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1 Introduction

Early Modern English (ENE) (1500-1700) witnessed the decline of negative concord (NC) and the rise of *any* in polarity contexts. This issue was given little consideration in the previous literature. It has generally been assumed that the loss of NC was the outcome of prescriptive views on language use rather than a natural case of change. Late fifteenth century and the sixteenth century private correspondence show that these two forms alternate in the speech of a single community. This study models the change in the frequencies of these two grammatical alternatives. In this paper, we present a detailed account of these different percentages within the framework of the Constant Rate Hypothesis (CRH) in an attempt to find out about the rate of replacement of one form by another in some grammatical environments. We focus exclusively on the results of our quantitative investigation as it bears on our main hypothesis, i.e., the Constant Rate Hypothesis.

We attempt to answer questions related to the actuation and completion of the change but most certainly we address issues related to the process of the change itself in the light of the Constant Rate Hypothesis. In this paper, we support and give further evidence for the constant rate hypothesis based on the idea that when one grammatical option replaces another with which it is in competition across a set of linguistic contexts, the rate of replacement will be the same in all of them.

2 The Constant Rate Hypothesis

The general assumption was that when one form replaces another over time in a changing language, the new form does not occur equally often in all linguistic contexts, i.e., the new form spreads rapidly in more common contexts. In his book *Variation and Linguistic Theory*, Bailey (1973) proposed a model of linguistic change based on two principles.

1. Linguistic replacements follow an *S*-shaped curve in time: slow in the first stages, faster in the middle changes, and slow again in the final stages.
2. Actuation of change and its rate of spread will differ based on more favourable contexts.

Bailey's first principle does indeed reflect a characteristic property of changes studied quantitatively. In fact, this idea was also suggested in work by Weinreich et al. (1968) and Osgood and Sebeok (1954). This, however, was not the case with the second principle. Quantitative studies from different languages suggest that the change will spread at the same rate in all contexts. This does not necessarily mean that the change will start at the same time in all contexts, something referred to by Kroch (1989) as "the unequal actuation model of change." The degree to which these contexts favor the new form might not be the same at different points in time; but the rate of spread of the new form will be the same. This contradicts Bailey's claim that change will spread at different rates in different contexts. Kroch (1989) provides evidence for the constant rate hypothesis based on specific historical changes from different languages that have been quantitatively studied. Evidence for the CRH was found in the increasing use of *have got* instead of *have* in expressing possession in British English between the 18th and 20th centuries, the loss of the subject-verb inversion in French, the increasing use of the definite article in possessive NPs in European Portuguese, and the case of the reanalysis of periphrastic *do* based on Ellegard's (1953) extensive quantitative description (Kroch 1989).

3 Data

Data were collected from about thirty sources, compiling a corpus of 1150 data points, materials likely to show linguistic usage of the spoken language, belonging to Late Middle and Early Modern English. Translated letters and letters by and to members of the royal family were eliminated. We studied the decline of NC over a period of one and a half centuries, precisely from 1450 until 1599. That period was divided into six stages of twenty-five years each. We traced four major contextual effects on the competition across time based on the type of construction, namely non-coordinate and coordinate contexts¹, and the grammatical function, namely objects and adverbials². We found that NC was showing a constant decline in favor of the use of the non-assertive form *any* in all considered contexts.

¹We have looked at the use of NC in non-coordinate and in coordinate contexts separately, based on the assumption that NC in coordinate constructions survived longer than in non-coordinate contexts (Barber 1997).

²We have considered the use of NC in all grammatical functions within our two target constructions, but considered only objects and adverbials, as the others were low in absolute frequencies.

4 Data samples

One of the issues we are considering in looking at the data is the range of variation, i.e., the dimensions along which there is variation, and the grammatical alternatives involved. Hence, we looked at negative constructions, i.e. utterances where *not* is used as the main sentential negator and utterances where negation is expressed by other elements than the sentential negator *not*, such as *nothing*, *none*, *never*, etc., followed by another NEG element. My first variable is type, i.e. target constructions, namely non-coordinate negative contexts (i.e. simple clauses) and coordinate negative contexts where a negative coordinator, either *nor* or *neither* is used together with an *n*-word to express negation. We give the following examples to illustrate the use of NC in the contexts mentioned above.

