(e) in Normandy: The sociolinguistics, phonology and phonetics of the *Loi de Position*

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1 Introduction

Standard French (SF) has two front unrounded oral mid-vowels, open-mid /ɛ/ and close-mid /e/, which are distinctive in word-final open syllables, although not in closed syllables (Rey 1989; International Phonetic Association 1999; Grevisse and Goosse 2016).¹ However, many regional varieties of France neutralise these two phonemes in a tendency known as the ‘Law of Position’ (*Loi de Position* / *LdP*): Séguy 1950, J. Durand 1976), which mnemonically prescribes ‘open vowels in closed syllables and close vowels in open syllables’. This is most famously true of the French of the South of France, but accounts as far back as Martinet (1945) show that it is also true of areas of the North, chiefly Normandy (Hall and Lyche 2010, and §2.4 below), Nord and Pas-de-Calais (Scherrer *et al.* 2015).

This study investigates variation in the phonetics and phonology of /ɛ/ and /e/ in the Regional French of Normandy (RFN). The variable will be referred to as (e), following the Labovian tradition of denoting linguistic variables with round brackets; (e) is defined as ‘the variable neutralisation of Intonational Phrase-final (IP-final) /ɛ/ and /e/ in open syllables’. We examine the following questions:

1. Which social variables may condition the neutralisation of IP-final /ɛ e/ in open syllables?

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¹ I would like to acknowledge the kindness of the inhabitants of La Bonneville and Darnétal in agreeing to be interviewed by me; many colleagues who have discussed this material with me; Julie Auger and Tim Pooley, for tips on Picard; and the insightful comments of my anonymous reviewers. Remaining shortcomings are of course my own.

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- 2a. If a speaker neutralises IP-final /ɛ e/, where in the vowel space is the neutralised phoneme?
- 2b. If a speaker distinguishes IP-final /ɛ e/, where in the vowel space are the separate phonemes?

The question of the neutralisation of IP-final /ɛ e/ in RFN is of interest because, despite the ongoing neutralisation of these vowels in open syllables even in northern France, there has not yet been a detailed cross-speaker investigation of the phonetic configuration of vowel-spaces for speakers of any variety where the neutralisation is in progress. Given that IP-final /ɛ e/ configurations vary between speakers—some speakers neutralise the two, some speakers bring them closer together in the vowel space without neutralising them, and some speakers keep them apart—the question deserves attention. For these cases of ongoing neutralisation in the community, where the community on average seems to be changing the configuration of its vowel-space, we offer some reasons why they may be changing it in the ways observed. We adduce these reasons both from the contemporary phonetics of the French vowel-space and from historical developments seen cross-linguistically.

2 Linguistic background

2.1 /ɛ/ and /e/ in Standard French

SF, as described in grammars and phonological surveys (Delattre 1951; Tranel 1987; Walker 2001; Grevisse and Goosse 2016), distinguishes /ɛ e/ syllable-initially, and in open syllables, but not in closed syllables

(where only /ɛ/ is permitted). This modern normative distinction arises along the etymological lines which are well-documented in such classic sources as Pope (1952). These etymological lines give rise to the different /ɛ e/ distinctions of SF (see below) and its sister variety Norman (§2.2).

A broad generalisation about the etymology of the modern SF /ɛ e/ distinction is that, if Latin / Gallo-Romance *ĩ*, *ē* or *a*² appears in stressed position in a word-ending, the SF reflex ends in /e/; otherwise, the reflex ends in /ɛ/. As the distinction of /ɛ e/ is etymological, all normative grammars make prescriptions about the pronunciation of each individual ending. In most cases, for any given ending, all grammars agree—for example, *-é(e)(s)* is always /e/, and *-ais*, *-ait* etc are always /ɛ/—though this is not true for all endings. For example, while all grammars agree that the verb ending *-ai* is /e/, some say that the noun ending *-ai* should be /-ɛ/ (Hall 2008: 167).

Whatever the fine details of the distribution of /ɛ e/ in modern SF, the distinction has at least the potential to be prominent and observed, as it follows a recognisable orthographic pattern. *Most* SF endings including a letter <e> with an accent are pronounced [e], and *most* endings including <ai> (followed by other letters or not) are pronounced [ɛ]. This generalisation about the letter <e> when accented holds because most accented <e>s are <é>; clearly, <è> is prescriptively [ɛ], but endings including <è> are comparatively rare. Therefore, the main division speakers

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² Orthographical letters and length markings (as used in many modern texts on Latin), and not IPA transcriptions, are used here, as the precise phonetics of the Latin and Gallo-Romance sounds represented by these letters is uncertain.

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could make is between endings with <é> on the one hand, and endings with <ai> on the other. The recognisability of this pattern may help to explain the fact that some varieties of RFN seem to reverse the SF pronunciations of /ɛ e/ (§2.4). For RFN speakers who reverse SF /ɛ e/, we speculate that, in order to gain prestige (Labov *et al.* 1968) as a careful speaker, the important thing would be to observe some distinction based on a linguistic pattern, even if the distinction was not necessarily the standard one. Such speakers could therefore feasibly bid for prestige by being seen to use the ‘<é> vs <ai>’ division. Even if they in fact used it the other way around from SF, they would still be making their distinctions in the ‘right’ etymological places.

2.2 /ɛ/ and /e/ in Norman

Some Norman varieties distinguish IP-final /ɛ e/, while others observe the *LdP* for open syllables and therefore do not make the distinction. We can infer this from examples in grammars, even though (for mainland varieties) explicit statements on pronunciation are surprisingly scant. Most linguistic descriptions of mainland Norman have been done in an older tradition which concentrates more on morphology and syntax, with only brief descriptions of pronunciation. Even descriptions from more modern traditions usually do not have explicit statements about theoretical constructs like the *LdP*, but confine themselves to describing pronunciation features which contrast with SF, since they are written in French and mostly for a French audience.

Jones (2014) and Lepelley (1999, especially p63) are the most theoretically informed recent linguistic descriptions of mainland Norman.

Jones (2014: 84, 94, 97) has some examples which show that not all Mainland Norman observes the *LdP* in open syllables. On the other hand, Lepelley (1999)'s examples of open syllables with a mid-vowel all have a close-mid vowel, whether it is [e(:)] as opposed to [ɛ(:)] or [o(:)] as opposed to [ɔ(:)]. Examples given in shorter descriptions of the pronunciation of Western / Lower Normandy varieties of Norman (UPNC 1995: 6, Marie 2012: xx) also suggest that they observe the *LdP*.

In varieties outside the Western mainland, the situation is more complicated. FDFRSM ([1985]: 5ff), Schortz (1998: 64-5) and Jones (2014) show that the Pays de Caux (Eastern / Upper Normandy³) distinguishes /ɛ e/ in open syllables. Spence (1985) and Jones (2014) also note that Channel Island Norman varieties make this distinction. (Note that this article does not discuss vowel quantity, which is contrastive in Norman but not in SF, and which can also have an effect on vowel quality.) Finally, a crucial recent resource on pronunciation of the autochthonous regional varieties of France is Boula de Mareüil, Rilliard and Vernier (2018 to appear), a collection of retellings of *The North Wind and the Sun*. Auditory analysis of the Norman texts in this resource shows that the presence of [ɛ] in open syllables in Norman increases from West to East, though there is only one

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³ From 1956 until 2015 the region of Normandy was cut into two regions: Basse-Normandie 'Lower Normandy', roughly the western half of the present region, encompassing the departments of Manche, Calvados and Orne, and Haute-Normandie 'Upper Normandy', roughly the eastern half, encompassing the departments of Eure and Seine-Maritime. On 1 January 2016 these two regions were reunified as 'Normandie', but of course publications before 2016 refer to the 1956-2015 regions.

