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CONTINUED CHAIN SHIFTING OF /u/ AND /o/ IN PARISIAN FRENCH (draft)

Drift is the propensity of linguistic history to repeat itself. The explanation of drift is one of the most difficult problems in the study of language change. Sapir's observation of the continued drift of Indo-European over millenia in the direction of fewer case markings is just as puzzling today as it was in 1921. Number One on the handout shows some examples from a case of drift in French in which consonants were palatalized before front vowels. ke and ge became tse and dže in the Third Century. These affricates were then simplified in the thirteenth century to se and že. Thus, Latin centu became French cent and Latin gente became French gent. Similarly, ka and ga were palatalized in the fifth century to tša and dža. With the loss of the initial stops in the 13th century, these became ša and ža as in the French words char and jambe, which came from Latin carru and gamba, respectively.

Many other examples of palatalization of consonants can be found in the history of French, but what is most striking about this phenomenon is that it seems to be continuing today. Here is an example of a Parisian speaker with strong palatalization of k in the environment of front vowels. For the word quelle he pronounces [cçɛl]. PLAY M.P. TAPE

One problem in the explanation of drift is to recognize when drift is taking place in a language and when it isn't. Since drift is a phenomenon which affects languages over long periods of time, we must distinguish short-term or local reversals

in the direction of language change from global changes in the direction of drift.

Another change often attributed to palatalizing drift in French is the fronting of u to y in the tenth century. This sound change is represented in Number 2A on the handout. The fronting of u was then followed by chain shifting of /o/ to /u/ as shown in 2B. In this pattern of chain shifting, shown schematically in Number 3, back vowels move to the front and lower back vowels rise to take their place. In Number 3, the solid lines illustrate the realization in French of this counterclockwise chain shift around the tenth and thirteenth centuries. The dotted and solid lines together represent the chain shift pattern in its most general form. Haudricourt and Juilland identified this counterclockwise chain shift in Swedish, Ancient Greek and San Miguel Portuguese. It is postulated by Labov, Yaeger and Steiner that this is one of the four general patterns of chain shifting that occur in a wide variety of languages.

Since u had already been fronted once in French, I was interested to discover that in some Parisian speakers, u has a centralized allophone after coronal consonants. This allophone is pronounced like barred-u. Some Parisians say, toujours [ɑ] [ʉ] and pas du tout [ʉ], pas du tout [ʉ] du tout [ʉ] du tout [ʉ] du tout [ʉ]. Here is an example of a Parisian speaker who has a very palatalized norm for this allophone. PLAY M.F. TAPE

I have been studying the vowel productions of twenty-eight Parisian French speakers between the ages of 11 and 84. During field work in Paris in 1975 I recorded about two hours of spontaneous conversation with each of them. There are thirteen women in the corpus and 15 men. The average age of the twenty-eight speakers is 41. I have done an acoustical analysis of 4886 vowel tokens produced by these speakers, all taken from stressed syllables. My field work was funded by Labov's National Science Foundation grant for the study of Linguistic Change and Variation. Much of the methodology and measurement technique used in this study was originally developed by Labov and other members of our research project for the study of English vowels.

Let me now focus your attention on Number 4 in the handout. This figure shows the distribution in two formant space of 14 tokens of the phoneme u produced by one speaker. The vertical axis corresponds to the frequency of the first formant, measured in Hertz. The horizontal axis gives the frequency of the second formant. The axes are oriented so that the upper right hand corner of the chart corresponds to the high back corner of the phonetic vowel triangle. Points on the chart farther to the left indicate fronter pronounciations. Points closer to the bottom of the chart represent vowels which are phonetically lower. Tokens of the phoneme u which occur after coronal consonants are plotted on the chart with the symbol T. Tokens of u after non-coronal consonants are plotted with the symbol K. Thus each T or K in Number 4 represents one stressed syllable containing the phoneme u. If the preceding consonant in the syllable was t, d, s, z, n, l, esh, ž or yod, the token is plotted as T,

otherwise it is plotted as K.