In non-coordinate negative contexts:

- (1) 'that ye wryt not to me no letters' 10
- (2) 'I cannot wryt to the nothing for lake of vnderstandyng' 10
The Cely Letters (1472-1488)

In coordinate negative contexts:

- (3) 'I pray ze say to hym I had none, ner he delyueryd me none' 18
- (4) 'I awyse you to lene hym no mony, ne do no thing with hym' 44
The Cely Letters (1472-1488)

5 Data Analyses

5.1 Applied Statistical Analyses

Following Kroch's (1989) analysis of linguistic change, we will test the Constant Rate Hypothesis, and that a particular mathematical function called the logistic, can be used to model linguistic change. Fitting empirical data to the logistic function will permit us to estimate the parameters of the slope S in each context of a changing form and we can then determine whether the rates of change in different contexts are the same or different. The slope S of the logistic function models the rate of replacement of one form by another.

We will summarize the main points here, beginning with the logistic model, and returning to the CRH in the analysis of my data. We used the Proc-Genmod procedure within the SAS Program to fit data into the logistic regression (Collett 1991) in order to determine whether the rates of change in different contexts are the same or different.

The equation of the logistic function is given in (5). By applying this function, we end up having an S -shaped curve.

$$(5) \quad p = \frac{e^{k+st}}{1 + e^{k+st}}$$

In this equation, p stands for the probability of use of the form we are looking at, and t is a variable for time. k and s are constants which tell us about the shape of the logistic function. The logistic is a mathematical function used in statistical studies when dealing with changing percentages of alternating forms over time. The logistic transform of frequencies is a linear function of time used to measure the rate of change at different points in time. In order to analyse the observed change and consider the different rates of use of a form over time, we use the logistic transform of frequency, or the logit, proposed by Kroch (1989:203). The logit, visually represented by straight lines, is given in (6).

$$(6) \quad \ln \frac{p}{1-p} = k + st.$$

5.2 The Decline of NC in Non-coordinate and Coordinate Contexts

The general picture shows an obvious decline in the use of NC in favour of the use of the polarity item *any*. Table 1 shows the gradual loss of NC in the six stages successively. NC was already on its way out at stage 5 and almost out of use in these texts at stage six.

	Stage1		Stage2		Stage3		Stage4		Stage5		Stage6	
	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total
Non-coord	83.3	126	78.4	116	48.2	27	43.3	187	3.1	160	0.6	157
Coord.	96.4	85	90	60	79.3	25	58.8	109	7.9	51	7	43

Table 1: The frequency of n -words by stage and construction type

A plot of the data is given in Figures 1 and 2, which show the observed probabilities fitted into the logistic regression model. We can see that the decline of NC in both non-coordinate and coordinate constructions follows an S-shaped curve.

³Type 1 = non-coordinate contexts; Type 2 = coordinate contexts

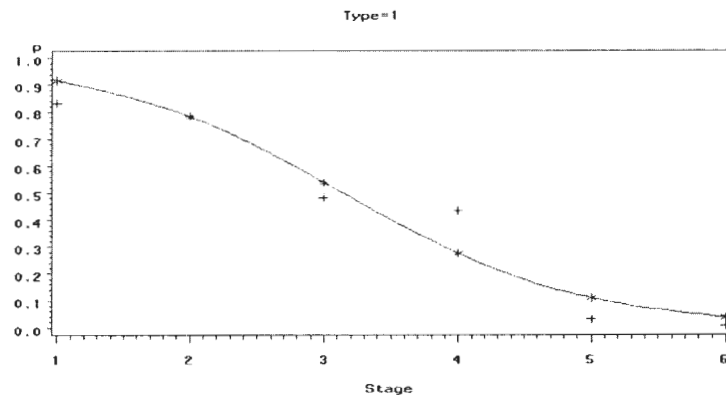


Figure 1: Observed data for non-coordinate contexts plotted against the fitted logistic regression