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Channel Islands recording there (Jersey), so the full range of variation in Channel Islands Norman is not covered.

This study is of /ɛ e/ in open syllables, but we complete the picture by mentioning the Norman treatment of /ɛ e/ in closed syllables, as it can differ from the SF treatment. SF is described as not following the *LdP* because it contrasts /ɛ e/ in open syllables, but it does partially follow it to the extent that it prohibits open-mid /e/ in closed syllables. Lower Normandy varieties of Norman also seem to prohibit (short) open-mid /e/ in closed syllables (from examples in UPNC 1995 and Marie 2012). For Jersey Norman, Spence (1985) notes the occurrence of /-ɛC/ and not */-eC/, though Jones (2014: 85) does have some examples of /-eC/ from Jersey.

Lepelley (1999: 55) also mentions that the infinitive ‘see’, cognate with SF *voir*, can be pronounced [vɛʁ] or [vɛʁ] in Norman. He does not say where in Normandy [vɛʁ] is found, but the foregoing descriptions suggest that it could be the Channel Islands. Our experience also suggests that it could be Upper Normandy, though again we have not been able to find explicit published descriptions of the phenomenon. At least certain varieties of Picard, adjacent to Upper Normandy, also permit open-mid /e/ in syllables closed by /ʁ/ and other consonants (Armstrong and Pooley 2010: 173; Carton and Lebègue 1989, e.g. Maps 237, 333, 335, 336, 347, 403; though the evidence in Flutre 1977: 26-7 is mixed). As there are Picard varieties which permit /-eC/, it is unsurprising that Upper Normandy Norman would also permit it.

2.3 /ɛ/ and /e/ in vernacular French in France

The /ɛ e/ distinction has long been found to be unstable in research which deals with non-normative French pronunciation in general, but not with specific regional varieties (Martinet and Walter 1973, Walter 1976, Lefebvre 1988). Recently, Armstrong and Pooley (2010: 123ff) have reviewed much evidence. Southern French accents stereotypically feature the *LdP* (e.g. Taylor 1996: 193 on Aix-en-Provence); as the stereotype includes the *LdP*, prestige may well also be associated with using the *LdP*, which would tend to reinforce it. J. Durand and Lyche (2004) also point out that the *LdP* operates in Grenoble, where the local French has elements of both Northern and Southern pronunciations. As has been noted, however, the *LdP*, or at least aspects of it, is not restricted to the South of France. At least one self-report survey of pronunciation throughout francophone Europe (Avanzi 2017: 54-55) finds that /ɛ e/ neutralisation is widespread in the North of France for *piquet* (SF /pike/, widely [pike]) and *poulet* (SF /pule/, often [pule]). The atlas presented in Boula de Mareüil, Rilliard and Vernier. (2018 to appear) also finds IP-final /ɛ e/ neutralisation in several parts of the North of France, and especially in Normandy (Scherrer *et al.* 2015).

It is worth dwelling in particular on studies of the /ɛ e/ distinction in Paris, because the evidence is contradictory. Martinet (1945) already details self-reported neutralising of IP-final /ɛ e/ in several regions of Northern France; and seventy years later, the self-reports of Scherrer *et al.* (2015) show the same. Lennig (1978), an acoustic phonetic study, also finds (pp78-9) that the overall distributions of IP-final /ɛ e/ for his Parisian subjects do

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not differ significantly—in other words, a neutralisation. Many other studies, though, have the opposite result. Deyhime (1967a, b), Léon (1972) and Walter (1992) do not find appreciable levels of IP-final /ɛ e/ neutralisation in Paris. Finally, other authors say simply that the opposition is unstable (Peretz 1977, Landick 1995).

On balance, then, the literature contains more evidence of an IP-final /ɛ e/ distinction in Paris than of a neutralisation. But there are recent reports (Hansen and Juillard 2011, Hansen 2013) that the neutralisation may be progressing in Paris, and Fagyal *et al.* (2002) has preliminary results pointing in the same direction. These findings are reviewed in detail in §5.2.

2.4 *Previous studies of the Regional French of Normandy*

The literature has no consensus regarding RFN's treatment of /ɛ e/ in IP-final open syllables. The following points of view are all attested.

- /ɛ/ → [e] and /e/ → [ɛ] ('switching' the realisations of /ɛ e/):

Lepelley (1975), on Lower Normandy, gives the examples

couché (SF /kuʃe/) → [kuʃɛ]

couchait (SF /kuʃe/) → [kuʃe]

- Contrast between /ɛ e/ not systematically maintained: for example, Walter's (1982) speaker from Gréville-Hague, Manche (pp131-2) has an 'opposition très instable', with 'réalisations le plus souvent intermédiaires', though the realisation after /ʁ/ is always [ɛ], and many imperfect endings are also pronounced with [ɛ], as in SF. Gréville-Hague is a rural, isolated site 32 miles / 52km from La Bonneville, our Lower Normandy site (see §2.5).

- Contrast between /ɛ e/ maintained (apparently in the same way as SF): Walter (1982: 134) for Le Vaudreuil, a semi-rural site in the same Norman dialect area as Darnétal/Rouen, our Upper Normandy site.

- /ɛ e/ neutralised to [e]: Tyne (2003), for Cherbourg (a medium-sized town in the Manche department), and Montreuil (2003) for Lower Normandy (not further specified, but this is also the location of Cherbourg).

- /ɛ e/ neutralised to [ɛ]: attested in the Norman dialect areas covering both sites for this study: Schortz (1998) for Senneville-sur-Fécamp (rural Seine-Maritime), and Carton *et al.* (1983) for Écoquénéauville (rural Manche). Senneville-sur-Fécamp and Darnétal are both in the Pays de Caux dialect area; Écoquénéauville, in the Cotentin dialect area, is also in the rural sample area for this study, though no speakers in this study are actually from there. Carton *et al.* (1983)'s speaker was recorded in 1956 at the age of 60, so she is a generation older than the oldest speakers in this study (the oldest speaker analysed here was born in 1918).

This seems a lot of uncertainty for something that is often assumed to be a single variety, but (based on our experience) speakers in some previous studies may have been confused about which variety researchers were asking them about. The previous studies themselves are also not always clear about this. They all say they are describing the French of their area,

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but it seems likely that in some instances the speakers were actually speaking Norman. §2.7 discusses this possible difficulty in relation to the present study's sample.

2.5 Sites for the present study

The two sites for this study (Figure 1) were chosen because they are very different socially and demographically, and yet natives of both could be said to speak Regional French of Normandy (RFN), simply because of their location. The sites are:

- La Bonneville: the villages around the rural towns of Saint-Sauveur-le-Vicomte and Sainte-Mère-Église (Manche). The site is called 'La Bonneville' in this study because almost half of the rural interviewees lived in that village.
- Darnétal: an urban commune immediately adjacent to Rouen (Seine-Maritime).

These sites are about 140 miles / 240 km apart; Darnétal is in fact closer to Paris than to La Bonneville, and shares many non-linguistic features with working-class parts of Paris. Both are also in the Seine valley, a major commuting route (a fact which was commented upon by several informants in this study).

Figure 1 about here

2.6 Social distribution of the sample

24 speakers were sampled in each location, using sample-grids based on sex, age group and socioeconomic status (SES). Speakers were recruited by friend-of-a-friend / snowball sampling, as is common in sociolinguistic

studies which wish to take account of the makeup of the local population (Meyerhoff *et al.* 2015: 36). Age groups and SES groups were also constructed using locally-relevant criteria. A summary of these criteria follows; for more detail, see Hall (2008: ch2).