You can see that the u tokens following coronal segments, represented by T, are clearly fronter than productions of the same phoneme after non-coronal segments, represented by K. The results of a t-test show that ten out of 28 speakers had significant differences at the five percent level for the second formant means of these two allophones. Could it be that the chain shift in Number 3 is continuing? Or are we simply observing a stable assimilatory phenomenon?

Number 5, on the second page of the handout, shows the distribution of tokens of the phoneme o in two formant space. The axes have the same interpretation and orientation as in the previous figure. Twenty tokens of the phoneme o are plotted for a single speaker. o in closed syllable is represented by a circle. o in open syllable is represented by a dot. The o's in closed syllable are clearly fronter than the o's in open syllable. The existence of a central allophone of o in closed syllables cannot be explained by any universal phonetic principle because in Philadelphia English precisely the opposite situation exists: it is the o's in open syllables which are fronter and the o's in closed syllables which are farther back.

So far I have presented data showing the existence of centralized allophones of u and o in some Parisian speakers. Open-o also has a central allophone, which occurs before consonants other than r. Observations by Armstrong, Martinet, and others about the central, schwa-like quality of open-o in positions before consonants other than r are represented by the rule in

Number 6. Open-o has a central realization before non-r segments. My own data on second formant means for these phones are shown at the bottom of Number 6. They confirm that for every speaker, the phoneme which I will call digraph, the low mid front rounded vowel of coeur and fleur, is fronter than open-o before not r, which is in turn fronter than open-o before r. In other words, for every speaker, the average

second formant of digraph was greater than the average second formant of open-o before not r. Also, the average second formant of open-o before not r was greater than the average second formant of open-o before r for every speaker.

I also observed, in certain types of working-class Parisian dialects, very extreme back pronounciations of back-a. The expression je ne sais pas is pronounced je n'sais [ɔ]pâs. The word là-bas is pronounced là-[ɔ]bâs. Passer and casser become [ɔ]pâsser and [ɔ]câsser. These extreme pronounciations of back-a, along with the centralized series of allophones of the back vowels which I just mentioned, would seem to indicate a continuation of the counter-clockwise chain shift pattern in Number 3.

But, if we look more closely at the group of speakers with extreme back-a, we find something quite different. We can get a measure of how far back a speaker's back-a is by comparing the mean second formant of his back-a with the mean second formant of his open-o before r. Open-o before r seems to be in the same place for all twenty-eight speakers, occupying a mid-low back position in the vowel space. It can therefore be used as a reference point to measure the frontness of back-a. In Number 7

the twenty-eight speakers are divided into two groups. Group 1 contains the speakers for whom the mean second formant of back-a is significantly greater than the mean second formant of open-o before r, at the five percent level. The mean age of the speakers in group 1 is 25 years. There are eleven speakers in this group. Group 2 consists of the speakers for whom there was no significant difference between the second formant means of back-a and open-o before r. The mean age of group 2 is 51 years. Seventeen speakers fall into this group. Thus group 1, which has a fronter pronounciation of back-a seems to be younger than Group2, which has a backer pronounciation of back-a. I performed a t-test to check the significance of the age difference between groups one and two. The age difference is highly significant, with p less than 0.005. It seems that, in agreement with Reichstein's data, back-a is being centralized in the younger generation. This apparent change in progress is illustrated at the bottom of number 7. Although back-a is being centralized, the distinction between this phoneme and front-a seems to be still firmly entrenched in Parisian speech.

Another interesting source of variation that I noticed among my speakers was in the frontness of the mid-high front rounded vowel ø, as in the word le feu or il peut. In Number 8, I have again divided the twenty-eight speakers into two groups. Group 1 contains the speakers who have second formant means of ø which are greater than their second formant means of digraph. The mean age of Group 1 is 52 years and there are 14 speakers in this group. Group 2 contains the speakers for whom the second

formant mean of ø is less than the second formant mean of digraph. The mean age of Group 2 is 29 years. There are 14 speakers in Group 2. Group 1, the older group, has a fronter realization of the phoneme ø than does group 2, the younger group. A t-test shows that the age difference between the two groups is significant at the five percent level. The diagram on the right side of Number 8 illustrates the apparent change in progress. On the left side of the arrow are the Group 1 speakers, who have ø fronter than digraph. On the right of the arrow are the younger Group 2 speakers, with ø backer than digraph.

