangings, Carpets, several Portraits of the most eminent Persons of Quality, with other curious Paintings, rare old Japan Cabinets, Plate, Jewels, China, a small Wardrobe of fine Household Linnen, good Kitchen Furniture, and a Library of Books.

The Goods, &c. to be view'd on Monday the 18th instant, and to the Time of Sale, which will begin each Day at Eleven o'Clock precisely.

Note, Among the Curiosities is a most perfect Mummy of a Daughter of Ptolomy, as will plainly appear to the Curious by the Egyptian Hieroglyphicks. Gentlemen and Ladies, by applying to Mr. Cole, in Golden-Square, may have Tickets gratis for viewing the Mummy, which is preserv'd, no Person will take ill, it being only design'd to prevent the Curious from being obstructed in their Observations. The Mummy only to be view'd between the Hours of Twelve and Two each Day.

Catalogues will be deliver'd gratis the Days of Viewing at the Place of Sale; at Mr. Cole's, Upholder, in Golden-Square; and at Mr. Sans Jones's, in Pall-Mall.

Figure 2: Extract from *Daily Advertiser* (12/10/1742), highlighting examples of s/f similarities.

2.2. Modifiers and objects: classification

In our analysis, we distinguish between ‘objects’, i.e. material goods that were put on sale in the auctions represented in the corpus, and ‘premodifiers’, any elements that can occur before objects to describe – or ‘modify’ – them.³ Put simply, the phrase *colourful glass shards*, we can identify one object (i.e. *shards*) and two premodifiers (i.e. *colourful* and *glass*). We designed and applied a custom classification scheme for both premodifiers and objects. First, for the premodifiers, we manually constructed a list of 282 commonly occurring premodifiers in the material. Each of these premodifiers was identified through a unique headword (type) in a normalised, modern spelling, but collapsing the difference between the characters < s > and < f >, effectively treating them as allographs. Two annotators then independently categorised the premodifiers along as either ‘evaluative’ (E) or ‘descriptive’ (D). If the premodifying element functioned as a classifier (e.g. *kidderminster* carpet is a type or class of carpet) or an “objective epithet” (e.g. *large, enamelled, woollen*), whereas “subjective epithets” (e.g. *antique, fashionable, valuable*) were marked as evaluative [10].⁴ In other words, modifiers that either do or do

³While this study focuses on premodification; it should be noted that not all modification is premodification. Still, premodification is expected to be more common in light of the language-external context of advertising. The price of placing an advertisement was based on conventions of “moderate length”, which ties in with what we see in the source material: there was little to no length variation throughout the research period [32]. This obviously had implications on the word choices that advertisers made. They had to convey what goods were for sale, why they were worth buying and when and where this was all happening, all without exceeding the customary word limit. This is presumably why Mr Postan (Figure 1) opted to print “satin-wood and mahogany drawing-room and parlour chairs” and “elegant pier and pembroke tables” instead of using postmodification, as in “drawing-room and parlour chairs made of satin-wood and mahogany” and “pier and pembroke tables that are elegantly fashioned”.

⁴Note that in some linguistic literature, the objectivity-subjectivity of epithets is considered a cline: while ‘good-looking’ is a clear example of a property assigned to people or objects in a subjective manner, properties such as ‘clean’ are “more collectively assessable”. Still, they are not as objectively assessable as properties like ‘blue’ or ‘wooden’ [10]. For simplicity’s sake, we chose to work with a binary annotation system where any degree of subjectivity was classified as evaluative.

Table 3

Initial instances of confusion between the two annotators in the binary modifier classification (282 headwords in total): Evaluative (E) vs Descriptive (D).

	D	E
D	167	4
E	17	94

not apply to an object -- for example, a table is either made of *mahogany*, or it is not -- were considered descriptive. This often applies, for instance, to words referring to textiles, such as *chintz* and *serges*, which appeared as modifiers for upholstered furniture. Furthermore, words such as *looking*, which only appeared in fixed combinations such as *looking glass*, are considered descriptive because they specify the type of object. Evaluative modifiers, by contrast, are modifiers that express a particular, more subjective evaluation of an object. Unlike descriptive modifiers, they cannot be defined through a straightforward yes or no question: whether or not a chair is elegant is a matter of personal taste and difficult to prove objectively. Similarly, it is difficult or even impossible to provide an objective definition that helps determine whether an object is *commodious* or *valuable* is true or false.