For age, see Table 1.

Tables 1, 2, 3, 4 about here

For SES, speakers were scored on two attributes, education (Table 2) and occupation (Table 3). Their scores were added, and SES groups were constructed on this basis (Table 4). Speakers in the <20 age group (they were aged 13 to 18) who had not yet had a job were judged to be in the same SES group as their parents, as they all still lived at home.

The final sample grids are Table 5 (La Bonneville) and Table 6 (Darnétal). Each cell was filled with one speaker; the speaker numbers appear in the grids (LAB=La Bonneville; ROU=Rouen, as Darnétal is taken by the people of Rouen as representative of the Rouen accent). As is evident, the final sample grids were not entirely full, and were not entirely evenly distributed between age-groups and social classes.⁴ This uneven distribution was not corrected for, as it was taken as a reflection of the social constitution of the two study-sites.

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⁴ There is oversampling of older people and lower SES groups in La Bonneville, and a slight oversampling of higher SES groups in Rouen. The oversamplings in La Bonneville—58.4% of speakers (14/24) speakers were in one of the two older age-groups, and also 58.4% of speakers (14/24) there were in one of the two lower SES groups—reflect trends in its population as a whole (INSEE 2010). In the Darnétal sample, 54.1% of speakers (13/24) were in one of the two higher SES groups. Higher-SES groups are not overrepresented in the population as a whole (*ibid.*), but the overrepresentation here is not large enough to skew the findings.

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*Tables 5 & 6 about here***2.7 Language in the study-sites**

As §2.4 notes, in some previous studies claiming to be of the Regional French of Normandy, it is not actually clear whether speakers made a clear distinction between Norman and their local variety of French. Tackling this at an early stage in a sociolinguistic interview is not generally recommended (Meyerhoff *et al.* 2015: 48), but it was done in this study (as discreetly as possible) if the interviewer thought it was necessary. This was in order to make it clear to speakers that they should speak in a relaxed, informal way if possible, and thereby speak RFN rather than SF. To further mitigate the possible difficulty, selection of vowel tokens for analysis also began after about 7 minutes of conversation (to try to avoid the initial period of high consciousness of being recorded).

It seemed that this precaution was necessary, because some speakers' responses to explicit questions about language (not covered in this article) did show that they did not necessarily see a difference between non-formal French and Norman. Regardless of their answers to those questions, speakers have still been included in this study if the speech analysed here did not show other attributes of Norman (and so they could reasonably be said to be speaking French). Some telltale attributes of Norman would be:

- most tellingly, morphosyntactic (e.g. use of the simple past tense, now almost unused in French)
- certain phonological elisions (Norman *sav-ous* /savu/ for the common tag-question 'Know what I mean?', cf SF *savez-vous*)

- many lexical items, especially concerning farming, very prominent given that La Bonneville is agricultural.

See also Tyne (2003) on some speakers' difficulty in telling the difference between Norman and regional French.

3 Linguistic methodology

3.1 *Vowels investigated*

This study investigates the phonology and phonetics of /ɛ e/ in IP-final stressed open syllables. Away from this position, any French vowel is more likely to be realised in a less canonical way. In this case in particular, since /ɛ e/ are neutralised by many speakers—and can be hard to distinguish even if they are not neutralised—it was especially important that the prosodic environment of tokens should not lead to ambiguity in their pronunciation. The comparative emphasis and stability of phrase-final syllables in French was considered the best way to achieve this. Not all tokens examined were sentence-final, but all were at least IP-final (judged by ear).

3.2 *Material analysed*

Our material is taken from recordings of sociolinguistic interviews carried out between 2003 and 2007. Interviews comprised a conversational section (labelled *IV* for 'interview' in the analysis), of at least 30 minutes (though sometimes much longer); and a formal linguistic task section (*FM* for 'formal methods'). Interviews were digitally recorded, using a tie-clip microphone for a single speaker, or a microphone placed between the speakers if there was more than one. The FM tasks comprised a word-list

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and a reading-passage. In the present study, these two tasks are analysed together as representative of a style where more attention is paid to speech; future research could profitably compare them to one another.

3.3 *Phonetic analysis methods*

As the basic analysis of vowels involves at least two sets of data—F1 for height and F2 for anteriority⁵—we have the possibility of charting their progress in at least two dimensions. While the possibility of independent F1 and F2 change is (at least implicitly) recognised in much phonological and sociophonetic work on English, it has been acknowledged much less frequently in work on French or other languages. It can be argued that changes in a vowel's position in the vowel-space are only truly meaningful when both height and anteriority are taken into account. Certainly, it is clear that two phonemes cannot be said to be merged or neutralised unless neither their heights nor their anteriorities are significantly different. Nevertheless, changes in only one dimension—either height or anteriority but not both—are still potentially meaningful when they bring one phoneme closer to another and so change the configuration of the vowel-space, even if they do not change the total number of phonemes in it, as a complete merger or neutralisation would.

Given that height and anteriority can be independently interesting, this study analyses movements in F1 and F2 separately. It is not the first

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⁵ *Height* is universally used to refer to 'the F1 dimension of a conventional F1-F2 vowel-space', but there is no universally-agreed term for the F2 dimension. *Anteriority* is used here; *backness* is sometimes also used.

sociolinguistic study to take the instrumental approach to French, of course—Lennig (1978) and a few other studies since then are instrumental, and the approach is becoming more common. It is, though, the first to take this approach to Normandy French as a regional variety separate from SF. The first instrumental study including Normandy French that we are aware of is Boula de Mareüil *et al.* (2013), but that study does not analyse Normandy French on its own terms, as a regional variety. Rather, the recordings from Brécey which form part of the ‘Programme “Phonologie du Français Contemporain”’ corpus are treated as Standard French (Boula de Mareüil *et al.* 2013: 76).

Praat version 5.0 (Boersma and Weenink 1992-2017) was used to measure F1, F2 and F3 in each vowel token: F1 and F2 for comparison of their normalised values, and F3 because Bark Difference Metric normalisation requires it. For tokens where visual inspection showed that the phonetic quality of the vowel did not vary (i.e. F1 and F2 each maintained the same frequency throughout the token), a measurement was taken at the midpoint of the vowel (Figure 2). For tokens where F1 changed direction during the token, a measurement was taken at the point where the change happened (the ‘point of inflection’: Figure 3). This point is taken to represent the target towards which the speaker was unconsciously aiming, or their closest approach to that target within the time of the token (Labov *et al.* 2006: 38). Points of inflection in F1 are privileged over those in F2 because of the general finding that ‘in chain shifts, long vowels rise’ (Labov 1994: 116; vowel movements in the height dimension are characterised by

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movements in F1). Labov (1994: 116) also adduces an F2-related principle: ‘In chain shifts, back vowels move to the front’. As the two vowels considered here are already front vowels, however (so they cannot move much further to the front), and F1 points of inflection were also the landmarks used by Labov *et al.* 2006, it seemed that F1 landmarks would be generally more important in this case. Measurement was by hand.

Figures 2 and 3 about here

A total of 5,078 tokens of (e) were measured (approximately half /ɛ/ and half /e/), made up approximately as in Table 7. Table 7 shows that, ideally, the sample should have included (120 tokens x 48 speakers =) 5,760 tokens; however, some speakers were recorded in only one of the styles (IV or FM), and other speakers completed both, but did not produce 30 tokens per phoneme in both. For the majority of speakers, who produced more than 60 tokens per phoneme, the study includes the first 30 tokens per style in which Praat detected clear F1, F2 and F3 tracks.