I interpret this data to indicate a backing of ø rather than a fronting of digraph for two reasons. First, because ø also becomes significantly backer with respect to front-a in the younger generation. A comparison of second formant means of digraph with front-a shows no such age grading. Secondly, the frontness of ø correlates positively with age in a Pearson correlation, indicating backer phones in younger speakers. The mean second formant of digraph did not correlate significantly with age at all. Thus it seems to be ø which is retracting and not digraph fronting.

In Number 9 we return to the allophone of close-o in closed syllables to check it for age grading. If we are indeed observing a continuation of the counterclockwise chain shift we would expect to see fronter norms in younger speakers. Group 1 contains the speakers for whom o in closed syllable is significantly fronter - that is, has a significantly higher second formant - than o in open syllables. By significant, I mean significant

at the five percent level. The mean age of Group 1 is 50 years. There are six speakers who fall into this group. Group 2 contains the speakers for whom the second formant of o in closed syllables was not significantly greater than the second formant of o in open syllables. The mean age of Group 2 is 37 years. Group 2 contains 21 speakers. One speaker is included in neither group 1 nor group 2 since he had only one token of o in open syllable position.

Since group 1, with two distinct allophones of o differing in their second formant norms, is older than Group 2, which has no significant distinction, we cannot conclude that o in closed syllab. is currently being centralized in Parisian French. If anything, the reverse seems to be happening, since Group 2, the younger group, shows less of a distinction in the frontness of the two allophones of o than does Group 1, the older group. In fact, a t-test shows that the age difference between groups 1 and 2 is not significant at all, so we cannot conclude that the two allophones are approaching each other either.

Number 10, however, shows an interesting phenomenon in the distribution of o in the speech of a 14 year old female speaker. In this figure, the axes are oriented as before with the upper right corner of the figure representing the high back corner of the vowel space. Circles again represent o in closed syllables and dots represent o in open syllables. Each plotted point corresponds to one stressed syllable nucleus. You can see from the figure that o in closed syllables is realized distinctly lower for this speaker than o in open syllables.

Number eleven, on the top of the next page, divides the speakers into two groups, depending upon whether or not they show significant differences in height for o in closed syllable and o in open syllable. Group 1 contains the speakers for whom the first formant mean of o in closed syllables is significantly greater than the first formant mean of o in open syllables. In other words, the speakers in Group 1 all show a significant height distinction between their closed and open syllable allophones of o, with the closed syllable allophone phonetically lower. The mean age of Group 1 is 15 years. There are three speakers in this group. Group 2 consists of the speakers with no significant first formant distinction between the closed syllable and open syllable allophones of o. The mean age of Group 2 is 43 years and there are 24 speakers in this group. The age difference between groups one and two is significant at the one percent level. Number 11 therefore shows that the speakers in Group 1, who have significantly lower norms for o in closed syllable, are also significantly younger. Thus the lowering of o in closed syllable may be an ongoing change in Parisian French.

Since there are only three speakers in Group 1, the group that shows the height distinction, we must be very cautious of drawing conclusions about an entire speech community. We may speculate, however, that the fronting of o in closed syllables, a seemingly completed sound change for which no age grading was found, is the first step in a lowering process. Number 12 shows that in order for a back vowel on the periphery of the vowel triangle to become lower, it must also become fronter. If this is a two step process of A. Centralization followed by B. Lowering,

then we may be observing the language at a stage where centralization is completed and lowering has just begun.