After manual annotation by two annotators, we applied the established metric Cohen’s κ [8] in the scikit-learn reference implementation [31] to estimate the inter-annotator agreement. The resulting κ statistic is a scalar that ranges between -1 and 1: larger positive values imply a strong agreement, but values closer to zero (or negative scores) mean that the agreement might be due to chance [2]. For the binary modifier classification, we obtained $\kappa=.8407$, indicating a “strong agreement” [20] between the two annotators, highlighting the relative straightforwardness of this task. In Table 3, we report the initial disagreement between the two annotators in the form of a confusion matrix. As is clear from the confusion matrix, there was relatively more disagreement regarding the assignment of the evaluative class label, which arguably makes sense from an interpretive perspective. During group discussions in the adjudication phase, the annotators resolved instances of disagreement and agreed on a single label for each headword. Ultimately, this yielded the following (somewhat skewed) distribution: 182 descriptive and 100 evaluative modifiers. These are listed in the appendix.

Second, we repeated a similar procedure for a set of relevant and common objects of modifications in the data, i.e. goods mentioned in the advertisements. We started from a set of 139 objects that were categorised into nine categories: ‘NA’ (for Not Applicable⁵), ‘clothing/fabrics’, ‘furniture’, ‘appliances/utensils’, ‘tableware’, ‘animal accessories’, ‘haberdashery’, ‘animal’, ‘instrument’, ‘accessories’, ‘decoration’, and ‘real estate’. This categorisation system was based on prior work in consumption history and aimed for reasonably balanced groups in the object set. Categorising objects is a widespread practice in material culture studies, which are usually centred around the function of objects in order to gauge the use, practices and meaning behind certain (clusters of) objects. Common categories for the eighteenth-century consumer society are, for instance, kitchenware, tableware, seating and table furniture, hot-drink-related

⁵NA was assigned when the noun phrase was not an object, a word like ‘assortment’, a street name or a nonsense word.

Table 4

Initial instances of confusion between the two annotators in the 12-class object classification (139 headwords in total).

	accessories	animal	animal accessories	appliances/utensils	clothing/fabrics	decoration	furniture	haberdashery	instrument	NA	real estate	tableware
accessories	5	0	0	0	0	0	0	0	0	0	0	0
animal	0	2	0	0	0	0	0	0	0	0	0	0
animal accessories	0	0	2	0	0	0	0	0	0	0	0	0
appliances/utensils	0	0	0	8	0	0	0	0	0	0	0	0
clothing/fabrics	0	0	0	0	5	0	1	1	0	0	1	0
decoration	1	0	0	3	0	11	0	0	0	2	1	0
furniture	0	0	0	0	0	0	24	0	0	1	0	0
haberdashery	0	0	0	0	0	0	0	2	0	0	0	0
instrument	0	0	0	0	0	0	0	0	4	0	0	0
NA	1	0	0	2	0	0	0	0	0	10	1	0
real estate	0	0	0	2	0	0	2	0	0	1	40	0
tableware	0	0	0	0	0	0	0	0	1	0	0	5

objects, interior decoration, sleeping furniture, and so on [35, 34]. However, all of these studies usually rely on object-specific narratives, while we opted for the most general object category possible. This allowed us to bring broader trends to light. The objects were categorised by two annotators using the historical thesaurus of the *English Oxford Dictionary* for object definitions and predefined simplified object classifications of Overton, Weatherill and Muldrew, amongst others [29, 43, 27]. In case of doubt (such as books), we looked at how they were described and assigned the most similar category. Books tended to be closely described like other objects in the decoration category, which makes sense since they often were collected and richly (re)bound to be shown off [37].

The headwords were again independently categorised by two annotators. In this case, the test yielded $\kappa=.8182$, indicating a lower but still substantial agreement, especially when considering up to 12 categories. The confusion matrix in Table 4 displays the initial disagreement between the annotators. In an adjudication phase, cases of disagreement were again resolved. The resulting distribution of object labels was as follows (after excluding the NA class): real estate (46), furniture (25), decoration (18), clothing/fabric (10), appliances/utensils (9), tableware (6), accessories (5), instrument (4), animal/accessories (4). To enable the pragmatic approach outlined below, we made sure that there was no overlap between the sets of object and modifier headwords; ambiguous cases were not included. The objects are also listed in the appendix.

