Journal of Linguistics

CAMBRIDGE
UNIVERSITY PRESS

RESEARCH ARTICLE

Stress in French loanwords in British and American English

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Abstract
This paper presents a dictionary-based study of French loanwords in contemporary English in order to investigate the location of primary stress in these loanwords. Four factors are found to be significant predictors of the position of primary stress: endings, word complexity, the segmental structure of the final syllable, and syllable count. Moreover, this study confirms previous observations on the tendency for American English to have more final stress in French loanwords than British English. Finally, the implications of our findings are discussed in light of a model that assumes that English phonology consists of distinct interacting subsystems.

1. Introduction

Primary stress in English usually falls in a final three-syllable window (see, among many, Liberman & Prince 1977; Alber 2020). However, final primary stress is quite restricted and is primarily found in:

- opaque prefixed non-nominal words with a final monosyllabic root (e.g. *behínd, compléte, dedúce, expláin, forgíve, oppóse, províde*; see J.-M. Fournier 2007);[1]
- words that contain certain suffixes, some of which are borrowed from French (e.g. *-aire, -ette, -ee*), and some of which can be analyzed as being autostressed for contrastive reasons, as in the case of the opposition between *-ee* and the legal agentive suffix *-or*, *-teen* which, according to Trevian (2007) is stressed to avoid confusion with *-ty* (e.g. *thirteen* vs. *thirty*) or *-ess* (see Castanier 2018);

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[1] Some may not be comfortable with an analysis that treats these words as morphologically complex. However, there is considerable phonological and psycholinguistic evidence that they can be analyzed as complex structures (see Dabouis & J.-M. Fournier 2024a for an overview).

- lexical exceptions to the stress rules that predict penultimate or antepenultimate stress (e.g. *aubérge, elíte, naíve, pèrsonnél*);
- words whose final syllable contains a long vowel, according to generative analyses following Chomsky & Halle (1968). Example words given by Chomsky & Halle (1968: 78) include *machíne, brassiére, regíme,* and *baróque*, which are all French loanwords.

As can be seen most clearly in the last three categories, words with final primary stress in English are often French loanwords. This can simply be argued to be a reproduction of the phrase-final stress found in French (see Section 2.2.1). Although it is well-established that some languages treat loanwords with a phonological grammar that is at least partly different from that of native words[2], it has been claimed that this is not the case for stress in English (Hammond 1999: 284):

> In some languages, borrowed words exhibit rather different phonological patterns from those of native words, but this does not appear to be the case in the stress system of English.

Existing studies on French loanwords report rates of final primary stress that are far higher than those found in the whole lexicon. For example, P. Fournier (2016b) reports rates of final primary stress of 59% in British English (henceforth BrE) and 73% in American English (henceforth AmE). We may take two estimates to compare the rates observed in that study and the rate of final primary stress in the lexicon. If we use the dataset described in Abasq et al. (2019), which is based on the 5,000 most frequent wordforms in SUBTLEX-UK (Van Heuven et al. 2014), we find that 421 of 3,105 words (14%), which are not monosyllabic, have final stress in BrE. If we take the data reported in Hammond (1999: 194), which quantifies stress patterns in monosyllabic, disyllabic, and trisyllabic nouns, verbs, and adjectives in a 20,000-word sample, there are 2,303 of 101,362 (23%) non-monosyllabic words with final stress in AmE[3]. Final primary stress thus appears to be much more widespread in French loanwords than it is in the whole vocabulary. However, Fournier's (2016b) study focuses only on words with certain well-identified endings (e.g. *-aire, -eur, -que*), which may function as stabilizers of final stress. Consequently, the rate of final stress may be overestimated in his results. Overall, it is well-established that French loanwords display stress patterns that differ from those found in the rest of the lexicon (Bauer et al. 1980; Berg 1999) and that there is considerably more final primary stress in those words in AmE than in BrE (see, among many, Poldauf 1984; Svensson 2007; P. Fournier 2016a). Words that may be perceived as French have also been argued to constitute an independent lexical subsystem in English, with its own phonological, graphophonological, and semantic properties (Dabouis & P. Fournier 2022; see Section 2.2.4). Thus, Hammond's position seems contradicted by the available evidence on French loanwords[4].

However, detailed studies accounting for the stress variability found in those words are scarce, and many questions remain open. Why do some words maintain final primary stress,

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[2] Japanese is a well-known example (Itô & Mester 1995; 1999).

[3] Note that, even if those two estimates differ, they should not be taken to mean that there is a general difference between BrE and AmE concerning the rate of final primary stress in the whole lexicon, as the corpora used to measure this are quite different and thus not comparable.

[4] Hammond's position is also contradicted by recent studies (P. Fournier 2018; 2024) whose results show that the stress patterns of source languages are generally preserved during the borrowing process and that this may lead to stress patterns that differ from those found in native vocabulary.

while others have it further leftwards? Are there identifiable factors that may explain why certain French loanwords have final primary stress while others do not? The aim of this paper is to bring new data to provide a better understanding of stress placement in French loanwords. In this study, we use dictionary data to assess the variables that may be relevant for stress placement in French loanwords, some of which have already been investigated in previous studies (endings, syntactic categories, word complexity) and some of which have not (syllable weight and syllable count).

This paper is organized as follows: in Section 2, we review the literature on stress in French loanwords. We then present the data used for our study in Section 3 and the results of our analyses in Section 4. We finish with a discussion of these results in Section 5.

2. French Loanwords in English

2.1. Definitions

Two distinct conceptions of words borrowed from one language have traditionally prevailed, as Haugen (1950: 213) points out. He establishes a difference between 'borrowing', which is interpreted as a process, and 'loanword', which refers to a state. However, the concept of 'loanword' is nowadays universally recognized, and we adopt Haspelmath & Tadmor's definition (2009: 36):

> Loanword (or lexical borrowing) is here defined as a word that at some point in the history of a language entered its lexicon as a result of borrowing (or *transfer* or *copying*).

This definition[5] (2009: 36) needs to be refined in terms of transfer directionality. What is considered a 'true' French loanword in this study is a word coming directly from French with no intermediate language, which may have influenced the transmission of phonological properties from French into English. Because our goal is to study how far English actually reproduces the final stress found in French, this argument seems relevant. This also corresponds to Mossé's definition (1943: 35) of French loanwords, quoted in Quinio (2009): 'a French loan-word is a word which whatever may be its etymology or ultimate origin has been immediately borrowed from the French'. However, such ambiguous cases are rare, and the quasi-totality of French loanwords in the corpus have been borrowed directly from French into English.

2.2. French loanwords in English

2.2.1. Stress in French

French is characterized by a fundamental frequency (f0) rise on non-final accentual phrases with dominant final syllable stress (Welby 2006: 346), even though stress is considered to be slightly marked in French compared with languages such as English, which legitimately questions the existence of stress universals (Hyman 2011). French has a 'rhythmic group

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[5] The borrowing process must be distinguished from code-switching (Myers-Scotton 1993) even if this is particularly difficult to do in the earlier stages of integration. As Haspelmath puts it (2009: 40), loanwords necessarily belong to target languages and do not have the same stylistic function code-switching suggests. The dictionary-based approach used in this study ensures that only institutionalized borrowed words are dealt with.

stress' (Posner 1996: 110), and this stress falls on the last syllable of the group. Its function is to segment intonation units (Eggs & Mordellet-Roggenbuck 1990; Léon & Léon 2009), which means that even though 'stress' is mentioned in the literature to qualify the phenomenon occurring in French, it should be distinguished from 'lexical stress'. French stress is linked to intonation groups, which Welby (2006) refers to as 'accentual phrases', very often modeled on syntactic units.

In assertive sentences with no specific emphasis, the last syllable of an accentual phrase has a rising tone when it is part of a non-final group. This rising pattern indicates that that unit is followed by other accentual phrases. Falling tones occur at the end of sentences to indicate sentence boundaries. The functionality of falling intonation, as an indicator of sentence boundaries, is said to be demarcative[6]. For example, consider (1) below, in which there are five accentual phrases, whose boundaries are indicated with slashes.

(1)   Dans une ↗ferme | il y ↗a | des ↗vaches | des mou↗tons | et des co↘chons.

The first four accentual phrases have rising tones on their last syllables to signal non-finality. The falling tone on the last syllable of *et des cochons* indicates the end of the sentence.