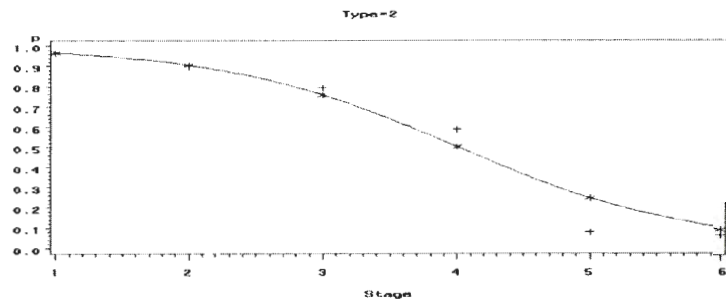


Figure 2: Observed data for coordinate contexts plotted against the fitted logistic regression

Figures 3 and 4 stand for the empirical logits of the observed responses plotted against $\text{logit}(p)$. Notice that the lines are essentially parallel in the two graphs which suggests that the rate of change in both non-coordinate and coordinate contexts is the same. When measured, the slope S , which stands for the rate of change, is the same for both constructions and is equal to -1.126 units. These graphs also show that there is an overall difference between the two types with Type 2 being higher on the logit scale by an estimated 0.979 units. This means that it is also higher on the probability scale,

i.e. we are more likely to come across cases of NC in coordinate contexts than in non-coordinate contexts. This, however, does not affect the rate of change; NC declined in both contexts at the same rate as demonstrated in the following graphs.

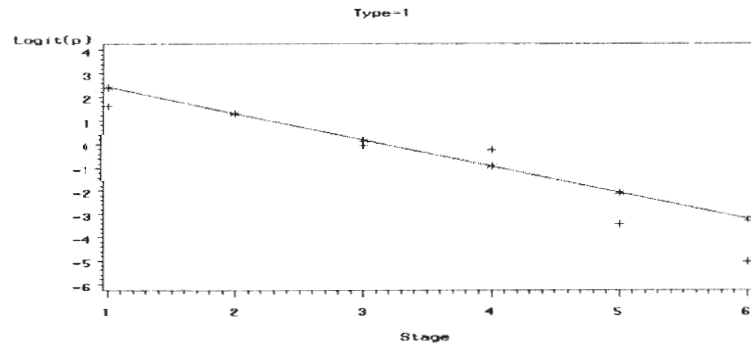


Figure 3: The logit transform of observed data for non-coordinate contexts

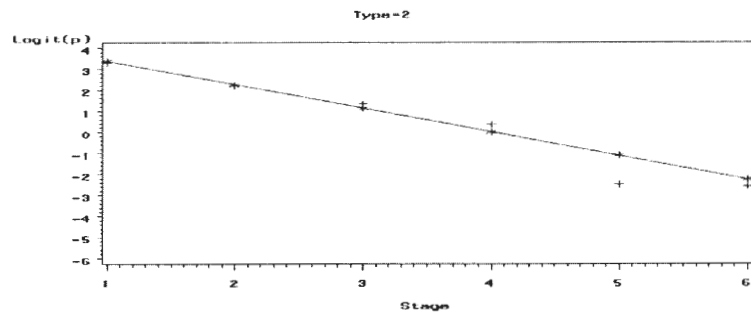


Figure 4: The logit transform of observed data for coordinate contexts

5.3 The Decline of NC in Objects and Adverbials

Our second variable is the grammatical function within a certain grammatical construction. The aim now was to model the decline of NC in these in order to find out if we still obtain the Constant Rate Effect. Because we have already looked at some other contexts, i.e. non-coordinate and coordinate,

we are now able to test the Constant Rate Effect in varied combinations. These are the following:

1. Objects in both non-coordinate and coordinate contexts, and adverbials in both non-coordinate and coordinate contexts.
2. Objects and adverbials in non-coordinate contexts on the one hand and in coordinate contexts on the other hand.

In the following section, we start by looking at the rate of decline of NC in objects in each grammatical construction.

5.3.1 The Decline of NC in Objects

	Stage1		Stage2		Stage3		Stage4		Stage5		Stage6	
	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total
Non-coord	80	55	79	62	41.7	12	35.3	76	3.6	82	1.4	75
Coord.	95	40	88.2	34	87.5	16	64.3	56	6.6	30	3.5	28

Table 2: The frequency of *n*-words in *objects* by stage and construction type

Table 2 summarizes the number of occurrences of *n*-words in objects in both types of constructions throughout the six observed stages. We notice that there is a constant drop in the use of *n*-words in favor of the use of the alternative form, the polarity item *any*. Figures⁴ 5 and 6 show that the decline in use of *n*-words follows an S-shaped curve, while Figures 7 and 8 indicate that the lines are parallel, hence the same rate of decline.