2.3. Orthographic normalisation

The materials under scrutiny contained a considerable amount of orthographic variation, which is partially due to naturally occurring historical spelling variants. The bulk of varia-

tion is, however, caused by artefacts from the imperfect digitisation procedure (see above for the automated transcription procedure followed). An example of a noisy single ad entry from the corpus is shown in the illustration above (Figure 2). This noise impedes the straightforward identification of the headwords from the modifier and object sets described in the previous section. In spite of English’s current dominance in the world of natural language processing, we are working with a historical language variant, which generally tends to be under-resourced. We decided to apply a pragmatic normalisation routine based on word embeddings in combination with straightforward string distance heuristics. FastText word embeddings [6] offer an advantage over the earlier generation of embeddings, such as Word2vec [25], in that they do not represent words as an atomic, symbolic index but that they take into account a token’s subword information, in the form of the token’s constituent n-grams. This makes them more flexible in the face of out-of-vocabulary items (in which our material can be expected to abound). FastText word embeddings could therefore offer a baseline for identifying superficial spelling variants (and inflexions) of the objects’ headwords and modifiers we aim to study.⁶

We first applied a lightweight naive preprocessing to the material, restoring hyphenated words at line endings, removing all non-alphabetic characters and splitting the entire corpus into space-free character strings or tokens. We divided the materials into 100,762 segments of 100 consecutive tokens we fed as sentences to a reference implementation of the FastText algorithm in Gensim [33]. We considered the entire vocabulary of tokens and trained a model with a dimensionality of 500 for 20 epochs. To recognise a new token as a potential instance of one of our headwords (objects and modifiers), we would use the FastText model to retrieve all the headwords with a cosine distance $< .3$ from the new token. If this set was non-empty, we suggest the headword at the minimal Levenshtein distance from the new token as a spelling normalisation replacement for the input token. Note that this routine is naive because it operates at the type level and considers no contextual features.⁷

We evaluated the effectiveness of this spelling normalisation procedure on a manually corrected sample of advertisements (amounting to 3,545 tokens in total), which contained random selections from all four periods in the corpus. Note that we collapse all instances of non-replacement into a single class for this purpose (‘NA’). Also, because of the transcription routine adopted, we treated the characters $< s >$ and $< f >$ as allographs and mapped all instances of $< s >$ to $< f >$. Tables 5 and 6 show a random sample of examples of concrete replacements, both for correct and incorrect interventions. The conventional classification statistics are reported in Table 7. We achieve an encouraging macro-averaged F1 score (0.877) in the upper eighties while maintaining a reasonable balance between precision (0.907) and recall (0.862). For instance, the random sample of incorrect replacements mainly concerns unusually noisy spelling variants for which the correct headword was not properly retrieved (‘NA’). That precision is higher than recall seems acceptable for our application that involves sufficient material: in this context, we favour the correct replacement of spelling variants over missing a few others.

We applied this spelling normalisation to the entire corpus before proceeding. Before this

⁶For an example of a study showing the potential of FastText and Word2vec Skipgram embeddings in identifying different types of spelling variants, see [28].

⁷For this reason, our method may be better suited for mid- to high frequency (rather than low-frequency) words and spelling variants, as the quality of word type vectors is affected by frequency.

Table 5

Random sample of correct replacements (out-of-context tokens).

token	gold	silver
houfhold	houfehold	houfehold
defks	defk	defk
rtanding	ftanding	ftanding
botles	bottlef	bottlef
handkerchiefs	handkerchief	handkerchief
serges	fergef	fergef
houfhold	houfehold	houfehold
fashionable	fashionable	fashionable
aluable	valuable	valuable
mualin	muffin	muffin

Table 6

Random sample of incorrect replacements (out-of-context tokens); 'NA's are dominant, indicating that the correct headword could not be identified.

token	gold	silver
finale	fingle	NA
pramttes	premifef	NA
idengs	refidence	NA
irigh	irifh	NA
righ	rich	NA
dameatle	domeftic	NA
atxiroxar	ftaircafe	NA
houfe	houfehold	NA
aparinus	fpaciouf	NA
darillay	dwelling	NA

Table 7

Conventional classification metrics for the spelling normalisation procedure on a manually corrected sample of 3,545 tokens.

accuracy	0.980254
F1 (macro)	0.877163
precision	0.907394
recall	0.862167

procedure, the four time periods amounted to unique 661,117 word types, distributed over 10,076,512 token instances – meaning that each type occurred on average about 15.24 times in the corpus. After the normalisation, the number of types was reduced to 521,516. In the normalised corpus, the average type would therefore have a token frequency of 19.32, suggesting that we were indeed able to reduce the orthographic noise in the material.

Table 8

Tabular overview of the mean scores for the normalised frequencies per category across SP1-SP4, including the average τ score.

era category	SP1	SP2	SP3	SP4	τ
Desc	0.214359	-0.406092	0.026862	0.164870	0.076923
Eval	-0.461974	-0.219575	0.462137	0.219411	0.285795

3. Analysis

3.1. Time series for modifiers and objects

To test our main research hypotheses, we calculated the relative frequency of each item from our modifier set for each of the four time periods in the data. We normalised the per-headword frequencies via standard scaling (mean subtraction and dividing by unit variance) to ensure that more common items would not dominate the analysis. We produce boxplots for the two categories of modifiers per time period. Based on Figures 3 and 4, we see that there is a considerable diachronic variance over time in both the evaluative and descriptive categories.⁸ However, the evaluative set of modifiers seems to display a more consistent increase in frequency over time than the descriptive modifiers, which show a pronounced drop in the second time period, with surprisingly many outliers (SP2).