The process of lowering of mid vowels in closed syllables is frequent in the history of French as illustrated by the examples in Number 13. e was lowered to epsilon in the eleventh and seventeenth centuries in closed syllable. ø was lowered to digraph in the seventeenth century in closed syllable. This process, like the palatalization of k that you heard earlier, seems to be repeating itself over and over again in the development of the language.

The apparent new lowering of o in closed syllables gives fresh meaning to the other two age-graded vowel shifts I have discussed: the centralization of back-a and the backing of ø. It seems as if all three vowels are undergoing a clockwise shift as shown in Number 14. The shift is allophonic for the most part and involves sometimes subtle changes in vowel timbre. It goes in the opposite direction from the usual counterclockwise chain shift shown in Number 3, which involves fully contrasting phonemes.

In Number 15, we return to the data on the phoneme u. The speakers are divided into two groups according to whether or not they show a significant difference in frontness between u after coronal consonants as opposed to u after non-coronal consonants. Group 1 consists of the speakers for whom the second formant mean of u after coronal segments is significantly greater than the second formant mean of u after non-coronal segments. The mean age of Group 1 is 65 and there are ten speakers in this group.

Group 2 contains the speakers with no significant difference between the second formant means of the allophone of u occurring after coronal and non-coronal segments. The average age of the speakers in Group 2 is 27. Eighteen speakers fall into Group 2. A t-test shows that the age difference between groups one and two is significant at the 0.00005 level. Group 1, with a significantly centralized allophone of u after coronals, is also significantly older. The younger group, Group 2, shows no significant difference in frontness between the two allophones of u.

Taken in isolation, the data in Number 15 could be interpreted either as a backing of the barred-u allophone of u which occurs after coronal consonants or as a centralization of the non-coronal allophone. A Pearson correlation disambiguates this result, however. The second formant mean of u after coronals gave a significant positive correlation with age, indicating fronter phones in older speakers. No significant correlation was found between the second formant mean of u after non-coronals and age. The rule at the bottom of 15 indicates the apparent/ongoing sound change: barred-u becomes u after coronal consonants. Thus/barred-u, just as ø, / seems to be moving back, in precisely the opposite direction of the counterclockwise chain shift.

Further evidence that this barred-u allophone of u is a relatively old form is provided by Nyrop in his Manuel Phonétique du Français Parlé published in 1902. He describes pronounciations of this phoneme as approaching the high front rounded vowel y. Nyrop gives examples of the word le jour pronounced le jur and the word bonjour pronounced bonjur.

Number 16 on the next page summarizes the four vowel shifts for which I have presented age grading evidence of possible change in progress. The vowels within the enclosed area seem to be stable, while the unenclosed vowels seem to be moving in the direction of the arrows. This is exactly the opposite direction of the chain shift shown in Number 3 on the first page.

It is hard to speculate when French first developed centralized allophones of the back vowel series. As far as I know, Nyrop was the first to report centralized varieties of u and open-o in 1903, but they may have existed much earlier. Nyrop did not observe any centralization of close-o in closed syllables, which may indicate that this was a later development.

If the centralization of allophones of the three back vowels was indeed the result of a counterclockwise chain shift as shown in Number 3, then what we are observing now is a reversal of direction of the sound change.

Number 17 gives a sketch of the possible recent history of the French vowel system. Stage One is hypothetical. Stages Two and Three are the older and younger generations in my data, respectively. Stage One shows the French vowel system before the length distinction between the two a phonemes was lost. The length distinction had been introduced by compensatory lengthening. As length was lost, people relied on the timbre distinction to keep the two word classes apart and old long a darkened into a low back vowel. Such a vowel system might have participated in a counterclockwise chain shift resulting in Stage Two. At Stage Two, a reversal of direction took place. Back-a started

moving forward and became brighter again. o in closed syllables, which contrasts with back-a, began to lower. ø and barred-u also participated in the retrograde shift giving stage 3.

As the investigation of sound change reaches microscopic levels, instrumental methods become indispensable to the study of the small differences in phonetic quality that arise. In this paper I have presented new possibilities of ongoing sound change in Parisian French which have never been described before. My findings are tentative, but I hope that they point the way to further research.