English has no dominant stress placement, and this characteristic of its stress system made it possible to stress the last syllables of words of French origin. This feature can be interpreted as a way to signal the French origin of these words by reproducing the French tonic placement system.

2.2.2. Historical perspective

Thousands of French loanwords have been integrated into the English language since the Norman Conquest and have been associated with the notions of power and prestige. In their reference books, Serjeantson (1935: 104–169) and Jespersen (1958) list and classify the French loanwords that entered the English lexicon century after century. These words cover a large range of semantic areas and are primarily attested in vocabulary dealing with war, law, church, fashion, and art. According to Jespersen (1958: 87), the strongest influx of French loanwords did not occur immediately after the Norman Conquest but between 1251 and 1400[7].

It is worth mentioning 'doublets' (i.e. two co-existing words that originally referred to the same notion but whose origins are different (Saxon and French)), in which the Saxon words are traditionally used in everyday contexts whereas the French terms are preferred in prestigious contexts. This is particularly clear with the well-known examples of *mutton / sheep*, *pork / pig*, *ox / beef*, *veal / calf*, in which the name of the animal is a Saxon word, whereas the name of the meat is a French loanword.

As for stress in French loanwords in English, Jespersen (1958: 96) considers that the influx of French loanwords did not at first modify the English phonological system. Svensson (2007: 100) identifies three key periods: before 1500 when final stress patterns are rare, between 1500 and 1700, and after 1700 when there is a significant rise of final

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[6] For a complete analysis of the French intonation system, see Di Cristo & Hirst (1993).
[7] Bliss (1966) (quoted in Chadelat (2000)) estimates that 52.3% of loanwords of the English lexicon are of French origin in the nineteenth century. Grant (2009: 370) estimates that BrE is nowadays composed of 41% of loanwords (with 25.2% of French origin).

stress patterns in words of French origin. Castanier (2016), in his large diachronic study of stress changes in the past three centuries, reports a pivotal date around 1660 in the stressing of French loanwords, after Görlach (1997) and Danielsson (1948: 29–30). The latter links this to the Restoration when words of French origin started to retain their stress properties from French. The next section deals with the characteristics of French loanwords in contemporary English, which make it possible for contemporary speakers to identify them.

2.2.3. Characteristics of French loanwords in contemporary English

Schultz's (2012) study focuses on twentieth century French loanwords[8]. Thanks to an advanced search using the *Oxford English Dictionary* etymological tool (www.oed.com), she identifies 1677 French loanwords (including semantic loans and hybrid formations). Her study (2012: 98–103) demonstrates that French stress may have been kept (i.e. on the last syllable) or may have been assimilated by the English stress system with root-initial stress. Morphology is presented in Schultz (2012: 101) as a major parameter in the stressing of French loanwords with certain endings, which are strongly associated to final stress (e.g. *-ade, -aire, -elle, -eur*). This echoes J.-M. Fournier's categorization (2007) in terms of strong and neutral endings (although some of Fournier's endings do not correspond to morphological units). J.-M. Fournier's system of stress assignment (2007), which can efficiently predict the location of primary stress based on syntactic, morphological, and segmental properties (see Abasq et al. 2019), demonstrates the consistent phonological behaviour of French endings (e.g. -C'C'e, *-ade, -que, -aire, -eur/euse*)[9]. J.-M. Fournier integrates them among what he calls 'strong endings' (which are opposed to neutral suffixes such as *-less, -ness, -some,* and *-ly*, which are generally of Germanic origin – the dichotomy being close to what many analyses in generative phonology refer to as Class 1 and Class 2 suffixes) with a resulting final stress pattern. To put it simply, those endings are systematically associated with final stress patterns in English, independently of the attestedness or the stress pattern of their base[10]. Schultz also shows that borrowed phrases are more likely to have final primary stress (e.g. *mission civilisatrice, plus ça change*). However, there are no figures in Schultz's study, which makes it impossible to estimate the proportion of final and non-final stress patterns in words of French origin or the effect size of the different factors that may affect stress or their interactions.

Castanier (2016) reports that there is a connection between stress patterns and frequency of use. The more words of French origin sharing morphological characteristics (e.g. words suffixed in *-ette* or *-eur*) are used, the more they tend to be uniformly stressed.

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[8] Note that the results that she reports may not be true of all French loanwords given that they are recent borrowings. As seen in the previous section, older borrowings were generally phonologically assimilated (especially before the seventeenth century).

[9] The term 'ending' is generally used instead of 'suffix' in the tradition introduced by Lionel Guierre approach (see Dabouis et al. 2023) because final sequences that have an influence on stress placement and whose resulting stress patterns can be attributed to the consistent determining influence of such sequences are not strictly limited to suffixation. Indeed, such sequences as *-sce* or *-que* are not suffixes, but it appears that words with such endings (mostly of French origin) are stressed on the final syllable, whether suffixal (e.g. *fluoresce, humoresque*) or not (e.g. *reminisce, antique*). See also Halle & Keyser (1971) for a similar view.

[10] Other strong endings may force stress onto the penult (e.g. *-ic,* -C$_2$*al, -osis*) or the antepenult (e.g. *-ical, -ity, -ify*).

Moreover, along with P. Fournier (2016b – cf. introduction), Schultz (2012) reports that French loanwords are stressed differently in BrE and AmE[11], and these observations echo those found in Svensson (2004) and in Poldauf (1984: 76):

> the tendency to domesticate these words by giving them initial stress or by stressing them after contributive prefixes is stronger in British English than in American English.

Sociolinguistic hypotheses have been formulated to account for that tendency (e.g. prestige and geographical proximity (Poldauf 1984: 76–77; Chadelat 2000)) as well as arguments concerning the influence of micro-paradigms sharing an ending (P. Fournier 2016a)[12]. In P. Fournier's study, loanwords are selected according to typical French endings in the latest editions of the *Longman Pronunciation Dictionary* (third edition) (Wells 2008) and the *Cambridge English Pronouncing Dictionary* (eighteenth edition) (Jones 2011). This study shows that there is significant variation between BrE and AmE, and that noun categories (i.e. common noun vs. proper noun) and endings have an impact on the position of stress depending on the variety of English under consideration. For example, such endings as *-eau* are associated with final stress patterns in proper nouns in AmE when they are associated with non-final stress patterns in BrE.

2.2.4. A French subsystem in English?

If one goes beyond stress, French loanwords in English or, more generally, words perceived to be French, can be shown to have other characteristics. This idea is explored by Dabouis & P. Fournier (2022), who develop a model in which the English lexicon is divided into different subsystems with their own graphophonological, semantic, morphological, and phonetic characteristics[13]. Following Carney (1994), who introduces that idea for spelling-to-sound correspondences, subsystems are represented using the "§" symbol (e.g. §French). In Dabouis & P. Fournier's model, there is a §Core system and three other subsystems: §Foreign, §Learned, and §French. These subsystems are partly linked to the etymology of words, but they are assumed to have a form of independence from source languages as certain loanwords might not be perceived as 'foreign' or certain words borrowed from a

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[11] Even if the introduction of French loanwords is historically related to BrE, phonologists started to tackle with the pronunciation of French loanwords in AmE as well at the end of the twentieth century. This was made possible because American transcriptions were then attested in major dictionary sources.

The French settlement in Louisiana especially in the eighteenth century (until it was sold to the United States by Napoleon in 1803) may have had an influence on the way words of French origin were pronounced in America. The pronunciation of French loanwords in the two varieties has evolved separately and probably explain why there are significant differences in contemporary English. New England French, which is still spoken in the New England area of the United States (although the dialect is endangered) and which results from the arrival of French Canadians, is also worth mentioning, as it may have influenced the pronunciation of French loanwords in AmE as well.

[12] An anonymous reviewer also suggests to us that part of the answer may lie in the Francophone presence in Louisiana and New England: the stronger persistence of French-like stress patterns would have to do with Francophones being present in the United States.

[13] The idea that English phonology is made up of different subsystems is not really elaborated in this article, nor contrasted with previous models of loanword adaptation (see, e.g. Ito & Mester (1995; 1999) or Simonovic (2015)), as it is not the main point of this study. For a complete development of the model posited here, see Dabouis & P. Fournier (2022).

given language might be perceived as being borrowed from another one. Let us review the characteristics that they identify for the §French subsystem, which are taken from the available literature.

First, they establish specific spelling-to-sound correspondences, some of which are shown in (2).