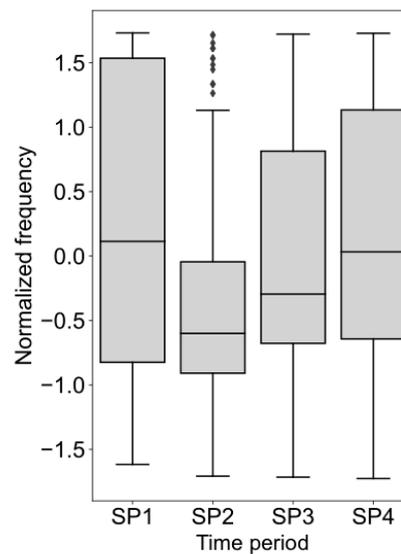


Figure 3: Per-category boxplots of τ scores across SP1-SP4 for modifiers in the Descriptive category.

⁸For a more detailed view on whether temporal effects differ depending on the type of object being advertised, we refer to Figure 7 below.

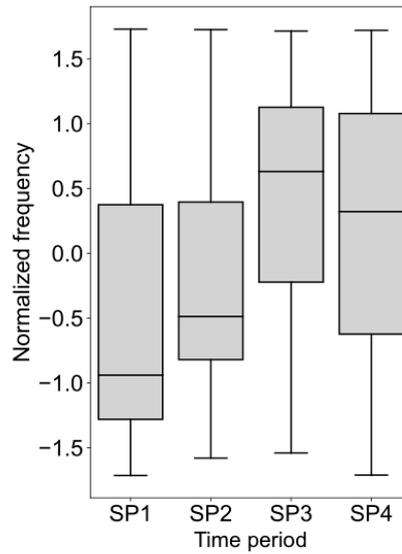


Figure 4: Per-category boxplots of τ scores across SP1-SP4 for modifiers in the Evaluative category.

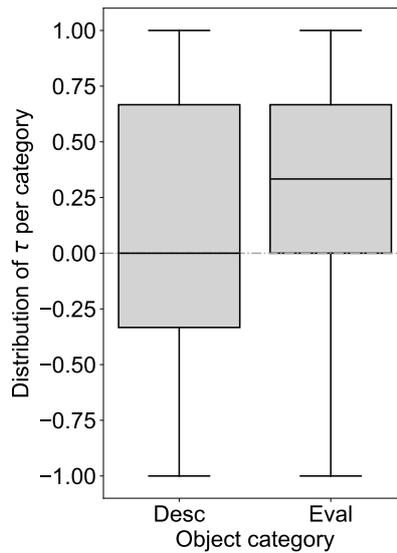


Figure 5: Per-category boxplots of τ scores across SP1-SP4 for modifiers in the Desc(riptive) and Eval(uative) category. The central tendency is markedly higher for the evaluative modifiers.

To obtain a more quantitatively informed assessment of this situation, we calculated the per-word Kendall τ statistic for each individual time series: this is a non-parametric rank correlation coefficient test that can be used to measure the consistency in the increase or decrease of a scalar over a series of time points. With only four time points, however, it is impossible to

reach statistical significance, so we focus on the τ primarily as a metric. This statistic will output a scalar in the $[-1, +1]$ range, with large positive values indicating a strong increase, large negative values indicating a strong decrease and values relatively closer to 0 indicating a stable result (neither increase nor decrease). The resulting distribution of τ values is shown in each category in (Figure 5).

The average τ statistic (cf. Table 8) is positive for both categories ($\tau=0.076$ for descriptive, $\tau=0.285$ for evaluative), indicating that linguistic premodification grew relatively more important over time in this material. However, the range of values seems notably higher for the evaluative modifiers indicating that these gained even more prominence over time. To compare the range of τ values in the two categories (which are both not normally distributed), we applied a non-parametric Mann-Whitney U test to verify the (directed) hypothesis that the evaluative τ -values are indeed larger overall than the descriptive ones. For this dataset ($n_{desc} = 182$; $n_{eval}=100$), the resulting test statistic ($U=7189.5$) and the associated p -value ($p=0.001$) offer reasonable grounds not to reject this hypothesis. We conclude that premodification grew more important over time, and this was relatively more true for the set of evaluative modifiers considered here than their descriptive counterparts.