References

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CONTINUED CHAIN SHIFTING OF /u/ and /o/ IN PARISIAN FRENCH

1. Consonant palatalization in the history of French

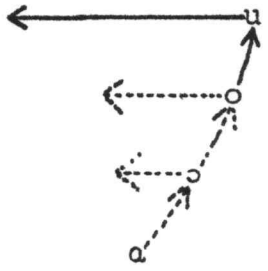
before e,i	k > t͡s (IIIrd Century) > s (XIII)	centu > cent
	g > d͡ž (IIIrd Century) > ž (XIII)	gente > gent
before a	k > t͡š (Vth Century) > š (XIII)	carru > char
	g > d͡ž (Vth Century) > ž (XIII)	gamba > jambe

2. Vowel palatalization and chain shifting in the history of French

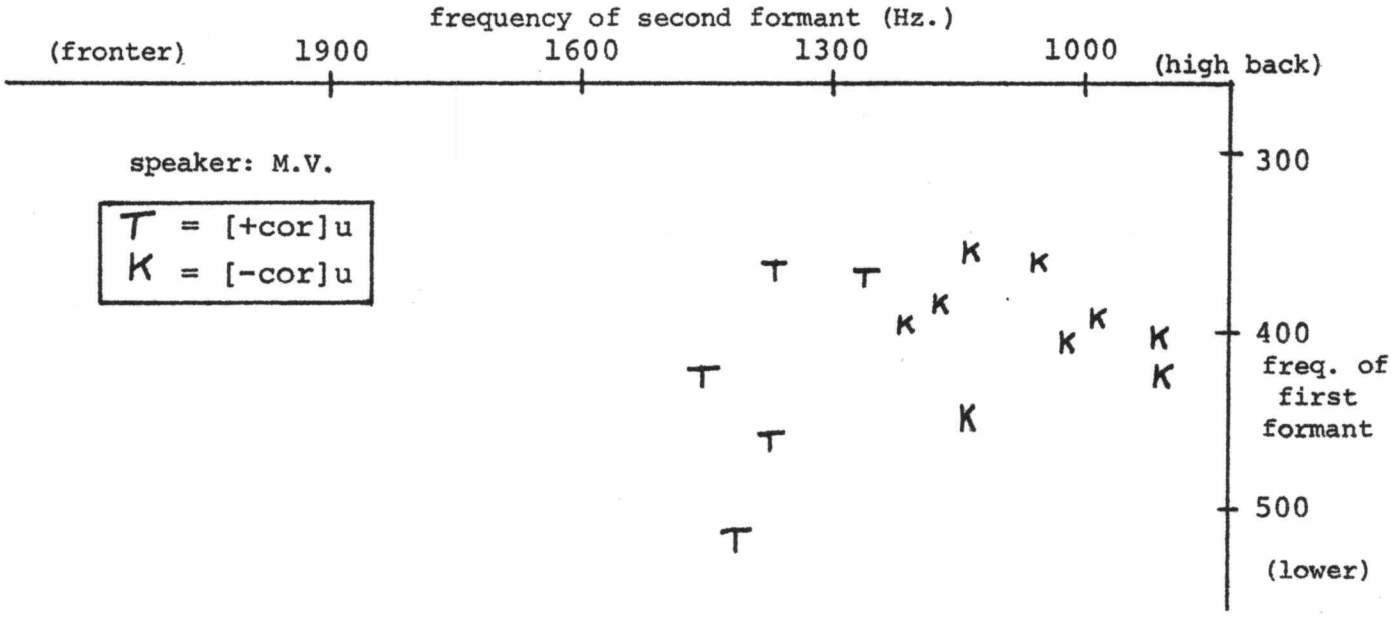
a. u > y (circa X)

b. o > u (circa XIII)