(2)   <a> - /ɑː/   *espion**a**ge, moust**a**che*   <eau> - /əʊ/   *bur**eau**, chat**eau***
     é(e)> - /eɪ/   *clich**é**, fianc**ée***   <oi, oy> - /wɑː/ *mem**oi**r, pat**ois***
     <i> - /iː/   *crit**i**que, qu**i**che*   <ch> - /ʃ/   *dou**ch**e, ni**ch**e*
     <ou> - /uː - ʊə/ *b**ou**rgeois, rendez-v**ous*** <g> - /ʒ/   *monta**g**e, refu**g**e*
     <eu> - /ɜː/   *dans**eur**, entrepren**eur*** <gn> - /nj/   *co**gn**ac, vi**gn**ette*

Moreover, §French words are the only ones to have final silent letters (e.g. *coup, dossier, bourgeois, precis, éclat, buffet, argot, debut*). Words of the §French subsystem also have specific semantic characteristics. They are often associated with the notion of 'prestige' (Chadelat 2000) and are used primarily to refer to foreign culture (e.g. clothing, food, brand names). With respect to morphology, §French words have specific suffixes such as *-aire, -ette, -eur / -euse,* or *-esque.* As mentioned in the introduction, not all French loanwords have final primary stress, and so a better understanding of the determining factors of final stress is required to improve our understanding of the accentual properties of the §French subsystem.

3. Methodology

3.1. Corpus building

To have as little self-intervention in corpus building as possible, phonemic transcriptions were extracted manually from the *Longman Pronunciation dictionary* (third edition) (henceforth *LPD*) whenever French phonemic transcriptions appear in entries. When no transcription was available for French, the entry was not included in the corpus. The following quotation found in the introductory guide of the dictionary is explicit (2008: xiv):

> For words belonging to foreign languages, which are in use in English, *LPD* shows both their anglicized pronunciations and their pronunciations in the language of origin.

The 'loanword' appellation is not explicitly mentioned in the dictionary quotation, but this is exactly what it refers to. However, no distinction is made between the varieties of French, and so French words from Quebec, Belgium, or Côte d'Ivoire (and wherever French turns out to be one of the national languages) can be found in the corpus. This methodology obviously has limitations, as it implies that only words which are explicitly identified as 'belonging to foreign languages' are included in the dataset. However, it gives us access to a relatively large number of loanwords; the method can be reproduced easily by anyone who would endeavor to replicate the study; and this methodology complements that used in previous research, such as P. Fournier's (2016a) study, whose data were selected on the basis of certain typical French endings.

The initial extraction represented 1,332 entries, but it had to be refined. Monosyllabic words were excluded (141 entries) as well as words with two source languages (18 entries), as it was difficult to determine whether they came directly from French or from the second

language, or again from both languages (e.g. *Aragon* comes from Spanish or French, *Brabant* from Dutch or French, *Eupen* from French or German, and *Monte* from Italian or French). Only loanwords coming directly from French and attested as such by the dictionary were kept, based on etymological information given in the online *Oxford English Dictionary*. In *LPD*, commentaries sometimes supplement phonemic transcriptions, such as 'this is not a true French expression' (in the entry for *beche-de-mer*) or 'not actually a French word' (in the entry for *epergne*). Hybrid formations were not included either (10 entries; e.g. *Bordeaux mixture*). Doublets with different spellings (7 entries; e.g. *Yaunde* for *Yaoundé* or *chateaux* for *château*) were excluded because these minor spelling changes had no effect on stress patterns and so keeping them in would have created redundancy in the data.

In *LPD*, certain entries may have different syllable counts, within or across the two varieties of English described in the dictionary, as shown in (3a, b).

(3) (a) *Corbusier* /kɔːˈbuːzieɪ, -ˈbjuːz-/ (Br.Eng.) and /ˌkɔːrbuːzˈjeɪ, -uːs-/ (Am.Eng.)
     (b) *oeil-de-boeuf* /ˌɜːidəˈbɜːf, ˌ-jə-/ (Br.Eng.) and /ˌʌdəˈbʌf/ (Am.Eng.)

The realization of vocalic sequences can be monosyllabic or disyllabic (with *-ier* for example, it is generally disyllabic in BrE and monosyllabic in AmE). Variability in the syllable count of such entries makes it difficult to conduct statistical analyses and complicates the comparison between the two varieties. That is why these entries were left out of the final dataset (57 entries). Finally, entries for which the English pronunciation has an extra syllable relative to French to adapt final sequences such as French /vʁ/ or /bl/ as /vʁə/ and /bəl/, respectively, were left out (36 entries; e.g. *amour-propre, enfant terrible, chypre, timbre*)[14]. Indeed, in these entries, the added syllable may never be stressed and so the absence of final stress cannot be said not to reproduce the stress pattern of French. On the contrary, in these words, primary stress systematically precedes the added syllable and is therefore placed on the syllable which receives stress in French[15].

The corpus that we analyzed therefore consisted of 1,043 items.[16] Many proper nouns are attested in the corpus, and this is the result of eponymization, which is the process when famous people give their names to products or techniques. Faure (2018) finds '231 name-givers of French origin' concerning the medical lexicon for example. It appears that the names of many French scientists, artists, politicians, or sportspeople have been integrated into English.

3.2. Data annotation

The data were annotated so as to evaluate the relationship between five variables and stress placement in French loanwords. These five variables are detailed subsequently.

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[14] This difference is due to the fact that French tolerates final consonant clusters with rising sonority (see Demuth & McCullough (2008) on how these structures have been analyzed in the literature) but English does not. /Cʁ/ sequences appear to be reanalyzed as branching onsets, and a /ə/ occupying the nucleus position is added. The /l/ in /Cl/ clusters is realized as a syllabic consonant or as a coda preceded by /ə/.

[15] Let us note that certain entries may optionally lose this extra final syllable (e.g. *Louvre* /ˈluːvrə/ ~ luːv/). As suggested by an anonymous reviewer, those could be treated as having final stress, at least in French if we only consider full vowels. We are interested in the stress patterns found in English, and having an extra syllable might affect how those words are stressed. Thus, we judged that it was more cautious to exclude those items, especially considering their small number.

[16] The dataset used in this paper can be consulted by following the link: https://osf.io/sgxpn/.

Table 1. Mora counts for the variable FINALSYLLABLE

	No coda	/C/	/st/ or /nC[+cor]/	Other /CC/
/æ, e, ɪ, ʊ, ɒ, ʌ, ə, i, u /	1 μ	2 μ	2 μ	3 μ
/aɪ, eɪ, iː, uː, əʊ, ɔː, aʊ, ɑː, ɜː/	2 μ	3 μ	3 μ	4 μ

ENDING – Entries were annotated as containing a French ending, suffixal or non-suffixal, if that ending appears in at least 10 entries in the corpus. Sixteen endings were identified in that way: *-age, -aire, -ant, -ard,* -C'C'*e*,[17] *-é(e), -el, -et, -eur/euse, -i, -ie, -ier, -in, -on, -que, -y.* This variable is taken into consideration to control for the potential regulatory effects of these endings, as word endings (which are often suffixes) have been shown to have strong correlation with certain stress patterns (see Section 2.2). Some of the endings identified in our corpus are well-known and have been identified in the literature (e.g. *-aire,* -C'C'*e, -eur/ euse, -que*).

SYNTACTICCATEGORY – Syntactic categories are taken from the online edition of *Merriam Webster's* (www.merriam-webster.com).

COMPLEX – Entries were treated as complex when they were either spaced (e.g. *bon appetit, coup d'état, déjà vu, en route, Moulin Rouge*) or hyphenated (e.g. *aide-de-camp, beaux-arts, passe-partout, Port-au-Prince*). This assumes that phrases or compounds may not be stressed in the same way as entries that contain a single root.

FINALSYLLABLE – Based on the previous literature, three measures of syllable weight were carried out and tested. In all of these measures, only the main pronunciation given in Wells (2008) was considered. The first is a general coding of the structure of the syllable (e.g. V, VC, VV, VVC, VCC), with V representing a short vowel, VV a long one, and C a consonant. The second is a binary coding as to whether the final syllable contains a long vowel, as long vowels have been claimed to attract stress when found in the last syllable of words. Finally, mora counts were calculated as follows: the short vowels /æ, e, ɪ, ʊ, ɒ, ʌ/ and the reduced vowels /ə, i, u/ were assigned one mora, and the tense vowels /aɪ, eɪ, iː, uː, əʊ, ɔː, aʊ, ɑː, ɜː/ were assigned two moras. As for consonants, two counts were tested: one in which each coda consonant was assigned a mora and one in which final /st/ or /nC[+cor]/ clusters were only assigned one mora (following Hammond 1999)[18]. Thus, mora counts were as detailed in Table 1.