Table 7 about here

Formants were detected using Linear Predictive Coding analysis, usually with Praat’s default setting of 5 formants (10 poles) in the relevant frequency range, though the number of poles was decreased to 9 or 8 poles if too few clear formants were detected at the 10-pole setting. The ‘relevant frequency range’ was 0-5,000Hz for males and 0-5,500Hz for females (Boersma & Weenink 1992-2017: Manual, Frequently Asked Questions on Formant Analysis).

In order to reduce speech differences due solely to physiology (in particular male-female differences), all vowel tokens were normalised before analysis. Normalisation was carried out using the Bark Difference Metric (BDM), as implemented in NORM (Thomas and Kendall 2007-2015). BDM was chosen as opposed to other common normalisation methods because, unlike many other methods, BDM normalisation of any given vowel token does not depend on any other tokens—not on other tokens of the same vowel by the same speaker *or* on tokens of different vowels by the same speaker. These qualities make this normalisation method suitable for studies where only tokens of certain phonemes have been measured (and not a representative sample of all vowel phonemes for every speaker).

Speakers were classed as having a neutralisation of IP-final / ϵ / and / e / in a given speech style if the heights of their / ϵ / tokens and their / e / tokens in that speech style were not significantly different, *and* the anteriorities of their / ϵ / tokens and their / e / tokens in that speech style were not significantly different. A non-significant difference between means in only one dimension but not the other is termed a '(height or anteriority) alignment'. Thus, speakers with both a height and an anteriority alignment for (e) in a given speech style had a neutralisation in that style.

Differences and their significance were judged as follows. For each speaker in each style, F1, F2 and F3 were measured for 30 tokens of SF normative IP-final / ϵ / and 30 tokens of SF normative IP-final / e . The tokens selected for analysis were those in which the software detected the clearest

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formant tracks, so as to maximise the reliability of the normalisation. Welch's t-test (a variant of the t-test which does not assume equality of variance between the samples) was performed between these two sets of measurements for each formant. If the probability associated with the resulting t-value was ≥ 0.05 , the difference was not deemed significant. That is, $p \geq 0.05$ for F1 meant that that speaker's /ɛ/ and /e/ could be considered to be at the same height, so they had a height alignment in (e); in the same way, $p \geq 0.05$ for F2 meant an anteriority alignment.

4 Results and discussion

4.1 /ɛ/ and /e/ in our data

As a guide to the general situation in both our sites, Figure 4 and Figure 5 show normalised speaker-by-speaker averages for data from interviews, with P. Durand (1985)'s set of reference vowels for comparison.⁶ Unfilled circles represent the reference vowels. Speakers in this study are represented by two linked points: red squares for their mean realisation of IP-final /ɛ/, and green triangles for /e/. Summary per-speaker data (means and standard deviations for F1 and F2 of /ɛ/ and /e/, in both IV and FM styles) is available at <https://doi.org/10.5281/zenodo.1066036>.

Figures 4 and 5 about here

P. Durand (1985: 104) gives per-speaker average values for F1, F2 and F3, for all French vowel phonemes, from two Parisian speakers. P.

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⁶ Other sets of reference vowels are also available, e.g. CALLIOPE (1989), Woehrling (2009), but these were not easily available at the time when this research was done. Future research could profitably compare them to the results here.

Durand takes these speakers as representative of non-regionally-marked French because their variety of French is the one which has resulted from the ‘slow levelling of different provincial varieties’ (Walter 1977: 17, quoted by P. Durand 1985: 20) which is found all over France, but most often in Paris. No other details of these speakers are given (age, sex etc). Each reference vowel plotted here is the average of P. Durand (1985)’s two speakers’ F1-F2 measurements for that vowel, normalised with the Bark Difference Metric.

The lengths of the lines linking pairs of points represent the Euclidean Distance (ED) between that speaker’s /ɛ e/ means. The ED can be taken as a rough guide to how close each speaker is to neutralising /ɛ/ and /e/ in this position: the smaller the ED, the more similar that speaker’s mean realisations of /ɛ/ and /e/ are, so the closer that speaker is to neutralising IP-final /ɛ e/.

The EDs for our two sites show that La Bonneville speakers are generally much closer to neutralising IP-final /ɛ e/ than Darnétal speakers are. La Bonneville speakers have mean ED 0.374 Bark difference units, standard deviation 0.194 units, coefficient of variation 0.518; Darnétal speakers have mean ED 0.517 units, s.d. 0.274 units, c.v. 0.529. The c.v. (=s.d. divided by mean) gives an idea of how well the mean summarises the whole data-set. Interpretations of it vary but, for sciences where data-sets with greater dispersion may be tolerable (i.e. sciences other than medicine), a rule of thumb is that a c.v. of under 1 shows that variance is relatively small (Kaufmann n.d.; Feinstein 2002: 65-6). In both our sites, the c.v. of

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speaker EDs between /ɛ/ and /e/ is under 1. Therefore, the mean EDs in our sites—La Bonneville 0.374 Bark difference units, Darnétal 0.517 units—are a reasonable representation of their extent of neutralisation.

These site EDs should be compared with the ED for Durand (1985)'s reference /ɛ e/, which is 1.371 units. It is striking that even in Darnétal, the site in this study where speakers are relatively further from IP-final /ɛ e/ neutralisation, the mean ED is still only just over a third of the ED for Durand (1985)'s reference /ɛ e/. Two fully-merged vowels would have an ED of 0 between their mean values. Therefore, as 0.517 units is closer to 0 than it is to 1.371 units, even Darnétal speakers are still closer to neutralising than to maintaining a full distinction. La Bonneville is even closer to full neutralisation than Darnétal is.

EDs therefore give us a good idea of how far apart our sites' mean realisations for /ɛ/ and /e/ are. To characterise the relationship more fully, we should also describe the degree of overlap between the clouds of speaker mean values for /ɛ/ and /e/ in each site. Statistical measures are also available for this (Nycz and Hall-Lew 2014), though time pressure has prevented us from applying them to this dataset. Doing so would certainly be desirable in future research. Visual inspection of the data shows the following. In La Bonneville taken as a whole, speaker average /ɛ/ and /e/ points are thoroughly mixed with each other, so that the impression of the community as a whole would be one where no consistent distinction between IP-final /ɛ/ and /e/ was made: a community-wide neutralisation. In Darnétal, most speaker averages for /ɛ/ are lower than most speaker

averages for /e/, so the community-wide neutralisation is less prominent, but there is still not separation between the cloud of points showing speaker averages for /ɛ/ and the cloud of points showing speaker averages for /e/.

4.2 *Phonetic unity?*

In both sites for this study, the cloud of tokens is high in the vowel-space (Figure 4 and Figure 5), occupying a space mostly between P. Durand (1985)'s reference /e/ and /i/. Few speakers, even those who do not neutralise /ɛ e/, have an /ɛ/ as open as P. Durand (1985)'s /ɛ/. We can therefore say that both /ɛ/ and /e/ are raised in both Normandy sites, to realisations that are at least as close as canonical [e]: phonetic unity of a sort.

4.3 *Phonological and sociolinguistic disparity*

At a deeper level, however, Figure 4 and Figure 5 show that our sites behave differently on average with regard to (e).⁷ In La Bonneville, it is clear that most speakers have neutralised /ɛ e/ in the relevant position, so that their one IP-final realisation is [e]. In Darnétal, on the other hand, the largest number of individual speakers have separate IP-final /ɛ e/—though exactly how the two phonemes are distinguished by speakers is a question we will address later (§5). The F2 / anteriority dimension seems more important than F1 / height.