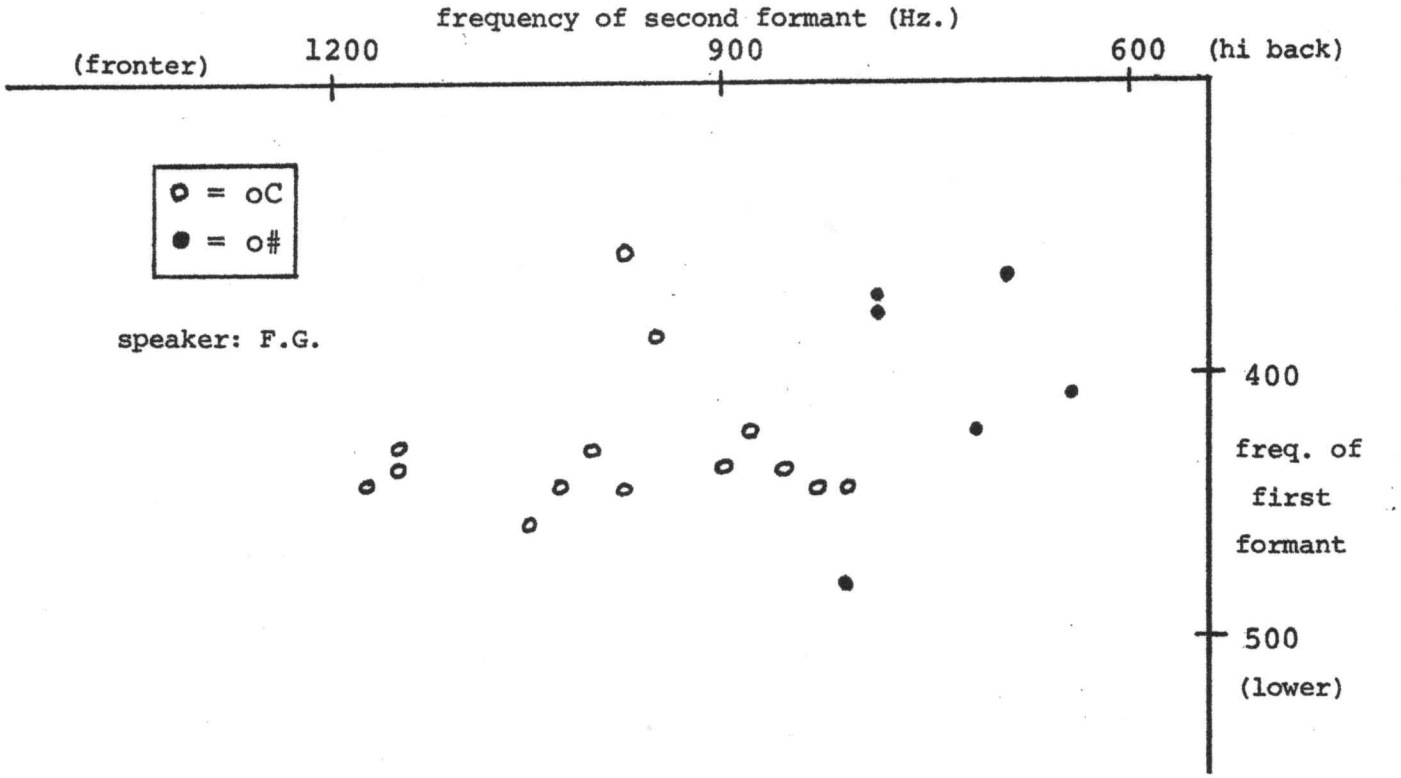
3. Counterclockwise chain shift



4. Two allophones of /u/



5. Two allophones of /o/



6. The central allophone of /ɔ/ before C ≠ /r/

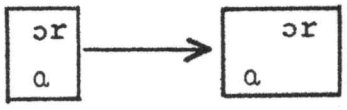
$$ɔ \longrightarrow ɔ^{\epsilon} / \_\_ [-r]$$