SYLLABLECOUNT – Entries were annotated for their number of phonetic syllables (see 3.1).

The dependent variable in all models is the stress pattern of the main pronunciation given in Wells (2008), coded as FINAL or NON-FINAL. Although variation is not integrated into statistical analyses, it is taken into consideration in the figures presented in the following sections, with entries showing either final or non-final stress identified in the 'Var' category.

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[17] The ending -C'C'e is to be read as 'a sequence of two identical consonants followed by a final silent <e>' (e.g. *baguette, Brigitte, Lafayette, Marianne, raclette*). This ending is defined orthographically, as are many other endings in the list, in line with the previous literature, notably after Guierre (1979).

[18] These clusters are treated differently by Hammond on distributional grounds: it is possible to find all types of vowels before these clusters, which he interprets as a sign that they have fewer moras than other sorts of clusters. Also note that <Vr> sequences in which the <r>, if it were realized, would be part of the coda, were treated as VV in BrE and VVC in AmE.

3.3. Statistical analysis

The five variables were included in a binary logistic regression model using R (R Core Team 2023). Binary logistic regression is a statistical test that allows the researcher to test the relationship between predictor variables and a binary dependent variable in a model in which each variable is tested while the other variables are held constant. Model selection was operated in a stepwise fashion by removing variables that did not improve the model. This was evaluated by retaining predictors whose t-value was not comprised between -2 and 2, by ensuring that the model has an Akaike Information Criterion (AIC) that is at least 2 points lower than a model without the predictor and by making sure that the model with the predictor is significantly different (p<.05) from a model without it in a likelihood ratio test.

In a subset of the data, we also used conditional inference trees, which are a type of non-parametric tree-structure model of classification that can be used as an alternative to logistic regression, particularly in configurations in which predictors interact in complex ways (Levshina 2021). This was done using the function `ctree` from the package `party`.

4. Results

4.1. Regression analysis

Before we present the results of statistical tests, let us consider the general distribution of stress patterns in the dataset. If we take the whole dataset and consider only the main pronunciation given in *LPD*, we find that 524 of 1,043 entries (50%) have final primary stress in BrE, whereas there are 813 of 1,043 with final primary stress (78%) in AmE. That confirms the observation found in the literature that French loanwords are more likely to have final stress in AmE than in BrE. As we will see in the following section, this tendency is confirmed in all subsets.

Two categories of entries have to be taken out of the dataset to be able to conduct the regression analysis, because they raise issues on how their weight should be measured. First, entries that end in /əʊ/ (US /oʊ/; e.g. *bureau, escargot, Peugeot, St Malo, Truffaut*) are problematic, because this vowel has been argued to be underlyingly lax when unstressed (Chomsky & Halle 1968: 75; Hammond 1999) and therefore should be interpreted as monomoraic when unstressed, but bimoraic when stressed. As this would potentially bias our overall results, the 71 entries that end with this vowel, whether stressed or unstressed, have been taken out. The second problematic category concerns entries whose final syllable contains a nasal vowel (e.g. *bon vivant, croissant, Dijon, Le Mans, Provence, vin blanc*). These vowels reproduce the nasal vowels of French, and they raise the question of whether they should be analyzed as short vowels or as an underlying vowel + nasal sequence. The second analysis is supported by the fact that several entries show an alternation between realizations with one or two segments (e.g. *parfum* /pɑːˈfæ̃ ~ /-ˈfʌm/). Seventy-three entries contain such final elements in BrE, and so they have been excluded from further analyses. These two subsets represent 144 words, which will be discussed in Section 4.4. Binary logistic regression analysis was conducted on the remaining 899 entries.

All factors were included in the model, and factors that do not improve the model were taken out following the procedures described in Section 3.3. For the ENDING factor, endings were progressively excluded, and entries were reintegrated in the NOENDING category until only the endings that are significant predictors of the position of primary stress were kept in. Seven endings are preserved for the BrE model, whereas only five are preserved in the

AmE model. All factors except SYNTACTICCATEGORY were found to be significant predictors of the position of primary stress in both varieties. For FINALSYLLABLE, mora counts in which final /sC/ and /nC[+cor]/ clusters were assigned one mora were found to be the best

Table 2. Binary logistic regression model for BrE

Predictors	Odds ratio	CI	Statistic	p	AIC of model without predictor
(Intercept)	0.21	0.06 – 0.71	−2.49	**0.013**	
COMPLEX-NO	17.39	10.17 – 31.09	10.04	**<0.001**	977.645
ENDING-AIRE	0.06	0.00 – 0.35	−2.59	**0.009**	1033.874
ENDING-C'C'E	0.08	0.03 – 0.18	−5.98	**<0.001**	
ENDING-É(E)	18.09	7.02 – 62.01	5.34	**<0.001**	
ENDING-ET	6.46	2.21 – 24.43	3.10	**0.002**	
ENDING-EUR/ EUSE	0.03	0.00 – 0.14	−3.44	**0.001**	
ENDING-IN	7.90	1.76 – 58.21	2.40	**0.016**	
ENDING-ON	5.66	2.35 – 16.14	3.57	**<0.001**	
SYLLABLECOUNT	1.77	1.37 – 2.30	4.37	**<0.001**	852.037
FINALSYLLABLE (MORA)	0.33	0.23 – 0.46	−6.30	**<0.001**	877.176
Observations	899				
R^2 Tjur	0.406				
AIC	834.041				

Abbreviation: CI, confidence interval.

Table 3. Binary logistic regression model for AmE

Predictors	Odds ratio	CI	Statistic	p	AIC of model without predictor
(Intercept)	0.01	0.00 – 0.03	−6.24	**<0.001**	
COMPLEX-NO	39.99	16.60 – 116.67	7.50	**<0.001**	880.199
ENDING-C'C'E	0.29	0.12 – 0.61	−2.99	**0.003**	821.872
ENDING-É(E)	0.28	0.12 – 0.57	−3.22	**0.001**	
ENDING-EUR/ EUSE	0.08	0.00 – 0.40	−2.42	**0.016**	
ENDING-IN	5.85	1.69 – 24.45	2.64	**0.008**	
ENDING-ON	5.76	2.81 – 12.18	4.71	**<0.001**	
SYLLABLECOUNT	2.13	1.64 – 2.78	5.62	**<0.001**	789.522
FINALSYLLABLE (MORA)	0.53	0.39 – 0.72	−3.96	**<0.001**	775.327
Observations	899				
R^2 Tjur	0.218				
AIC	760.547				
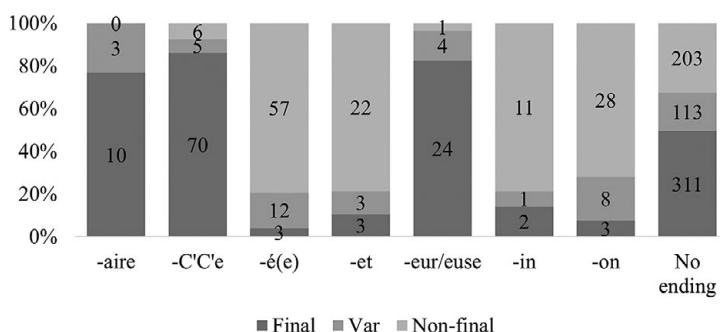
Figure 1. Position of primary stress in entries with different endings compared to those with no endings in BrE.

predictors of stress placement in the dataset[19]. The two regression models are provided in Tables 2 and 3.

These tables show that the same factors are significant predictors of final primary stress in both varieties of English, and that the directionality of the relationship between factors is the same (an odds ratio below 1 indicates that the factor favors final stress, whereas an odds ratio above 1 indicates that it favors non-final stress). These results are detailed in the following sections.

4.2. The role of endings

The regression analysis has allowed us to identify which endings have a significant relationship with the position of stress in the data. In BrE, there are seven such endings, for a total of 276 entries, which can be said to have an impact on the position of stress, and which overrides any effect of syllable count, complexity, or syllable weight. The stress patterns of these entries are shown in Figure 1.

As can be seen in Figure 1, in BrE, three endings are more associated with final stress (see (4a)), whereas four are more associated with non-final stress (see (4b)).