⁴Function 1 = objects; Function 2 = adverbials

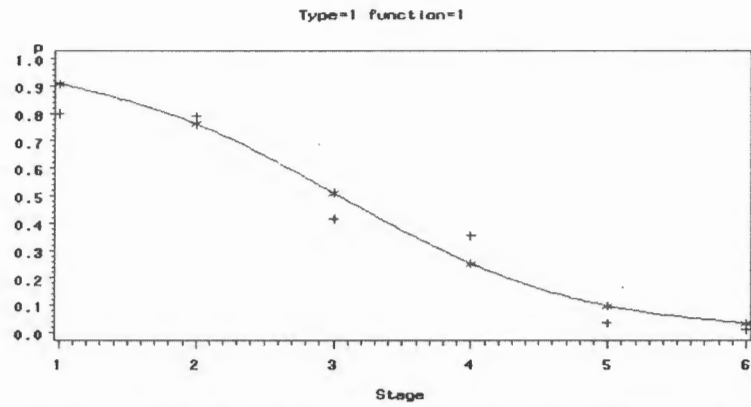


Figure 5: Observed data for objects in non-coordinate contexts plotted against the fitted logistic regression

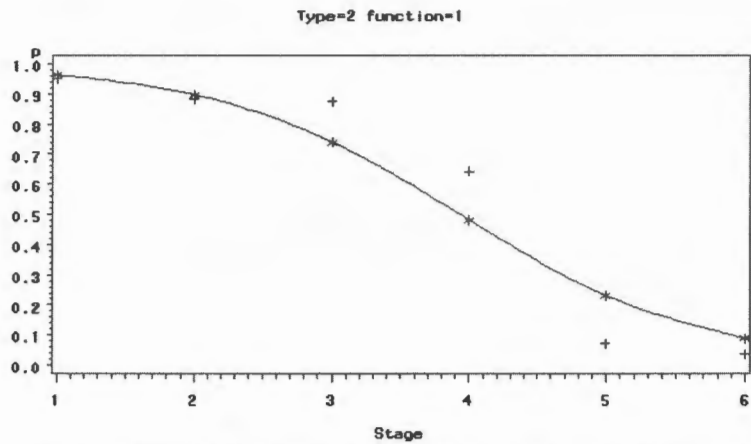


Figure 6: Observed data for objects in coordinate contexts plotted against the fitted logistic regression

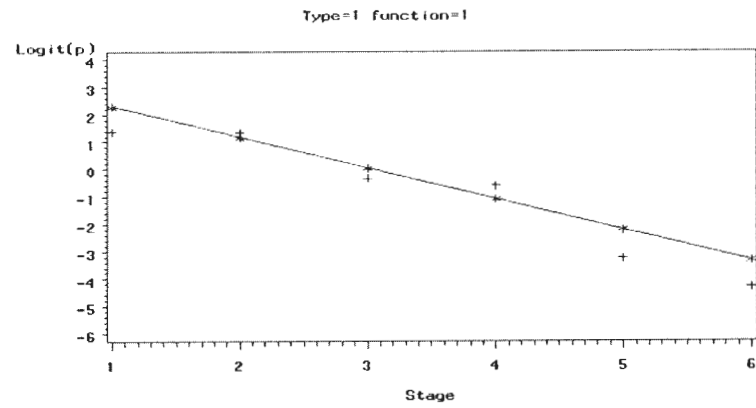


Figure 7: The logit transform of observed data for objects in non-coordinate contexts