We applied analogous measurements to the frequency of normalised tokens in the object categories we distinguished and recorded their scaled relative frequencies across the sample periods SP1-SP4. Next, we calculated Kendall's τ for the time series associated with each normalised token and aggregated them at the category level. Figure 6 shows the distribution of the τ 's across these categories. The category 'clothing/fabric' is the only one to display a negative trend, indicating that its prominence in the advertisements decreased over time. Next, the median presence of 'appliances/utensils', 'decoration', and 'furniture' remained stable. The rest of the categories have a mean τ that is more outspokenly positive; goods belonging to the following categories have clearly gained prominence over time: 'animal/accessories', 'tableware', 'instruments', and 'real estate'.

3.2. Complexity in modification

We now turn to H4, the hypothesis related to 'modifier stacking': did instances of premodification become longer in this material and thus gained complexity over time? Because we lack a proper syntactic parse of the data, we adopted a pragmatic approach and collected all instances of an object mention that was directly preceded by an uninterrupted series of modifiers (i.e. series of at least one modifier in front of an object). We gauged their length across the four time periods and presented a number of relevant summary statistics in Table 9. A clear majority of the premodification instances has a length of one, and longer series are much less common. Interestingly, we found no clear diachronic trend regarding these length measurements, and we must therefore refute H4 for the time being. This suggests that the increase in evaluative modifiers is not due to a simple stacking process, where evaluative modifiers simply supplement descriptive modifiers. Rather, these numbers suggest that the descriptive modifiers were more likely replaced altogether by more evaluative ones.

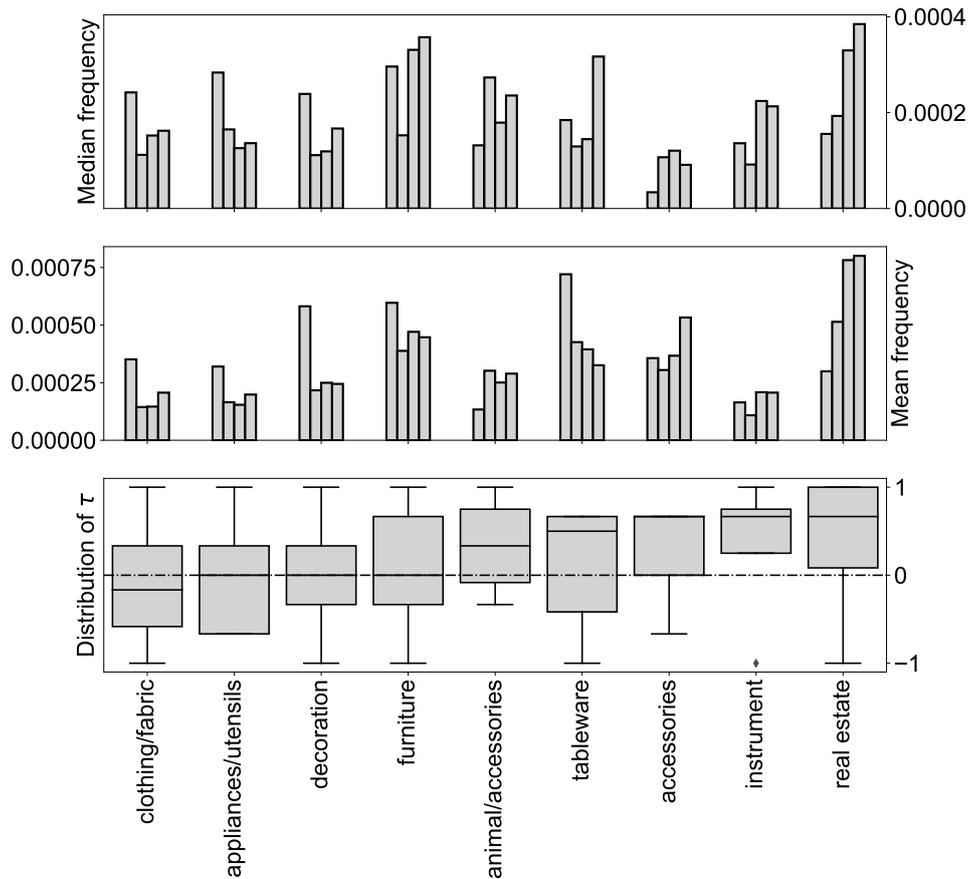


Figure 6: From top to bottom: (1) median frequency and (2) mean frequency of objects in each category per time period (left to right: SP1-SP4); (3) Per-category boxplots of τ scores across for objects in several categories.