(4) (a) Endings associated with final stress in BrE:
          -aire   *affaire, Hilaire, laisser-faire, ordinaire, Voltaire…*
          -C'C'e   *Bastille, cayenne, cocotte, demoiselle, Marianne, Navarre…*
          -eur/euse *agent provocateur, danseuse, entrepreneur, restaurateur…*
     (b) Endings associated with non-final stress in BrE:

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[19] In all models for BrE, the other variables remained significant, but the measure of FINALSYLLABLE using syllabic structures (e.g. VV, VC, VCC) was not a significant predictor of the position of stress. The one based on a distinction between final syllables containing a long vowel and those not containing one was found to be a significant predictor of the position of stress, but the model using this variable had a higher AIC (866.553) than the one using mora counts (836.74). In AmE, all three options were significant predictors of the position of stress, with the lowest AIC for syllabic structure (743.61), then presence of a long vowel (748.75) and mora counts (760.85). The choice between these different variables was therefore not an easy one: syllabic structures were not an option, as no significant effect could be detected in BrE, but the choice between the presence of a long vowel or mora counts had to be somehow arbitrary. We chose to use mora counts, but much of the analysis detailed here should not be strongly different should we have chosen to use the presence of a long vowel instead.
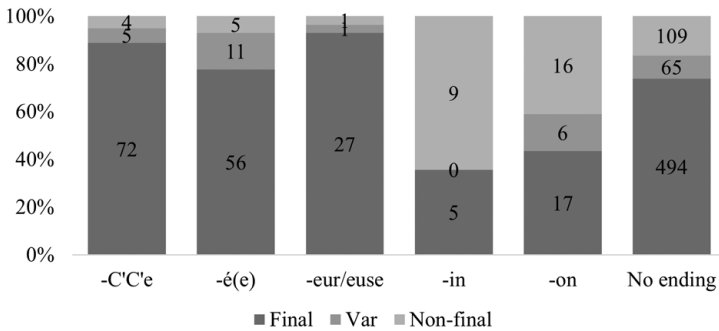
Figure 2. Position of primary stress in entries with different endings compared to those with no endings in AmE.

-é(e)	*actualité, bourrée, démodé, fiancé(e), pâté, rusé…*
-et	*beignet, bidet, filet, Le Creuset, Monet, Piaget…*
-in	*au gratin, gamin, Gobelin, navarin, Rodin…*
-on	*Bourbon, cabochon, filet mignon, liaison, Sauvignon…*

The endings that were found to have a significant relationship with the position of stress in AmE are approximately the same, although *-aire* and *-et* were not found to be significant in that variety. The stress patterns of the 235 entries containing these endings are shown in Figure 2.

Here too, the general tendency is for AmE to have more final stress than BrE. The effect of these endings on stress is the same for *-C'C'e*, *-eur/euse, -in*, and *-on*, although there is less non-final stress for the latter two endings than there is in BrE. However, *-é(e)* has the opposite behavior in AmE than in BrE, as it is strongly associated with final stress. Consider the examples in (5), which all have non-final stress in BrE but have final stress in AmE.

(5)   *actualité, appellation contrôlée, barré, blasé, Champs Elysées, crudités, distingué, écarté, Fauré, frisée, Mallarmé, passé, Pouilly-Fumé, repoussé, risqué, soirée…*

4.3. Syllable weight, complexity, and syllable count

To deal with the same dataset for both varieties, this section only deals with the 623 entries that do not contain one of the seven endings identified in the previous section for BrE. Once more, the stronger tendency is for AmE to have final stress. If we consider only the main pronunciation given in the *LPD*, 359 of 623 entries (58%) have final stress in BrE, whereas 477 of 623 (77%) do in AmE. If we compare simple and complex entries (see Figure 3), it becomes clear that the difference between varieties persists in both categories. Moreover, Figure 3 shows that there is a difference between complex and simple entries, as the former almost systematically have final primary stress.

Examples showing the similarities (6a) or differences (6b) between the two varieties of English are provided in (6).
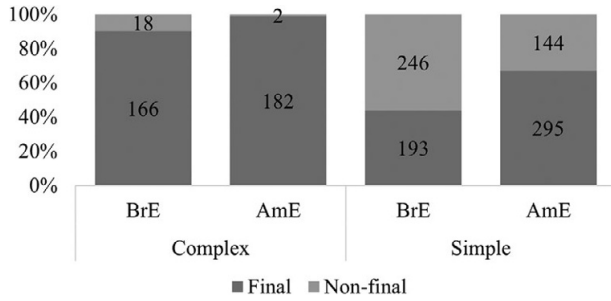
Figure 3. Position of primary stress in BrE and AmE depending on the complexity of entries.
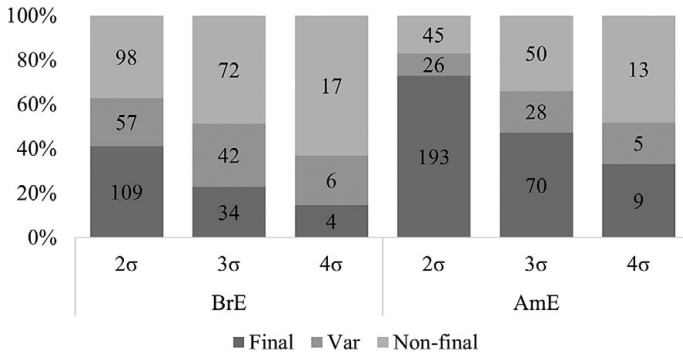
Figure 4. Position of primary stress in BrE and AmE in simple entries depending on syllable count.

(6) (a) Entries with the same position of stress in both varieties:

          Final stress: *aperçu, Candide, champagne, coup d'état, entente, faux ami, LaFontaine, mélange, Pasteur, sangfroid…*

          Non-final stress: *ampère, Bonaparte, diablerie, gendarme, Jura, mésalliance, parvenu, rendez-vous, Solvay, Tuileries…*

    (b) Entries with non-final stress in BrE and final stress in AmE:

     après, Arc de Triomphe, Beauvoir, concours, Douai, Fragonard, hors de combat, objet, par excellence, Périgord, prêt-à-porter, Sarkozy, Tanguy…

Let us now turn to the effects of syllable count. We will focus on simple entries, as we have just seen that complex entries nearly systematically have final stress (although there is a small effect of syllable count for them too). The distribution of the data for simple entries is represented in Figure 4.

As shown in Figure 4, in both varieties of English, the proportion of final stress decreases as syllable count increases. Examples are provided in (7), organized by syllable count and position of stress in BrE (7a, b, c).
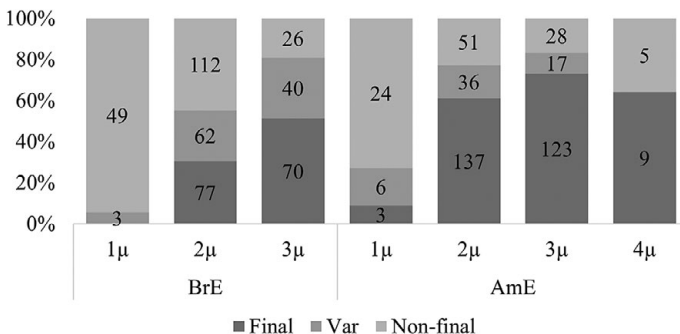
(7) (a) Two-syllable entries
       Final stress: *auberge, cuisine, farci, Lamarck, pétanque, sangfroid…*
       Non-final stress: *Beauvoir, centime, gendarme, orgeat, poussin, Ronsard…*
       Variable stress: *Alsace, distrait, éclair, langouste, maquis, rapport…*
  (b) Three-syllable entries
       Final stress: *Abidjan, bavaroise, langoustine, maquillage, Zinédine…*
       Non-final stress: *allemande, Chardonnay, farandole, Occitan, Rabelais…*
       Variable stress: *Depardieu, entourage, Montesquieu, renaissance…*
  (c) Four-syllable entries
       Final stress: *mesdemoiselles, napolitaine, téléphérique, Vientiane*
       Non-final stress: *bijouterie, Casablanca, insouciant, Montgolfier…*
       Variable stress: *apéritif, chinoiserie, matériel, Pantagruel…*

The third significant predictor of the position of stress is the weight of the last syllable. The distribution of the data for simple entries is represented in Figure 5.