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⁷ The construction of the sample (24 speakers per site, divided across 4 age-groups and 4 SES groups: §2.6) makes it difficult to conduct statistical analyses of differences between groups here, as the groups are often too small even for tests which are reliable with small samples, such as Fisher's Exact Test.

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Within each site, rates of neutralisation differ according to sociolinguistic variables which have been found useful in many Western urban studies: socioeconomic status (SES), age-groups within the SES groups, and levels of formality. There was no clear pattern of gender differentiation for this neutralisation in either site.

4.3.1 Neutralisations by socioeconomic status

Figure 6 about here, with Table 8 below it

Figure 7 about here, with Table 9 below it

Sociolinguistic investigations in unstudied communities should start with few or no *a priori* expectations about which social factors will condition variation. Therefore, they often begin with the ‘big four’ (Preston 1986): gender, age, SES and race. Race is not investigated here, since all the interviewees in the present study were Caucasian, like the vast majority of inhabitants of Normandy. It is difficult to support this contention with demographic data, since it is illegal to ask questions about race or ethnicity in the official census in France (INSEE 2016: 11), but personal experience confirms it.

Of the remaining three major social variables, in Normandy SES shows the most canonical division for (e), at least in interview speech. Figure 6 shows the proportion of speakers with neutralisations in La Bonneville, and Figure 7 that in Darnétal (total N per site = 24; data is in Table 8 and Table 9 respectively). In both study-sites, but particularly in La

Bonneville, visual inspection shows that rates of neutralisation in interview speech increase with decreasing SES.⁸

4.3.2 *Neutralisations by age*

Figure 8 about here, with Table 10 below it

Figure 9 about here, with Table 11 below it

In La Bonneville (Figure 8 / Table 10), rates of neutralisation in formal tasks are high in the 70+ age-group but peak in the 45-69 age-group and decline in speakers younger than that. In interview speech, rates of neutralisation are uniformly high. In Darnétal (Figure 9 / Table 11), on the other hand, rates of neutralisation in formal tasks and interview speech interact to create a pattern which reflects what we argue to be the changing social evaluation of neutralised /ɛ e/ in that site.

The gross pattern of (e) neutralisations in Darnétal is that only the oldest three age-groups (70+, 45-69 and 20-44) have any neutralisation in interview style, while only the youngest three age-groups (45-69, 20-44 and <20) have any neutralisation in formal tasks. As the youngest age-group have relatively high rates of neutralisation in formal style, we may infer that they think of neutralisation as having overt prestige, as situations of language change usually show that overtly prestigious variants are preferred when speakers are paying more attention to their speech (Labov 2001: 437).

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⁸ Fisher's Exact Test gives $p=0.52$ for La Bonneville and $p=0.006$ for Darnétal—that is, it finds that La Bonneville's increase of neutralisation with decreasing SES is not significant, and Darnétal's increase of neutralisation with decreasing SES *is* significant. These results are counterintuitive, however, and the small amount of data makes them possibly spurious.

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Proposed prestige effects in sociolinguistic studies can be difficult to justify, if the analysed interviews did not include discussion of reasons why speakers might speak the way they do—and, as previously observed, such discussion is usually not advisable. For this reason, like many previous studies, this study does not include systematically-gathered evidence on the prestige of different ways of speaking. To some extent, though, well-known non-linguistic facts about the societies in question can support hypotheses about prestige effects.

For our urban speakers who neutralise IP-final /ɛ e/, their neutralisation may be at least partly motivated by the fact that the same neutralisation is relatively widespread in the prestigious and nearby city of Paris (Fagyal *et al.* 2002, J. Durand and Lyche 2004). Darnétal is closer to Paris than to La Bonneville, and Darnétal is connected to Paris by a great deal of travel along the industrialised Seine Valley corridor—and of course Paris is also the prestigious centre of France in many other ways (Armstrong and Pooley 2010: 12ff). It therefore seems natural that young people might also look to Paris for prestigious linguistic norms.

On the other hand, though, we then have to explain why the oldest age-group have no neutralisation in formal style, but relatively high rates in interview style—the opposite pattern to younger people. It would clearly be untrue to suggest that Paris was not prestigious when they were growing up and forming their speech habits. We therefore should not claim that their social evaluation of this neutralisation is the reverse of the younger people's. But the literature does contain more evidence of IP-final

distinction in Paris at the time when our older Darnétal speakers were growing up, than it does of IP-final neutralisation (§2.3). Both older and younger Darnétal speakers therefore seem to be reacting to the prestige of Paris. More of our older speakers distinguish /ɛ e/ in formal speech because that was the Parisian norm when they were growing up, whereas more of our younger speakers neutralise /ɛ e/ in formal speech because neutralised IP-final /ɛ e/ seems to be the incoming norm in Paris now.

The apparent-time patterning of the IP-final /ɛ e/ configuration in formal tasks among younger people is therefore stylistically opposed between our two sites: more distinction in La Bonneville, more neutralisation in Darnétal. Younger people in La Bonneville may be retreating from the neutralisation in formal language, even though it is now present in Paris, because they hear a lot of neutralisation from their parents and grandparents (who often live in the same village). Therefore, they actually see it as a rural, stigmatised feature. The stigma attached to /ɛ e/ neutralisation would therefore override any prestige effect coming from Paris. On the other hand, in Darnétal young people are adopting the neutralisation; perhaps they see it as a prestigious feature because they hear it in Paris. Many Darnétalais pointed out the closeness of Paris when asked to comment on their local accent and when doing the map-task for this study. Also, like the rural young people, young Darnétalais may be motivated by moving away from their parents' and grandparents' treatment of /ɛ e/ (a separation in their case). Both these possible motivations would result in young Darnétalais moving towards a neutralisation of IP-final /ɛ e/.

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The difference in how much the current Parisian treatment of (e) matters in our two sites, may be explained by the fact that Paris is further from La Bonneville than it is from Darnétal, and that in fact Darnétal is closer to Paris than it is to La Bonneville.

5 Theoretical implications

5.1 *Phonology, sociophonetics and (e): probing the neutralisation more deeply*

As §3.3 mentions, complete neutralisation of IP-final /ɛ e/ is not the only sociophonetic outcome which deserves investigation in our sites. The component dimensions of the neutralisation—vowel height and vowel anteriority—also bear scrutiny individually.

The respective heights of /ɛ e/ in Normandy are interesting, and particularly in La Bonneville. Unusually (since informal style usually changes first in linguistic change), formal style shows the relevant patterns better than informal interview style does. Figure 8 shows that apparent-time change patterns in height alignment and in complete neutralisation are similar in La Bonneville, except that rates of complete neutralisation are lower than rates of height alignment (formal style data is represented by the filled areas; interview style data is represented by the columns). This might be expected, as a speaker with a complete neutralisation of IP-final /ɛ e/ by definition has a height alignment *and* an anteriority alignment for the two phonemes. It is therefore likely (though not inevitable) that there will be fewer speakers with both alignments than speakers with an alignment in one

of the two dimensions but not the other. There may also be a ceiling effect on height alignment among the older two age-groups in our sample: as there were already high rates of complete neutralisation in the older two age-groups, the height-alignment rate could not be much higher than this in the younger groups, before it hit the ceiling (100%) and obscured the pattern.