For every speaker, $\overline{F2}(æ) > \overline{F2}(ɔC) > \overline{F2}(ɔr)$

7. Age grading in the centralization of /ɑ/

	Mean Age	N
Group 1: $\overline{F2}(ɑ) > \overline{F2}(ɔr)$	25	11
Group 2: $\overline{F2}(ɑ) \stackrel{?}{=} \overline{F2}(ɔr)$	51	17

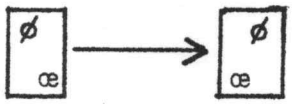
$p < 0.005$



8. Age grading in the backing of /ø/

	Mean Age	N
Group 1: $\overline{F2}(ø) > \overline{F2}(œ)$	52	~~11~~ 14
Group 2: $\overline{F2}(ø) < \overline{F2}(œ)$	29	14

$p < 0.05$

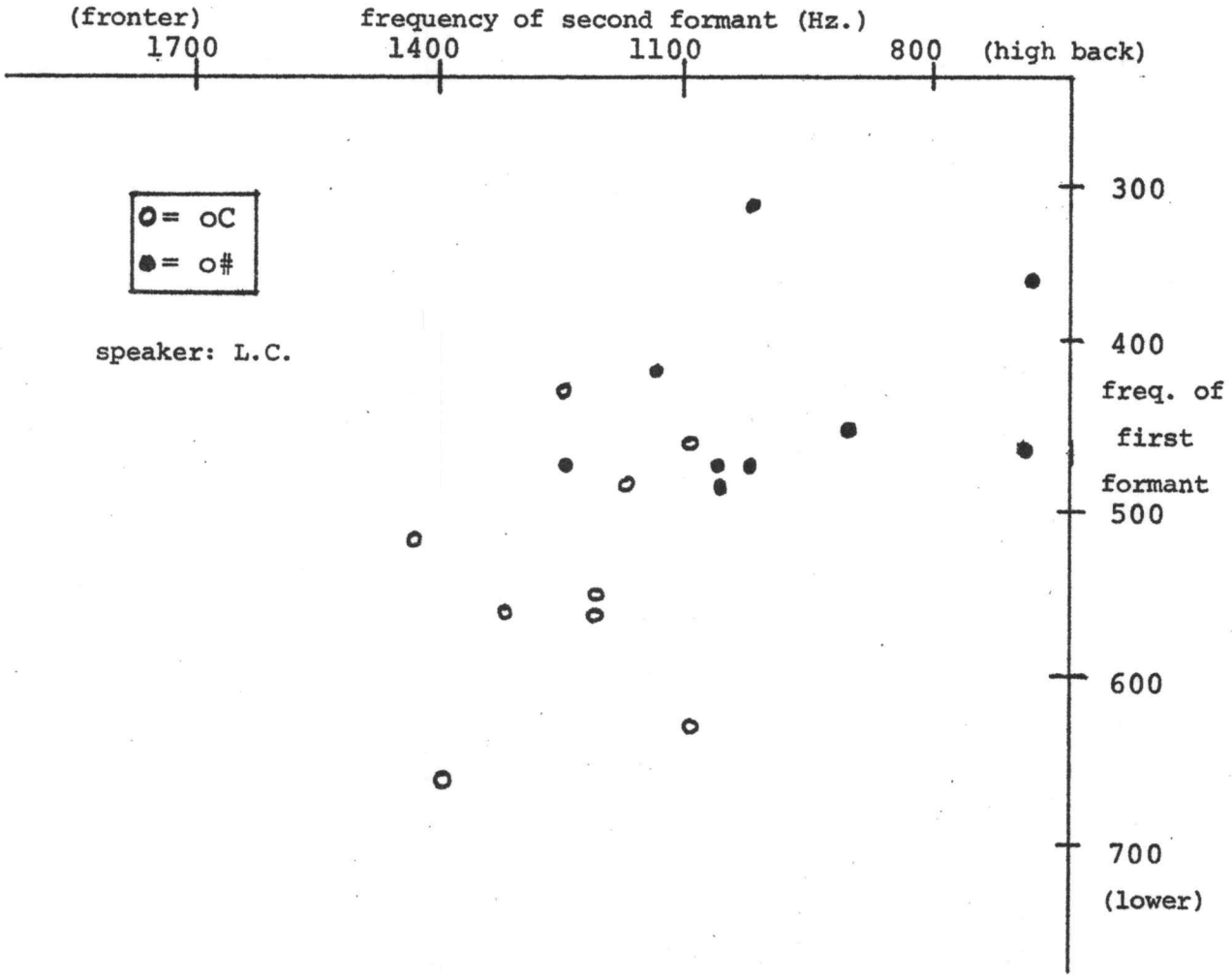


9. Absence of age grading in the centralization of oC

	Mean Age	N
Group 1: $\overline{F2}(oC) > \overline{F2}(o\#)$	50	6
Group 2: $\overline{F2}(oC) \stackrel{?}{=} \overline{F2}(o\#)$	37	21

(not signific.)

10. Lowering of oC

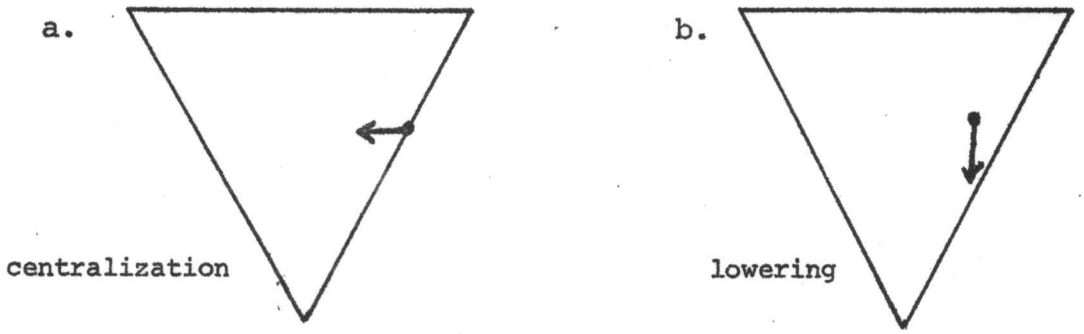


11. Age grading in the lowering of oC

	Mean Age	N
Group 1: $\overline{F1}$(oC) > $\overline{F1}$(o#)	15	3