Figure 5 shows that we get higher rates of final stress in entries with heavier final syllables. However, a closer investigation of the data is required to be able to draw conclusions from these results. Thus, let us focus on entries whose final syllable has been analyzed as having only a single mora; only certain vowels are attested in these final syllables, as shown in the examples in (8a, b).

(8) (a) Entries with monomoraic final syllables in BrE:
       /ə/ *Broca, Casablanca, Montgolfier, Nouméa, Santer, Wenger, Zola…*
       /i/ *Apache, causerie, Curie, Dufy, Picardy, Rémy, Thierry, Vichy…*
  (b) Entries with monomoraic final syllables in AmE:
       /ə/ *Broca, Casablanca, Douala, Jura, Nouméa, Sabena, Zola*
       /i/ *diablerie, Eugénie, Grappelli, kepi, Louis, Orly, Picardy…*
       /u/ *Bayeux*
       /ʊ/ *Montreux* (~ /uː/)
       /ʌ/ *Depardieu, Monteux*

The vowels /ə/, /i/, and /u/ are described by Wells (2008) as 'weak' vowels (although some analyze /i/ and /u/ as realizations of the vowels of FLEECE and GOOSE; see Szigetvári

Figure 5. Position of primary stress in BrE and AmE in simple entries depending on the weight (in moras, noted μ) of the final syllable.

(2017) and Lindsey (2019)). That kind of vowel is only supposed to be found in unstressed syllables, and therefore poses a possible issue of circularity: are they unstressed because these vowels are unstressable, or are these vowels present because the syllable is unstressed? Answering this question goes far beyond the scope of this paper, as the issue of the relationship between vowel reduction and stress is a complex and controversial one (see Dabouis & J.-M. Fournier 2024b for an overview)[20]. As for the vowels /ʊ/ and /ʌ/ attested in AmE, as shown in (8b), they constitute exceptions to the regular distribution of short vowels, which are normally not attested word-finally nor prevocalically.

Considering the possible issue of circularity for syllables which we have analyzed as monomoraic, the effect of syllable weight can still be observed between heavier syllables of different weights, as entries with bimoraic syllables show lower rates of final stress than heavier syllables. Examples are provided in (9a, b).

(9) (a) Entries with heavy final syllables in BrE:
          2μ   *Artois, Binoche, Camus, étui, mirepoix, succès, Verdun, Versailles, voilà…*
          3μ   *Antibes, cuisine, Justine, Lesseps, manège, portugaise, Villeneuve…*
     (b) Entries with heavy final syllables in AmE:
          2μ   *Ardèche, ampère, dauphin, Laval, mesdemoiselles, poussin, Ravel, voilà…*
          3μ   *entracte, Chabrol, Directoire, montage, peignoir, Thermidor, Vaucluse…*
          4μ   *Bonaparte, Camargue, canard, gendarme, Lamarck, Picard, Suchard…*

Now that we have seen the isolated effects of complexity, syllable weight, and syllable count, let us carefully consider the way in which they interact. To analyse those interactions, we used conditional inference trees that, as explained in Section 3.3, allow for analyses of complex interactions between predictors. Figures 6 and 7 show the distribution of stress patterns using such models in the two varieties depending on syllable count, complexity, and syllable weight. In this kind of representation, each node represents a significant split in the data regarding the distribution of the dependent variable using all predictors. Here, the dependent variable is shown below each subset in light grey for final primary stress and darker grey for non-final primary stress.

We can see in Figures 6 and 7 that the most significant split in the data is based on complexity in both varieties, and there is near-categorical final stress in complex entries, with only a few exceptions in longer entries. In AmE, there is hardly any final primary stress if the final syllable is monomoraic, but final stress is the dominant pattern in entries with heavier final syllables, especially in disyllables. Longer words show more non-final stress in simple entries overall. Finally, in BrE, there is categorical non-final primary stress if the final syllable is monomoraic, and more final stress if the weight of the final syllable increases. However, there is an effect of length in entries with bimoraic final syllables, as there is a weak tendency toward final stress in entries longer than two syllables, but an even proportion of final and non-final stress in disyllabic entries.

Let us now turn to the two categories that were put aside: entries ending in /əʊ/ (/oʊ/ in AmE) or a nasal vowel.

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[20] Note that, when entries coded as having a monomoraic final syllable (the coding being based on their main pronunciation) have final stress, the final vowel is long (e.g. *gaucherie* /ˈgəʊʃəri/ ~ /ˌgəʊʃəˈriː/; *tapis* /ˈtæpi/ ~ /tæˈpiː/).
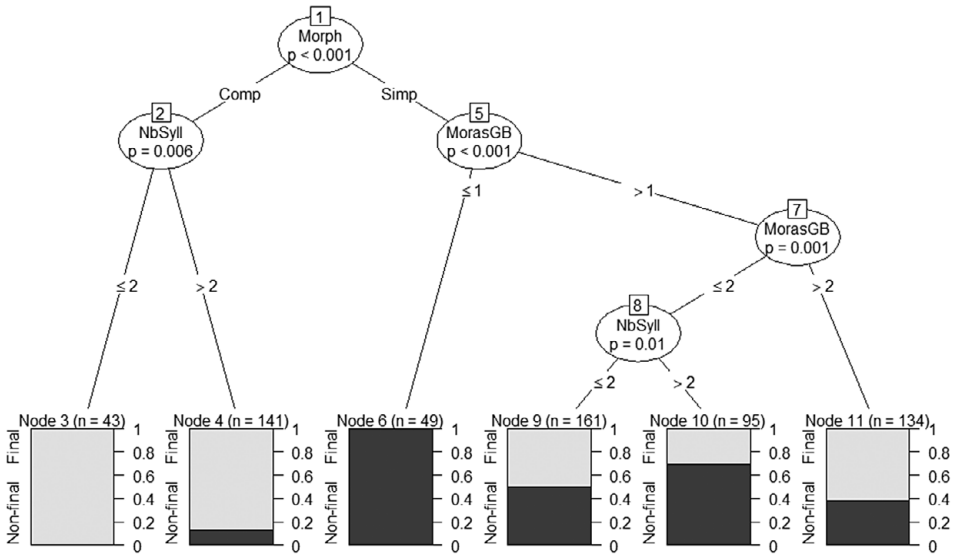
Figure 6. Conditional inference tree for the position of primary stress depending on syllable count, complexity, and weight of the final syllable (in moras) in BrE.
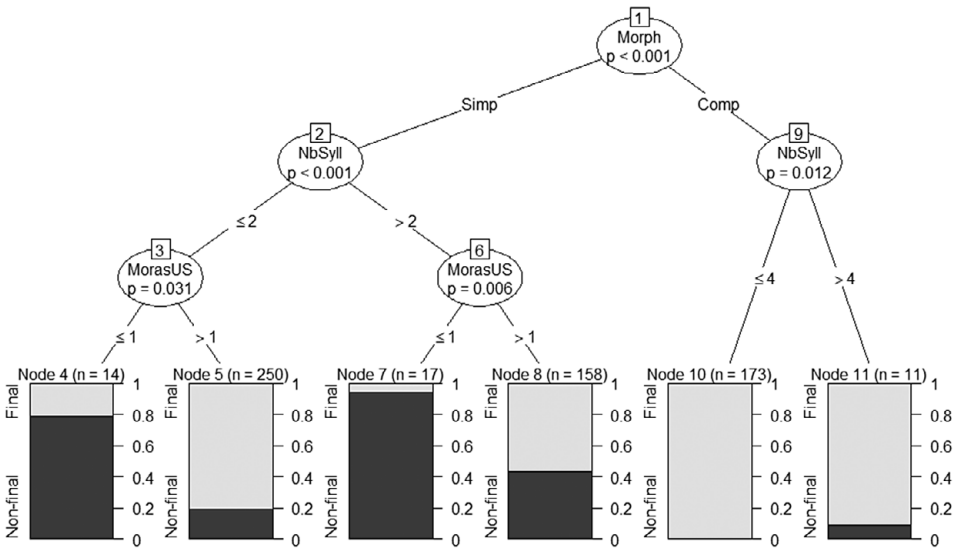
Figure 7. Conditional inference tree for the position of primary stress depending on syllable count, complexity, and weight of the final syllable (in moras) in AmE.