In Darnétal, the apparent-time pattern of height alignments is not as clearly reflected in the complete neutralisation pattern, as the filled areas in Figure 9 show. For both height alignments and neutralisations, there are none in the 70+ age-group, a few in the 45-69 age-group and more in the 20-45 age-group. In the youngest age-group, however, the patterns diverge. The <20 age-group in Darnétal has fewer neutralisations than the 20-45 age-group, but the <20 age-group has *more* height-alignments than the 20-45 age-group. Again, we may find an explanation of this lack of similarity in the general lower proportion of neutralisations in Darnétal.

In both La Bonneville and Darnétal, anteriority alignments show little consistent patterning or, at least, much less than height alignments and complete neutralisations do. It therefore seems legitimate to say that, of these two separate aspects of a complete neutralisation, height alignment is the primary one, that is, the one that responds to social conditioning better. Height alignment may therefore take a greater part in driving the (e) neutralisation process. The more robust social patterning of height alignment, and the much lower rates of anteriority alignments in general, allow us to say that, if a speaker has /ε e/ aligned in anteriority, it is likely that he/she also has them aligned in height—that is, it is likely that he/she

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has a complete neutralisation. And indeed, this prediction is borne out in both sites for this study.

5.1.1 Separating height and anteriority alignment

The primacy of height alignment over anteriority alignment in RFN allows us two observations about the configuration of phonological space, and the diachronic positioning of phonemes within it.

5.1.1.1 Minimal separation of phonemes in the vowel-space

There is less phonetic ‘room for manoeuvre’ in the height (F1) dimension of the vowel-space than there is in the anteriority (F2) dimension, whether these are measured in (physical) hertz or (perceptual) Bark difference units. That is, whatever the unit of measurement, the vowel quadrilateral is wider than it is high. The phonetic dimensions of the whole SF vowel system, and the place of /*ɛ e*/ within it, are summarised in Tables 12-15.

Tables 12-13 about here

To interpret these data, note that post-normalisation, perceptual Bark difference units run in a different direction from (pre-normalisation, physical) hertz. The axes of a Bark difference unit plot run in the same direction as those of a conventional *x-y* plot. Values on the *x* axis increase from bottom to top (i.e. lower vowels have lower values and higher vowels have higher values), and values on the *y* axis increase from left to right (i.e. fronter vowels have lower values and backer vowels have higher values). This is the opposite way around from a typical plot in hertz, where lower

and fronter vowels have high values, and higher and backer vowels have low values.

We should also bear in mind that normalisation can result in vowel-spaces changing shape, and this is in fact what we see here. Whereas the highest vowels in an unnormalised SF vowel-space are usually /i u/ and the lowest is usually /a/ (Table 12), after BDM normalisation, the single highest vowel in P. Durand (1985)'s reference data is clearly /i/: its BDM-normalised value is substantially higher than that of /u/. Likewise, whereas the frontmost vowel in an unnormalised SF vowel-space is usually /i/, and the backmost is /u/, after BDM normalisation, the frontmost vowel in the same reference data is clearly /y/ (Table 13). This means that the maximal dimensions of the vowel space—the ranges between the highest and lowest vowels and the backmost and frontmost vowels—are not calculated between the same vowels if calculated before BDM normalisation as they are if calculated after BDM normalisation. This has an implication when we compare measurements and distances within the vowel space. *Either* before *or* after normalisation, we can still compare total ranges, the size of average degrees of height / anteriority, and the distance between /ɛ/ and /e/—but we cannot do this between unnormalised and normalised values.

Phonologically, vowel spaces are often divided into four degrees of height (close, close-mid, open-mid, open) and three degrees of anteriority (front, central, back). We may interpret these degrees of height and anteriority as the smallest divisions of the vowel space which speakers of the language in question can potentially use to make contrasts in meaning,

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though of course this does not mean that all speakers *will* actually make all the possible contrasts. There are also often conventions about which contrasts are used to describe particular languages' vowels. French vowels are described using only two degrees of anteriority (front and back) in the majority of scholarly literature and textbooks (e.g. Walter 1977, Battye, Hintze and Rowlett 2000, Lyche 2010, Violin-Wigent *et al.* 2013), though Fougeron and Smith (1999: 78) note that 'possibly three' degrees (i.e. including central) could be used.

In phonetics, the analogue to these minimal degrees of separation is the Just Noticeable Difference (JND; Denes and Pinson 1993: 105). JND is the phonetic distance (in hertz, Bark or any other scale) beyond which the difference between two sounds is too large to be disregarded. If we do indeed take phonetic JND to be analogous to phonological minimal degrees of separation, the JND between any two phonemes for height should be smaller than the JND for anteriority.

Table 14 and Table 15 about here

For /ɛ e/ specifically, Tables 14 and 15 show that the distances between reference /ɛ/ and /e/ in both height and anteriority are very close to or smaller than the average distances per degree in the French vowel space, whether these average distances are measured before or after normalisation. This may indicate that, phonetically, a neutralisation of /ɛ e/ would be particularly likely to happen, among all vowel pairs which are candidates for this process. And this is for P. Durand (1985)'s reference French speakers; for our Normandy speakers, it is likely that the distances between

/ɛ/ and /e/ would be smaller still, especially in height, given our sample's high rates of height alignment in particular. Therefore, neutralisations might be even more likely. Quantitative confirmation of this fact will await further studies, though, as P. Durand (1985)'s reference figures are presented here only to orient the reader. It would be misleading to make a detailed comparison of the Durand figures with our Normandy speakers' data, because of the differences in sample size and composition between the two data-sets.

5.1.1.2 Where in the vowel space do merging/neutralising phonemes tend to come together?

Given that the configuration of the vowel space for maximal distinction between phonemes requires tighter organisation in height than in anteriority, there is the further question of where in the vowel space phonemes which are possible candidates for height alignment or complete neutralisation will come together. Will two phonemes align, neutralise or merge nearer to the normative position of the more open of them, or nearer to the position of the more close of them? The overwhelming tendency in such cases seems to be neutralisation, alignment or merger in the more close position: 'in chain shifts, long vowels rise' (Labov 1994: 116), *pace* Schortz (1998) and Carton *et al.* (1983). The present finding from two sites in Normandy would therefore be further evidence in the same direction.

5.2 The Loi de Position in RFN and Northern French

The distinction or neutralisation of IP-final /ɛ e/ in RFN is an interesting case-study of possible social factors in a linguistic change

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because, for some speakers at least, the social factors here point in the opposite direction from the dominant linguistic factors. Older Darnétalais in particular seem to regard an IP-final /ɛ e/ distinction as prestigious, whereas the dominant linguistic tendency seems to be neutralisation. The social factors in the change have been discussed in detail in §4; the linguistic factors remain to be explored.⁹

Much of the North of France does not observe the open-syllable element of the *LdP*, so Northern French, which would include RFN, usually has /ɛ e/ distinguished in that position. This may be changing, though: there may be an increasing tendency in Paris to neutralise /ɛ e/, which would amount to an introduction of the full *LdP* (Hansen 2013: 155), and (as previously noted) many speakers in Nord and Pas-de-Calais already do neutralise them (Scherrer *et al.* 2015).

How, then, does the present study contribute to our knowledge of the progress of the *LdP* in France, and the /ɛ e/ neutralisation in particular (*cf* §2.3)? In the early- to mid-1970s, at least some Parisian speakers had an /ɛ e/ neutralisation (Peretz recorded her speakers in 1972-4; Lennig recorded his in 1975 and 1977), and other speakers in Northern France also have a neutralisation. We might therefore reasonably expect the neutralisation to have spread in the time between the 1970s and the time of the results reported here, since usually ‘mergers expand at the expense of distinctions’

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⁹ Though many studies now point to an IP-final /ɛ e/ neutralisation which is gaining ground in the speech community, we still refer to it as a ‘change’ here because there are still many speakers who do not have a neutralisation, and there is still the strong normative force of SF, whose norms do not include a neutralisation.