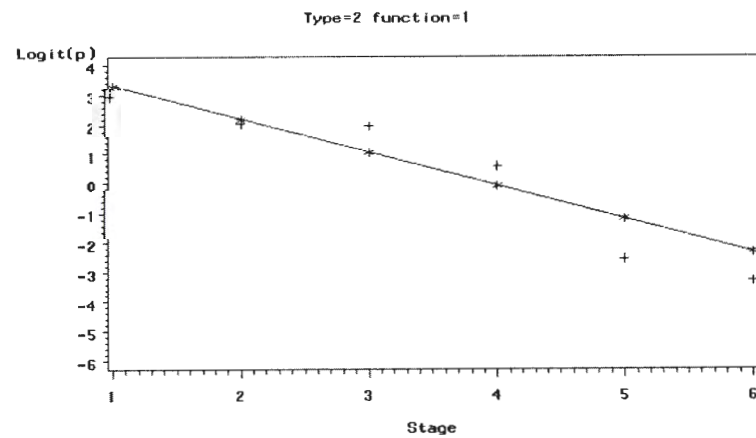


Figure 8: The logit transform of observed data for objects in coordinate contexts

5.3.2 The decline of NC in adverbials

	Stage1		Stage2		Stage3		Stage4		Stage5		Stage6	
	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total
Non-coord	86.8	68	77	52	41.7	14	49.5	109	1.3	77	0.0	82
Coord.	96.8	31	89.5	19	87.5	12	54.4	46	12.5	16	7.2	14

Table 3: The frequency of *n*-words in *Adverbials* by stage and construction type

In this section, we model the decline of NC in adverbials in each grammatical construction to see if we still obtain a Constant Rate Effect. Table 3 summarises the percentages of use of NC in adverbials in both grammatical contexts. Notice that there is an ongoing decline in the percentages of use of *n*-words and Figures 9 and 10 indicate, again, that the decline of NC in these contexts follow and S-shaped curve. Figures 11 and 12 also show that the lines are essentially parallel, indicating the NC in adverbials declines at the same rate in each grammatical construction.

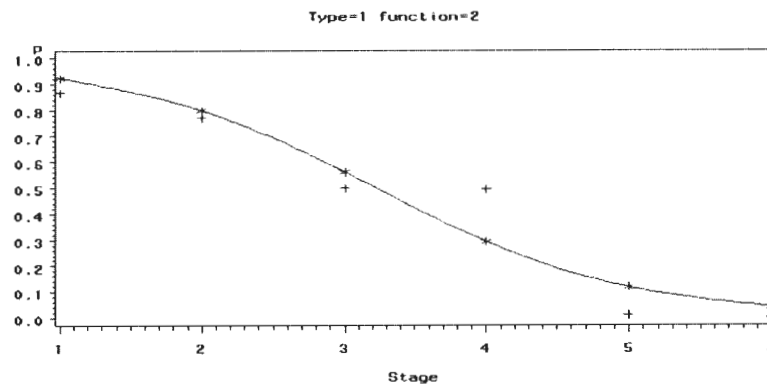


Figure 9: Observed data for adverbials in non-coordinate contexts plotted against the fitted logistic regression

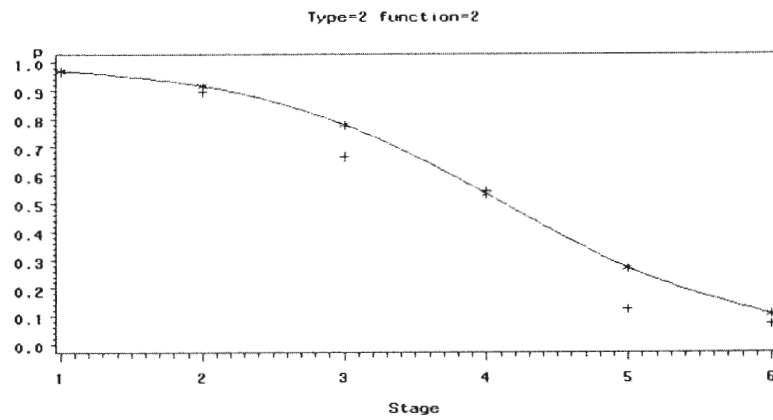


Figure 10: Observed data for adverbials in coordinate contexts plotted against the fitted logistic regression