3.3. Interaction between time and object categories

Above, we presented preliminary evidence that the use of evaluative modifiers would have increased over time in the corpus. However, this trend will likely show a different development across the various categories of objects we distinguish in the corpus. To verify this hypothesis, we extracted a subset of the corpus containing all instances of modifiers immediately preceding a headword from one of the object categories. This makes it likely that the modifier was reigned by the adjacent object.⁹ For each instance in the subset, we record the original token of the modifier, the normalised headword, the category of the ensuing object and its headword. This resulted in a data set of 168,417 modification instances, of which a random sample is presented in Table 10. This subset contains a much simplified and partial view of the data set but apart

⁹Note that, at present, reliable deep or shallow parsers are not readily available for this period – though progress may be underway [30].

Table 9

Length (in tokens) of premodification instances across time: mean length, standard deviation, and proportion of instances of length 1 (f1), length 2 (f2), etc. None of these summary statistics display an obvious trend.

	mean	std	prop(f1)	prop(f2)	prop(f3)	prop(f4)
period						
SP1	1.377	0.676	0.712	0.219	0.054	0.013
SP2	1.360	0.617	0.699	0.255	0.035	0.009
SP3	1.469	0.778	0.663	0.238	0.073	0.017
SP4	1.348	0.643	0.726	0.216	0.046	0.009

Table 10

Random sample of instances from the premodification subset extracted, consisting of each modifier occurring immediately preceding a headword from one of the object categories. Our binomial model predicts whether a modifier will be evaluative as the dependent target variable.

token	normalised	period	head-cat	head-word	mod
handfonie	handsome	2	real estate	apartment	E
houfhold	household	0	furniture	furniture	D
capital	capital	1	real estate	mansion	E
excellent	excellent	3	furniture	press	E
arable	arable	3	real estate	land	E

from the high precision of this extraction process, the measurements in the previous section demonstrate that we nevertheless cover a large portion of all modification instances.

Using a conventional Generalised Linear Model (of the binomial family), we apply a statistical model that aims to predict whether the modifier will be evaluative (i.e., we applied the coding: 0 = descriptive; 1 = evaluative). For each instance, we have two predictors available as main predictors: time period (0-3, encoded as an ordered, categorical factor) and the type of object it modifies (categorical factor). We ran three versions of the base model, each of increasing complexity.¹⁰ We compare the variants of the model using their AIC score and Akaike Weights (i.e., conditional probabilities which indicate how much statistical importance we should attach to differences in AIC values [41]; for an application in Linguistics, see [15]); additionally, models are compared using the Anova test. This information is presented in Tab. 11. We considered adding token-level random effects to this simple model, i.e. fitting random intercepts to the (1) normalised headword for the modifiers and (2) the objects for each instance. However, for (1), this would not be insightful because the modifier headword perfectly predicts the dependent outcome variable (evaluative vs descriptive). With (2), this extension proved difficult because this random effect had to be included as a *nested* variable since the headword of the object perfectly predicts the category of the object included in the interaction term. The resulting model frequently failed to converge properly, arguably because the contribution of the random effect towards the optimisation objective was ultimately too small. Following the concerns formulated by [3], we did not pursue this mixed effect approach further.

¹⁰None of the models displayed overdispersal.

Table 11

Comparison of three variants of the binomial model, showing the model index, its underlying formula (R syntax), the AIC and Akaike Weights, as well as the significance of the pairwise Anova (with the likelihood ratio test) for the comparison with the previous model.

model	formula	AIC	Weight	Anova (LRT)
1	mod ~ period	207983.6	0.0	0.0
2	mod ~ period + head.cat	198723.6	0.0	$p < 2.2e - 16$ ***
3	mod ~ period * head.cat	196284.7	1.0	$p < 2.2e - 16$ ***

We note that the subsequent models always yield a better fit of the data, as indicated by the decreasing AIC scores. The weights in Table 11 indicate a very high probability (of 1.0) that model 3 outperforms models 1 and 2 (both of which were assigned a weight of 0.0). Each subsequent model is, moreover, invariably a significant improvement over the previous, according to the Anova test. The simplest model (1), where the time period is the sole predictor, predicts a solid increase in the probability of encountering an evaluative modifier. This was probably to be expected based on the previous section, but the additional experiments show that this simple view is naive. Adding the object type of the modifier’s head (model 2), for instance, yields a better fit of the data in which, surprisingly, the effect of time reverses: this indicates that the evaluative trend probably played out differently in different modification contexts. Model 3 concretely models this interplay as a statistical interaction between time period and object category: the interaction model proves to be an improvement concerning the additive model, urging us to include the interaction and disregard the effect of the individual predictors.