(Labov 1994: 313). And indeed, two reasonably recent studies do seem to show an increase in /ɛ e/ neutralisation in Paris. There are also tantalising hints elsewhere in France of developments of the phonetic relationship between /ɛ e/ on the same lines as we have described them here for Normandy: height alignment but anteriority distinction.

First, Hansen and Juillard's (2011) re-study of Peretz (1977), using distinctions made in possible minimal pairs (e.g. *piqué*, *piquet*), does find that young Parisians' rate of neutralisation of /ɛ e/ has risen (Hansen and Juillard 2011: 320ff). In 1972-4, 69% of the possible /ɛ e/ minimal pairs were distinguished, whereas in 2001-4 only 52% of the possible distinctions were made. Hansen and Juillard (2011) also found a reduction in possible distinctions for the other three vowel quality pairs of French (/a α/ /o ɔ/ /ø œ/).

Secondly, Hansen (2013), also on young Parisian speakers, has somewhat contradictory (but intriguing) results. She reports (p157) that most of the possible /ɛ e/ minimal pairs examined there were distinguished, but makes two interesting notes. First, in the majority of the distinguished minimal pairs there was only a slight phonetic distinction—clear enough to be audible, but perhaps not enough to be standard. This may be a description of what we also find in Normandy: distinction of /ɛ e/ by one parameter only, height *or* anteriority, not height *and* anteriority. Hansen (2013) also reports that for her speakers, it makes no difference whether the words in minimal pairs are presented separately or together. In the protocol used by Hansen (J. Durand *et al.* 2002), the word-list consists of 84 items presented

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in random order, followed immediately by repetitions of ten of the words in five minimal pairs. Hansen notes that the presentation of the pair *épée* /epe/ ~ *épais* /epɛ/ together at the end of the list ‘provokes no change whatsoever in their pronunciation by the speakers, as compared to their occurrence [separated] in the course of the list. Thus there is apparently no normative pressure forcing speakers to pay special attention to their /E/ quality’.

Fagyal *et al.* (2002) may find a similar relationship between /ɛ e/ to that found by Hansen (2013). One speaker, Camille M, shows a ‘neutralisation partielle dans la dimension de F1’ (Fagyal *et al.* 2002: 166). The dimension neutralised by Camille M is height, leaving anteriority as the only distinguishing dimension for the words affected. Later, on the basis of all three speakers in the study, Fagyal *et al.* (2002: 168) go so far as to say that ‘la neutralisation des voyelles [e] et [ɛ] en syllabes ouvertes de fin de mot est bien avancée dans la parole des jeunes Parisiens cultivés’. As Fagyal *et al.* (2002) is carefully identified as a pilot study, it would be inappropriate to draw wide-ranging conclusions from it. Suffice it to say, however, that the study does indicate that the French of young Parisian speakers may feature both complete neutralisation of /ɛ e/ (for some speakers), and height alignment of the phonemes (for others). In the latter speakers, only anteriority would be left to distinguish the two phonemes—like many speakers in the present study of Normandy.

6 Conclusion

This article has shown that IP-final /ɛ e/ in RFN are now more likely to be neutralised than was the case previously; and that, if they are not actually neutralised for a given speaker, they may well be less distinct than they would have been previously. Stated differently, this is evidence of the increasing prevalence of the open-syllable element of the *LdP* ('close vowels in open syllables') in Normandy. It is present in the RFN of both sites investigated here, even though the sociolinguistic conditions in the two sites are different.

In both La Bonneville and Darnétal, rates of /ɛ e/ neutralisation in IP-final open syllables in interview style increase with decreasing socioeconomic class. The effect of age differs between the two sites: in La Bonneville, neutralisation is uniformly high in interview style, while it decreases with decreasing age in formal style; in Darnétal, younger people neutralise more often in formal style, while older people neutralise more often in interview style. Figure 10, which is schematic only, summarises these effects, using a simplified age categorisation ('Older' and 'Younger') and a simplified rate of neutralisation ('High' and 'Low'). Vertical position on this chart is only relative. For example, in the Older age-group, the chart simply shows that neutralisation is relatively low in FM style in Darnétal, while it is relatively high in IV style in Darnétal and in both styles in La Bonneville: the data-points in the high position are separated only for display purposes.

Figure 10 about here

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The dotted lines representing Darnétal, which cross each other, point to a social evaluation of the neutralisation which is changing over time in that site. We can reasonably infer that both younger and older people there may be reacting to the prestige of Paris, both because it is the capital and because it is relatively close and well-connected. The literature contains more evidence of an /ɛ e/ separation in Paris at the time when our older speakers were growing up, and so they regard that as prestigious; whereas the more recent trend in the /ɛ e/ relationship in Paris seems to be a neutralisation, so younger people are neutralising the two phonemes more in IP-final position. The amount of neutralisation in both our sites (whatever the motivation) goes counter to the stereotype that the phonology of Northern France does not include the *LdP*.

As well as cases of IP-final open-syllable /ɛ e/ neutralisation, this article has also investigated cases where speakers align /ɛ e/ only in height *or* only in anteriority, but not in both. In Darnétal, whereas complete neutralisations drop in the youngest age-group, height alignment rises in that group—so, possibly, younger speakers in Darnétal are not reducing the number of phonemes in their vowel space (which a complete neutralisation would do), but they are at least changing the configuration of their vowel space by raising /ɛ/ (i.e. moving it towards the height of /e/, while keeping it further back than /e/). Given the dimensions of any vowel quadrilateral (wider than they are high), possibly younger speakers in Normandy are reorganising their vowel space in order to make better use of the available

resources, reducing the number of contrasts in the more crowded height dimension, and fully exploiting the less crowded anteriority dimension.

In Martinet's (1945) self-report study of upper middle class spoken French, Normandy was the only region of France outside the South where an appreciable number of subjects neutralised /ɛ e/. It is not surprising, therefore, to find that two to three generations later the tendency is confirmed (though Nord and Pas-de-Calais have also joined the tendency in the meantime). In the theory of diachronic phonological change, the upward movement of IP-final /ɛ e/ in Normandy is also expected, since being IP-final tends to lengthen vowels, as a wealth of evidence in Labov (1994) shows. Labov's evidence mostly concerns vowels involved in chain shifts; full investigation of whether this Normandy movement represents one element of a chain shift will await future research, though the upward movement of /a/ and /ɑ/ in Normandy (Hall 2008, ch3) may indicate that it does. In the meantime, we can show at least that the established tendency for the *LdP* to apply to the French of more and more of France is continuing.

[approx. 9,000 words including footnotes]

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Location of study sites within France. Attribution of base map: By TUBS [CC BY-SA 3.0 de (<http://creativecommons.org/licenses/by-sa/3.0/de/deed.en>)], via Wikimedia Commons

Midpoint measurement of the vowel in *mais*, spoken by LAB01. Measurement taken at double-headed arrow: F1 542Hz, F2 2186Hz.

Point of inflection measurement of the vowel in (é)*taient*, spoken by LAB01. Measurement taken at double-headed arrow: F1 691Hz, F2 2037Hz.