Group 2: $\overline{F1}$(oC) $\stackrel{?}{=}$ $\overline{F1}$(o#)	43	24

$p < 0.01$

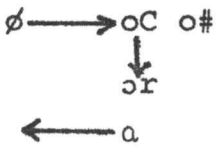
12. Lowering as a two step process



13. Lowering in closed syllables in the history of French

e > ɛ (XI)
e > ɛ (XVII)
ø > œ (XVII)

14. Clockwise shift



15. Age grading in the backing of /u/ after [+coronal] segments

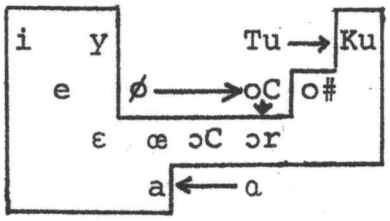
	Mean Age	N
Group 1: $\overline{F2}$(Tu) > $\overline{F2}$(Ku)	65	10
Group 2: $\overline{F2}$(Tu) $\stackrel{?}{=}$ $\overline{F2}$(Ku)	27	18

$p < 0.00005$

(T=[+coronal], K=[-coronal])

ʉ ⟶ u / [+cor] ___

16. Apparent changes in progress: a general clockwise shift



17. A possible recent history of the French vowels

Stage I (hypothetical)

i y u
e ø o
ɛ œ ɔ
a ɑ:

Stage II (early 20th Century)

i y Tu Ku
e ø oC o#
ɛ œ ɔC ɔr
a ɑ

Stage III (post W.W. II)

i y u
e ø oC o#
ɛ œ ɔC ɔr
a ɑ