4.4. Entries ending in /əʊ/ or a nasal vowel

As in previous subsets, complex entries display a greater tendency to have final stress than simple entries, and so they have been collapsed into a single category. The stress patterns of entries ending in /əʊ/ (/oʊ/ in AmE) are shown in Figure 8.
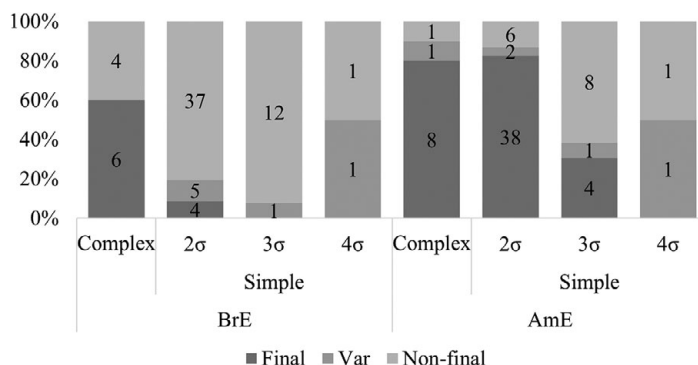
Figure 8. Position of primary stress in entries ending in /əʊ/ in BrE and /oʊ/ in AmE, depending on their complexity and syllable count (noted as σ).

As can be seen from these figures, the results are comparable to what has been observed previously:

- Complex entries are more likely to have final stress than simple entries.
- Longer entries are less likely to have final stress than shorter words, although this is primarily observable in AmE.
- If we consider the main pronunciation in simple entries only, there is more final stress in AmE (44/61 – 72%) than in BrE (5/61 – 8%).

Examples are provided in (10a, b).

(10)   Entries ending in /əʊ/ (/oʊ/ in AmE):
    (a)   Complex entries
    à gogo, art nouveau, Beaujolais nouveau, blanquette de veau, bon mot, comme il faut, Manon Lescaut, St Malo, Veuve Clicquot
    (b)   Simple entries
    2 syllables: *Bardot, Foucault, griot, nouveau, Rimbaud, Truffaut…*
   3 syllables: *Belmondo, entrepôt, escargot, Maginot, Mirabeau, Utrillo…*
    4 syllables: *D'Entrecasteaux, Yamoussoukro*

Let us now turn to entries whose final syllable may contain a nasal vowel in BrE and in AmE. The stress patterns observed in these entries are shown in Figure 9.

In this subset, we find once again the same tendencies observed in the rest of the dataset regarding complexity, syllable count, and the difference between the two varieties of English.

4.5. Entries with non-final primary stress

Let us now focus on words that do not have primary stress on their last syllable, which may or may not contain one of the seven endings identified previously. The stress patterns observed in these words are shown in Figure 10, in which /1/ represents primary stress and /0/
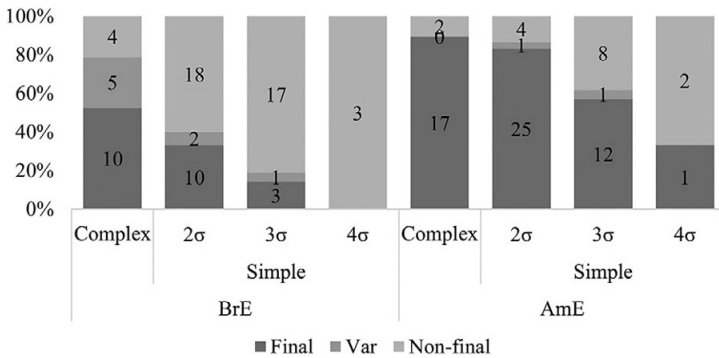
Figure 9. Position of primary stress in BrE and AmE for entries that may end with a nasal vowel, depending on their complexity and syllable count.
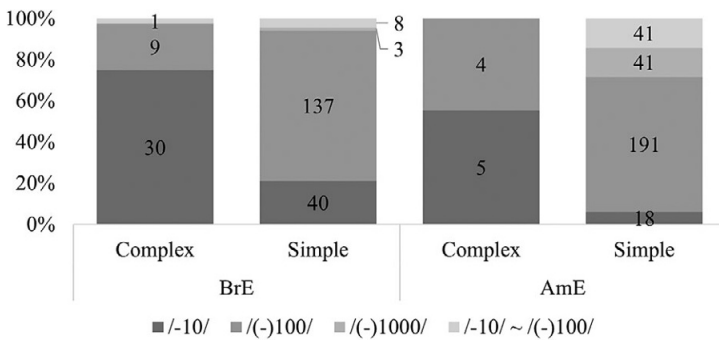
Figure 10. Position of non-final primary stress in entries of more than two syllables. /1/ represents primary stress, /0/ the absence of stress, and - preceding syllables and brackets optional structure (i.e. /-10/ represents entries with penultimate stress having at least three syllables, /(-)100/ represents entries with antepenultimate stress of three syllables or more).

represents the absence of stress (in *LPD*). Only entries longer than two syllables are considered, amounting to 228 entries.

There is again a difference between complex and simple entries, as the former are more often stressed on their penultimate syllable than the latter. This difference can probably be attributed to the fact that many complex entries in this inventory have a final disyllabic constituent (Table 4 lists the relevant examples for BrE, but the same could also be done for AmE).

The fact that simple entries which are longer than two syllables generally adopt antepenultimate stress more often than penultimate stress can probably be attributed to what Liberman & Prince (1977) and Hayes (1982) call 'strong retraction'. This rule was introduced in metrical phonology to account for antepenultimate stress in long words with a final syllable with an unreduced vowel (which they analyze as stressed and so forming a foot) such as *designate* /ˈdezɪgneɪt/ or *anecdote* /ˈænɪkdəʊt/. This rule builds a disyllabic foot before the final syllable regardless of the weight of the penultimate syllable[21]. Similarly, we may

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[21] This is different from 'weak retraction', which assigns stress immediately before a suffix if the syllable preceding it is heavy (e.g. *ellipsoid, eléctrode*) and antepenultimate stress if it is not (e.g. *hóminoid, pálinode*).

Table 4. Position of non-final primary stress in complex entries depending on the presence of a final disyllabic constituent.

	/-10/	/(-)100/	/-10/ ~ /(-)100/
X + disyllable	27	1	1
	au gratin, aide-mémoire, Arc de Triomphe, bon voyage, folie de grandeur, prêt-à-porter…	*passe-partout*	*crème brûlée*
Other	3	8	0
	appellation contrôlée, Champs Elysées, fait accompli	*Cyrano de Bergerac, nom de plume, cul-de-sac, par excellence, pain au chocolat…*	

assume that French loanwords are usually initially assigned final stress and that this stress may get retracted two syllables leftwards.

We have seen that there is a significant proportion of entries with non-final primary stress, especially in BrE, and this would appear to contradict the idea that French loanwords generally have final stress in English. However, it is interesting to note that, although the final syllable sometimes does not bear primary stress, it often contains a full vowel that, in certain approaches, would be analyzed as having secondary or tertiary stress. Although it is not the aim of this paper to study vowel reduction in French loanwords, as vowel reduction is a complex and multifactorial process (see Dabouis & J.-M. Fournier 2019), let us still quantify the presence of such final full vowels. To do so, we classified the vowels found in the last syllable of entries with non-final primary stress as reduced if they contained one of the five vowels identified as 'weak' by Wells (2008) and Cruttenden (2014: 158): /ə/, /i/, /ɪ/, /ʊ/ or /u/. Note that /ɪ/ and /ʊ/ may correspond to full vowels too, and so the 22 entries with these vowels were excluded from the present counts. All the other vowels were treated as full, and entries that alternate between a full and a reduced vowel were coded as 'Var'. We only consider BrE here because there is previous research on this variety of English and so our results can be compared with those previous findings. The results are shown in Figure 11.