The previous paragraph contains important insights: apparently, the object categories invited different levels of evaluativeness in their modification, and this association can only be properly modelled by taking the interaction with the period properly into account. In Figure 7, we plot the effect of time period conditional on the object category of the modifier for the most complex model 3. This lattice plot shows that the increase in evaluative modifiers has been relatively stronger for specific object categories, such as accessories, clothing/fabric and instruments. In other categories, this evolution was less outspoken (e.g. decoration) or even negative, such as for real estate and tableware. This suggests that linguistic developments in consumer trends showed different rationales in specific market segments. One caveat, however, is that under our approach, many multiword units in the real estate and tableware category would be of the type *glass bottles*, where we treated *glass* as a descriptive modifier and *bottles* as the headword. This might explain why we should expect no surge in the use of more evaluative modifiers in this position, and why some object categories are more strongly associated with, e.g. descriptive modifiers. At the same time, this situation also does not explain why one should see such a consistent *drop* in the use of evaluative modifiers.

4. Discussion

Object categories such as ‘decoration’, ‘furniture’ and ‘utensils/appliances’ were continually offered for sale in the adverts because their socio-cultural worth (i.e. the previous owner)

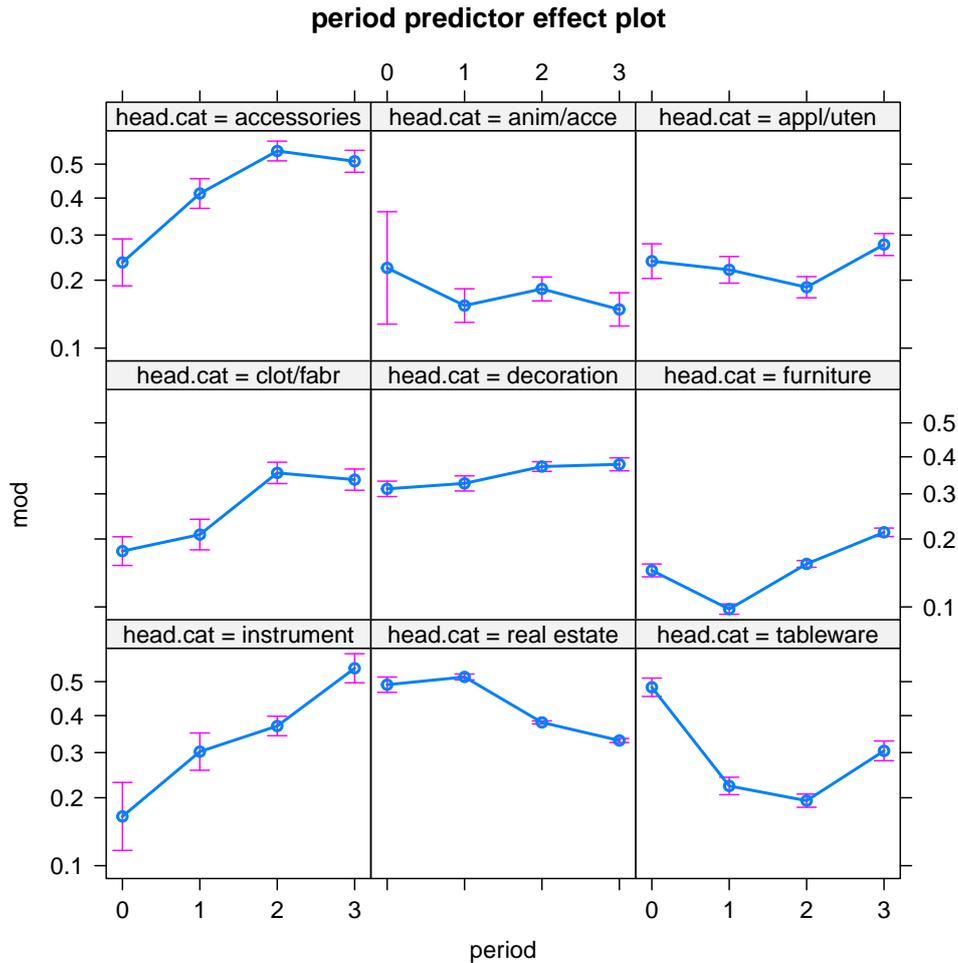


Figure 7: Effect plot (resulting from Model 3) for time as a predictor, conditional on the category of the object headword.