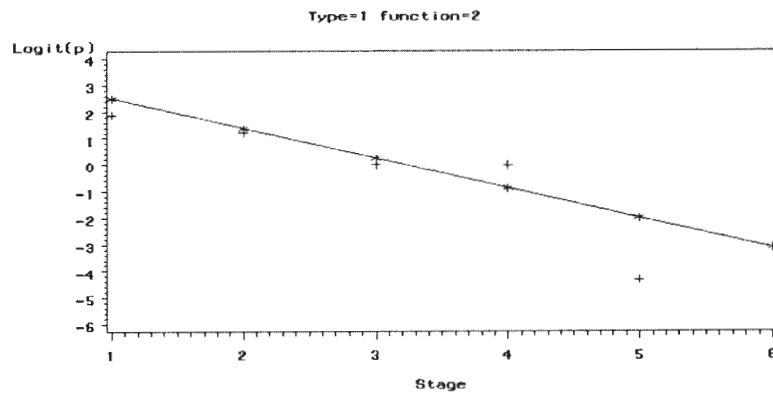


Figure 11: The logit transform of observed data for adverbials in non-coordinate contexts

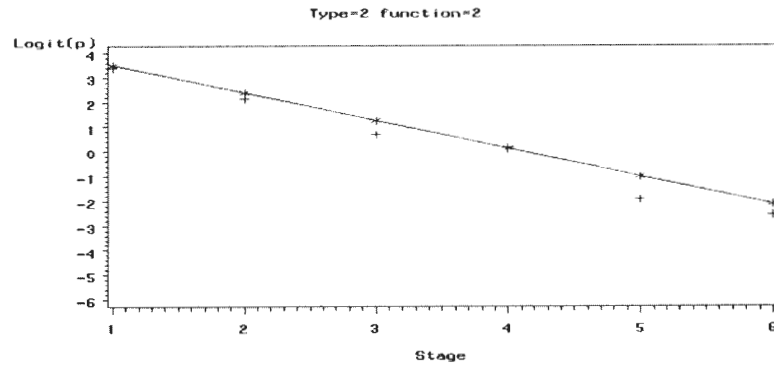


Figure 12: The logit transform of observed data for adverbials in coordinate contexts

5.3.3 Comparing the rates of change in objects and adverbials

In this section, we would like to know if NC declines at the same rate in objects and adverbials in non-coordinate contexts on the one hand and in coordinate contexts on the other hand. Here, we refer back to Figures 7 and 11 in order to compare the rate of decline of *n*-words in both objects and adverbials in non-coordinate contexts, and to Figures 8 and 12 in order to compare the rate of decline of *n*-words in both objects and adverbials in coordinate contexts. Figures 7 and 11 and Figures 8 and 12 indicate that on comparing the rate of decline of NC in objects and adverbials, we find that NC declines at the same rate in these two grammatical functions, first in non-coordinate contexts and, second, in coordinate ones.

6 Summary and Conclusions

Conducting this quantitative study allowed us to investigate the process of the decline of NC. The late 15th century showed that NC was very strongly favored particularly in coordinate negative contexts. In the later 16th century NC has virtually disappeared in both non-coordinate and coordinate negative contexts. This is in accordance with Nevalainen's (1998) findings reported in her sociolinguistic study of the loss of NC.

The change was mainly gradual and steady. Our findings support the general claim that linguistic changes tend to follow an S-shaped curve (Bailey 1973, Weinreich et al. 1968, Osgood and Sebeok 1954). NC declines in

both grammatical constructions, i.e., non-coordinate and coordinate contexts, at the same rate. Our results suggest that there is a Constant Rate Effect when considering these target constructions separately. Change in non-coordinate, as in coordinate, contexts seem to proceed at the same rate throughout the whole process.

We support and give further evidence to the Constant Rate Hypothesis. We looked at contexts and sub-contexts to see if the Constant Rate Hypothesis still obtains and it did. NC declines at the same rate in:

1. Objects in both non-coordinate and coordinate contexts, and in adverbials in both non-coordinate and coordinate contexts
2. Objects and adverbials in non-coordinate contexts, on the one hand, and in coordinate contexts, on the other hand

Looking at the overall picture, our results also provide counter-evidence to the general claim assuming the loss of NC to be the outcome of prescriptivism. Our data suggest that this is a case of natural and gradual historical linguistic change. NC was lost long before prescriptive views came into being.

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