Complex entries were collapsed into a single category because they almost systematically have full vowels (e.g. *bon voy*/ɑː/*ge, Cyrano de Berger*/æ/*c, prêt-à-port*/eɪ/), with only four exceptions: *Cro-Magn*/ɒ ~ ə/*n, par excell*/ɑː ~ ə/*nce, se-ten*/ə/*nt, St Bern*/ə/*rd*. In simple entries, there is more variation, but we still find high rates of full vowels. This can be seen if we compare the figures observed here with those reported by Dahak (2011) in her study on vowel reduction in post-tonic syllables in BrE. Two of the positions that she investigated are represented here. For the final syllable of disyllabic words with initial stress, she reports that 33.9% of the words in her dataset may have a full vowel, as opposed to 89.1% in our dataset (Full + Var). For the final syllable of longer words with penultimate primary stress, she finds 26.6% of words with non-reduced vowels, whereas we find 55.3% in our dataset. Although the figures are not entirely comparable, as some of the entries in our dataset may also have
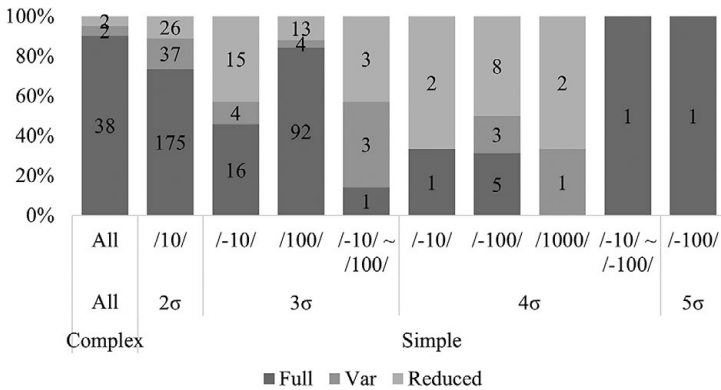
Figure 11. Vowel reduction in the final syllable of words with non-final primary stress in BrE.

primary stress on their final syllable (which could increase the chances for the last vowel to remain full) and as Dahak treats /ɪ/ as a full vowel (which means her figures would be even lower if it was excluded from the counts). However, the differences between her figures and ours are so great that it can safely be assumed that French loanwords are overall less likely to undergo vowel reduction in their last syllable when it does not bear primary stress than other words in English. Future research will be needed to corroborate this hypothesis.

Finally, let us also note the high proportion of entries with antepenultimate stress that may have a non-reduced final vowel (83.3%; e.g. *actualit*/eɪ/, *entour*/ɑː/*ge, Valér*/iː/), which is far higher than that observed in entries with penultimate stress. This is probably attributable to the proximity of primary stress in the latter case and to what analyses in Optimality Theory capture using the *CLASH constraint (see e.g. Pater 2000).

4.6. Summary of the results

First, we have confirmed certain previous observations. We have seen that there is a significant difference between BrE and AmE, with more final primary stress in AmE than in BrE. We have also confirmed the regulatory role of certain endings, even though we have found results in that regard that have not, to our knowledge, been reported before. For instance, we have confirmed the association between -C'C'e, -eur/euse, and -aire and final stress (only in BrE for the latter), but have found that -in, -on, and -et (only in BrE for the latter) appear to be somehow stress-repellent. We also found a result that is similar to that reported by Schultz (2012), who found that phrases had more final primary stress than words. In our data, the entries classified as complex were indeed found to have more final primary stress than simple ones, and some of them are indeed phrases (e.g. *bon appetit, en route*). This is quite unsurprising, as phrases usually have right prominence.

Contrary to the previous literature, we did not find any significant effect for -*que*, which can probably be attributed to the fact that most words in -*que* have superheavy syllables (e.g. *Monique* /mɒˈniːk/) and so the fact that these words all have primary stress on their final syllable has probably been captured in the regression model through syllable weight. As for -*é(e)*, we found it to be stress-repellent in BrE but autostressed in AmE. Then, we did find a probabilistic effect of the weight of the final syllable, as entries with heavier final

syllables show higher rates of final primary stress. However, part of this result should be taken with caution, as it could be argued that monomoraic final syllables are monomoraic because they are unstressed – because of vowel reduction – and, therefore, it would be circular to assume that the light weight of these syllables is the reason why they are not assigned primary stress. Even if those particular cases are left aside, our results still show significant differences between bimoraic and trimoraic syllables, with heavier syllables showing higher rates of final primary stress. In both varieties, we saw that syllable count interacts with the weight of the final syllable so that disyllables have more final primary stress than longer words if their final syllable is heavy. Second, we obtained a result that contradicts previous work by P. Fournier (2016a), who reports a difference between proper nouns and common nouns in BrE. We found no such difference, and this is probably due to the fact that P. Fournier did not control for the variables investigated in this paper, and so the observation that he made might, in fact, be attributable to these variables.

We have also brought forward a new observation regarding the relationship between the length of French loanwords and the position of primary stress in these words. The fact that there are more non-final stresses in longer entries can probably be accounted for by the fact that if primary stress is final and the entry has at least three syllables, then there needs to be a secondary stress earlier in the entry, as no word may begin with two unstressed syllables in English. The presence of this secondary stress might make it more likely for relative prominence to shift and so for primary stress to get retracted leftwards so as to avoid a marked stress pattern with final primary stress.

We have also studied the behavior of entries with non-final primary stress, and we found an effect of constituent size in complex entries, as those which have final disyllabic constituents almost systematically have penultimate stress, whereas this is not true of other complex entries. As for simple entries, we found that the most common non-final pattern is antepenultimate stress, which may be attributed to long retraction. Finally, we found that there are lower rates of less vowel reduction in the final syllable of the words of our dataset as compared with what is observed in the English lexicon as a whole. However, a more detailed study of vowel reduction comparing French loanwords and native vocabulary, which would consider all the parameters that may determine vowel reduction, would be needed to confirm this finding.

5. Discussion and Conclusion

Let us now consider the implications that our results have on the model of lexical subsystems developed by Dabouis & P. Fournier (2022) that we presented in Section 2.2.4. In that model, it is assumed that words belonging to the §French subsystem have a greater tendency to have final primary stress than words belonging to other subsystems. Our data show that final primary stress is not systematic, even though the dataset is made of words explicitly marked as French in Wells (2008). However, the proportion of words with final primary stress is higher than what is observed in the rest of the vocabulary, as reported in Section 2. The two estimates of the rate of final primary stress given in the Introduction (14% in BrE and 23% in AmE) are largely below the 50% of final stress found in our data for BrE and 78% for AmE. This effect cannot be entirely attributed to complexity, as we have seen in Figure 3 that there are still high proportions of final primary stress among simple entries: 193 of 439 (44%) in BrE and 295 of 439 (67%) in AmE.

In terms of formally accounting for the distribution of the data, Dabouis & P. Fournier (2022) suggest that differences between different subsystems might be captured in

probabilistic models using weighted constraints (Pater 2016) such as Max-Ent-OT (Goldwater & Johnson 2003) by attributing differentiated weights to a given constraint depending on the subsystem considered. It goes beyond the scope of this paper to propose a full analysis of the stress system and how it may differ between §Core and §French, but we assume that the higher acceptability of final primary stress in §French may be attributed to a weaker NONFINALITY constraint and/or a stronger ALIGN-HEAD[22] in §French than in §Core. Our results show that those differences should be made greater in a model of AmE phonology, as opposed to BrE. Moreover, on top of ALIGN-HEAD, which requires alignment of the head of the prosodic word to the right edge of the prosodic word, it may be necessary to have an additional weaker constraint requiring the alignment of the right edge of the prosodic word with a foot, so as to account for the presence of full vowels in the final syllable, which could be analyzed as foot heads that are not the head of the prosodic word. Finally, the interaction between word length and the weight of the final syllable appears to require a probabilistic model.

Another analysis could consist of interpreting the patterns reported in this paper as showing different levels of integration into §Core. In this case, the least assimilated French loanwords would be those with the most typical properties of §French, including final stress. However, the words that display stress retraction, but which still have a full final vowel, may be analyzed as partially integrated.

To conclude, our paper has shown that final stress in French loanwords is not as regular as previously assumed, especially in BrE. However, there are still many issues to explore regarding stress in French loanwords in English. There are certain variables which we did not consider in this study that may turn out to be of interest, such as word frequency, the date of entry in the English lexicon, or semantic connotations (especially the notion of "prestige" evoked previously). We might also want to investigate the role of analogy between loanwords and similar integrated English words. For example, is the antepenultimate stress of *par excellence* or *cinema vérité* to be attributed to the stress of the English words *excellence* and *verity*? Or the penultimate stress of *fait accompli* to the stress pattern of *accomplish*? Finally, dictionary data, like any kind of data, have their limitations, and so it might be informative to study these words in judgment or elicitation tasks and study what the preferences of English natives are and whether there are differences between speakers with different levels of proficiency in French.

Our study has unveiled the variables that determine the position of primary stress in French borrowings in English using one the largest datasets on the issue to date. We have shown the complexities of the patterns found in the data, but much remains to be done, and the set of variables presented in this study could be expanded.

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[22] See Pater (2000) for a description of those constraints and an analysis of primary stress placement in optimality theory.

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