Bark Difference Metric-normalised average French vowel values, interview style, La Bonneville

Bark Difference Metric-normalised average French vowel values, interview style, Darnétal

(e): proportion of speakers with neutralisations, by SES, La Bonneville. N=24.

(e): proportion of speakers with neutralisations, by SES, Darnéval. N=24.

(e): proportion of speakers with complete neutralisations and height alignments, by age-group, La Bonneville. N=24.

(e): proportion of speakers with complete neutralisations and height alignments, by age-group, Darnétal. N=24.

(e): schematic depiction of changes in rates of neutralisation, by simplified age-group and style, both sites

Age-group	Reason for age-group
>69 yrs	One of the working hypotheses for the larger study of which this investigation forms part is that the linguistic characteristics of RFN may well be influenced by the linguistic characteristics of Norman. Generally, only speakers 70 years old or older spoke any Norman; the rule of thumb was that Norman-speakers were old enough to remember the Second World War (even if they were a child at the time).
45-69 yrs 20-44 yrs	The 20-44 yrs age-group and the 45-69 yrs age-group between them cover the majority of working life for most informants. The split between these age-groups was chosen simply in order to make the two age-groups cover equal spans of years.
<20 yrs	The boundary between the first two age-groups in this study was placed at 20 yrs in order to place everyone still in education in the youngest age-group.

Table 1   Age groups

For Peer Review

Points	Level of education	Explanation
1	Primary education	Informant completed only primary education
2	Secondary begun but not completed	
3	Informant completed first stage of secondary education (left school at the end of obligatory education)	The end of obligatory education varied according to the age of the informant. Age was therefore taken into account when allotting points for education. • For informants born before 1922 (aged over 83 in 2005 / 85 in 2007), education was obligatory up to age 13 or until the <i>Certificat d'Études</i> had been taken, whichever came first (the <i>Certificat</i> could be taken from age 11) • For informants born 1923-1943 (aged 62-82 in 2005 / 64-84 in 2007), education was obligatory up to age 14 • For informants born after 1943 (aged up to 61 in 2005 / up to 63 in 2007), education is obligatory up to age 16
4	Informant completed second (optional) stage of secondary education	Informant took the <i>Certificat d'Aptitude Professionnel</i> ('Certificate of Professional Aptitude') or the <i>baccalauréat</i> ('baccalaureate') – either usually taken at age 18 or 19
5	Tertiary education	Informant did some tertiary education (whether or not a degree was completed)

Table 2   Education scores

Points	Occupation type	Examples
1	Unemployed	
2	Blue-collar – unskilled	(Urban) cleaner (Rural) farmer (not owner of own farm); milk-tanker driver
3	Blue-collar – skilled	(Urban) pharmacy medication-preparer (Rural) care-worker; roofer
4	White-collar, lower level	(Urban) journalist, or office-based mid-manager (Rural) nurse; psychiatric care-worker
5	White-collar, higher level	(Urban) butcher (owner of his business); pet-parlour owner and operator (Rural) Farm owner, manager and operator; haberdashery owner
6	Professional	(Urban) teacher; laboratory biologist (Rural) Web entrepreneur; nuclear technician

Table 3   Occupation scores

SES points	Socio-Economic Class group
10-11	Upper Middle Class
8-9	Lower Middle Class
6-7	Upper Working Class
< 6	Lower Working Class

Table 4   Composite Socioeconomic Status scores (= Table 2 + Table 3)

For Peer Review

	<20		20-44		45-69		>69	
	F	M	F	M	F	M	F	M
UMC	LAB24				LAB47			
LMC	LAB12	LAB17	LAB48	LAB45	LAB50	LAB08	LAB44	LAB27
UWC	LAB23		LAB13	LAB16	LAB34	LAB42	LAB41 LAB11	LAB32
LWC	LAB07			LAB14	LAB21	LAB22	LAB02	LAB09

Table 5   Rural sample grid

For Peer Review

	<20		20-44		45-69		>69	
	F	M	F	M	F	M	F	M
UMC	ROU13	ROU32	ROU30	ROU24	ROU08	ROU50	ROU49	ROU37
LMC		ROU54	ROU12	ROU63	ROU18	ROU58		
UWC	ROU29			ROU51	ROU65	ROU57	ROU61	
LWC	ROU25		ROU41	ROU64	ROU45	ROU14		ROU59

Table 6   Urban sample grid

For Peer Review

Phonemes	ɛ	e
Interview style (IV)	30	30
Formal Methods (FM)	30	30
TOTAL per style	60	
GRAND TOTAL	120	

Table 7 Approximate number and distribution of tokens per speaker

For Peer Review

	UMC	LMC	UWC	LWC
IV	0/1	5/7	6/8	5/6
FM	1/2	6/7	3/7	4/5

Table 8   (e): number of speakers with neutralisations, by SES, La Bonneville

For Peer Review

	UMC	LMC	UWC	LWC
IV	0/8	2/5	0/4	4/5
FM	2/8	2/5	1/5	1/6

Table 9 (e): number of speakers with neutralisations, by SES, Darnétal

For Peer Review

	>69		45-69		20-44		<20	
N	6		6		6		4(IV), 5(FM)	
	Neut.	Height alignments	Neut.	Height alignments	Neut.	Height alignments	Neut.	Height alignments
IV	5	5	4	5	4	6	3/4	3/4
FM	3	4	5	6	4	5	2/5	2/5

Table 10 (e): number of speakers with complete neutralisations and height alignments, by age-group, La Bonneville

Neut. = Neutralisations

For Peer Review

	>69		45-69		20-44		<20	
N	4		8		7		3(IV), 5(FM)	
	Neut.	Height alignments	Neut.	Height alignments	Neut.	Height alignments	Neut.	Height alignments
IV	1/4	3/4	3/8	6/8	2/7	5/7	0/3	2/3
FM	0/4	0/4	1/8	1/8	3/7	6/7	2/5	5/5

Table 11 (e): number of speakers with complete neutralisations and height alignments, by age-group, Darnétal

Neut. = Neutralisations

For Peer Review

	Height range (F1)	
	Pre-normalisation (Hz)	Post-normalisation (Bark difference units)
Highest	281Hz /u/	12.354 BDU /i/
Lowest	808Hz /a/	7.117 BDU /a/
Range	527Hz	5.237 BDU
Average per degree	132Hz	1.309 BDU

Table 12   *Height in the Standard French vowel system*

For Peer Review

Anteriority range (F2)		
	Pre-normalisation (Hz)	Post-normalisation (Bark difference units)
Frontmost	2,179Hz /i/	0.939 BDU /y/
Backmost	841Hz /u/	6.425 BDU /u/
Range	1,338Hz	5.486 BDU
Average per degree	435Hz	1.823 BDU

Table 13   Anteriority in the Standard French vowel system

For Peer Review

Height range (F1)		
	Pre-normalisation (Hz)	Post-normalisation (Bark difference units)
/ɛ/	514Hz	9.450 BDU
/e/	413Hz	10.787 BDU
/ɛ e/ distance	101Hz	1.337 BDU
Reference average per degree (from Table 11)	132Hz	1.309 BDU

Table 14   Height of /ɛ e/ in the Standard French vowel system

For Peer Review

	Anteriority range (F2)	
	Pre-normalisation (Hz)	Post-normalisation (Bark difference units)
/ɛ/	1,880Hz	1.859 BDU
/e/	2,109Hz	1.557 BDU
/ɛ e/ distance	229Hz	0.302 BDU
Reference average per degree (from Table 12)	435Hz	1.823 BDU

Table 15   *Anteriority of /ɛ e/ in the Standard French vowel system*

For Peer Review