remained more stable [17]. A more trend-sensitive object category such as ‘fabric/clothing’ declined throughout the research period, most likely due to rapid changes in fashion on the one hand and competitive access to upholsterers, which allowed buyers to customise their purchases to their liking and interior [23, 26]. Next, we look at the rising object categories, namely ‘animal/accessories’, ‘real estate’, ‘tableware’ and ‘instruments’. We can explain the first two based on our hypothesis that houses were increasingly sold with household effects and gardens, including stables and their inhabitants, which is clearly reflected in the source material [21]. The remarkable surge in ‘tableware’ and ‘instruments’ is likely due to their status as elite markers; some *genuine* chinaware and a harpsichord clearly indicated gentility. The auctioneer thus placed these goods prominently in his adverts to assure potential buyers of the quality and prestige of the furnishings offered for sale. Besides, these goods became simply a much more widespread commodity throughout (elite) society throughout the eighteenth century [23, 21,

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A. Modifiers

Descriptive adapted - ebony - white - turky - sedan - wilton - couch - domestic - elbow - library - madeira - chintz - scotch - silk - double - golden- - green - plated - servants - writing - dimity - carved - glass - window - red - steel - moreen - household - blue - bronze - sleeping - hollands - housekeepers - private - brussels - mohair - brick-built - four-post - royal - cotton - brass - french - muslin - parlour - nankeen - tin - bowed - built - irish - cheney - metal - repair - four-stall - check - dresden - eight - walled - card - gilt - printed - enamelled - leasehold - bordered - attached - culinary - damask - satin - arched - several - winged - public - english - field - german - farming - furnished - dwelling - goose - serges - walnut-tree - wainscot - sconces - crimson - pembroke - double-key'd - bay - detached - various - snuff - harrateen - three-stall - standing - kitchen - yellow - toned - persian - stained - brilliant - glazed - single - genoa - copper - inlaid - sundry - calico - camblet - iron - indigo - jamaica - circular - pier - general - japan - fowling - eight-day - pewter - breakfast - drawing - musical - pearl - japanned - marseilles - womens -

worsted - brown - carpeting - grey - velvet - wrought - dressing - chestnut - mahogany - horse-hair - wood - lisbon - india - spanish - nag-tail - marble - upholstery - pair - livery - woollen - looking - wearing - stage - cornices - coloured - four - black - chelsea - foreign - singularly - ornamental - oval - cabriole - broad - eating - coach - silver - copyhold - singular - stone - russia - flemish - miscellancous - diamond - dutch - feather - draught - shaving - complete - variety - drinking - dining - panned - italian - oriental - rosewood - worsted-damask - chinese - billiard

Evaluative fancy - extensive - useful - requisite - celebrated - antique - splendid - old - lady's - modern - improvable - beautiful - truly - richly - clean - very - cheerful - great - plain - exceedingly - well-chosen - large - scarce - valuable - convenience - comfortable - well-bred - superior - neatly - pleasing - long - spacious - genteel - larger - neat - fitted - light - compact - highly - easy - condition - elegant - pleasure - remarkable - fine - proper - airy - convenient - masters - strong - prime - finished - important - improved - capital - new - superb - taste - commodious - noble - well-built - excellent - select - fashionable - fine-toned - curious - suitable - eminent - original - little - admired - magnificent - exceeding - stout - lofty - genuine - ladies - narrow - eligible - common - numerous - desirable - necessary - seasoned - handsome - roomy - principal - arable - new-built - clever - quality - superfine - gentleman's - much-improved - substantial - rich - exquisite - family - grand - ancient

B. Objects

accessories jewellery - bracelet - locket - trinket - earring

animal/accessories horse - saddle - harness - pony

appliances/utensils barrel - butts - hearth - pistol - chimney - mangle - utensil - fire-arm - stove

clothing/fabric counterpane - mattress - mercery - shawl - haberdashery - handkerchief - sheet - clothes - hose - drapery

decoration boxes - chandelier - pillar - picture - lamp - lustre - candelabra - globe - plant - carpet - cut-glass - vase - shell - screen - books - frame - chimney-glass - candlestick

furniture settee - cellarets - drawers - desk - bedstead - cabinet - chair - couch - library-case - pantry - cabinet-work - sideboard - bureau - dining-tables - furniture - canopy - secretaire - commode - wardrobe - closet - chaise - chest - bookcase - press - sofa

instrument instrument - harpsichord - piano - pianoforte

real estate cistern - dining-room - lawn - out-building - estate - garden - buildings - farm-yard - villa - chamber - drawing-room - staircase - orchard - hall - stabling - wash-house - timber-land - house - bedchamber - farm-house - brewhouse - residence - premises - mansion - dwelling-house - lots - cellar - stable - pipe - cottage - garret - court - coach-house - bath - tenement - warehouse - bed-room - messuage - attic - counting-house - apartment - farm - stall - cellaring - mansion-house

tableware dish - china - bottles - decanter - porcelain - glasses