Sound change in a complex system

This paper intends to be a contribution towards the debate on the role of the individual and the lexicon in sound changes. We will base the analysis on a rich memory model of language representation (Bybee, 2001, 2010; Foulkes and Docherty 2006; Pierrehumbert, 2001, 2003). The results to be presented suggest that a complex interaction at various levels of a dynamic system - where the lexicon, community, language structure and the individuals interact - offers insights towards a better understanding of sound change actuation (Beckner et alii, 2009).

Harrington (2006) studied the recorded Christmas speeches of Queen Elizabeth II over a period of 50 years. His study provided evidence of the Queen’s speech production adaptation to an ongoing sound change in British English. Sankoff and Blondeau (2007) examined R-distribution in Montreal French comparing data from the same speakers from 1971 and 1984. Their results showed individual differences regarding change within the period thus providing evidence for change in adult linguistic systems. These studies show that speakers may display changes in their language patterns during their lifetime. These changes appear to reflect innovative patterns of ongoing linguistic changes in the community. An issue that arises from these studies is under which conditions a given person may present innovative patterns. In other words, would certain speakers be responsible for the actuation of a given linguistic innovation?

Labov (1980) addresses the actuation problem by first locating the innovators themselves and then examining their social relationships. In his view innovators are persons who have high prestige and a large number of ties both inside and outside a small local group and who serve as models to others. Innovators are leaders in linguistic change who present high rates in an examined phenomenon while in contrast non-leaders present low rates of an examined phenomenon. Milroy and Milroy (1985) suggest that innovations are normally transmitted from one group to another by persons who have weak ties in the community. We suggest that the conflict between Labov’s and Milroy & Milroy’s proposals as whether innovators have strong or weak ties in the community may be reconciled within a view which assumes that individuals have consistent linguistic behavior which evolves dynamically through their lifetime in a complex system.

As noted by Marshall (2004, p. 26) “The practice of grouping informants to show patterns of linguistic variation is of course a valid procedure; however, much systematic individual variation is left unaccounted for by this method”. Thus, evaluating individual linguistic behavior might shed some light on the nature of the actuation problem. Sangster (2002) analyzed seven different phonological phenomena in Liverpool English in order to evaluate inter and intra variation. She observed that while an individual could present high rates in a given phonological phenomenon, in another one her rates could be lower than the average observed in the community. Thus, the individual could be a leading person in a given phonological phenomenon but a non-leading one in another phonological phenomenon. Sangster’s work suggests that individual linguistic behavior has a complex nature which involves ties within the community and within the individual’s own linguistic system.

Inspired by Sangster’s (2002) work we investigated the relationship between the linguistic behavior of individuals and their lexicon. We argue that a complex interaction at various levels of a dynamic system - where the lexicon, community, language structure and the individuals interact - offers insights towards a better understanding of sound change actuation.
We examined three phonological phenomena in Brazilian Portuguese (BP): a) loss of final “r” as in *computado[r]* > *computado* ‘computer’ (Huback, 2003); b) loss of intervocalic liquid as in *ócu[l]*os > *ócus* ‘glasses’ (Fontes Martins, 2001) and c) Cluster reduction as in *li[v]*o > *li[v]*o ‘book’ (Cristófaro Silva, 2003). A group of twelve speakers who had contributed to the previous work mentioned above were examined in a new project. These twelve speakers had been classified as a leader (high rates of the phenomenon) or a non-leader (low rates of the phenomenon) in the previous research they had participated in. In the new project we intended to investigate whether leaders and non-leaders had consistent linguistic behavior in the three phonological phenomena which were examined and compare their behavior to the previous works which examined the community in general. Results showed that leaders, in general, presented higher rates for all phenomena than non-leaders. Nevertheless, the rates between each phenomenon varied amongst speakers. For example, in the three phenomena that were analyzed a leader had 93%, 88% and 93% respectively whereas another leader had 57%, 71% and 96%. On the other hand a non-leader presented 11%, 6% and 30% respectively and another non-leader presented 10%, 21% and 0%. In order to account for the differences between speakers we examined the lexical items that displayed the innovative patterns for each phenomenon. Results showed that some words presented high rates of the phenomenon whereas others words were not affected at all. For example, a word such as *outro* ‘another’ showed 39.8% rate of cluster reduction amongst all participants whereas a word such as *grande* ‘big’ did not present a single case of cluster reduction. Interestingly, the words which presented higher rates of the phenomena in the data from the leaders were those which were also affected by the phenomena amongst non-leaders. This indicates that certain lexical items play an important role in the implementation of innovations and also that some lexical items seem to be at the heart of the actuation problem. Another observation about the lexical items that are more favored in the lenition cases that we investigated is that the prosodic environment played an important role. Thus, for the loss of final “r” we observed that primary stress favored the phenomenon, whereas in the loss of intervocalic liquids and in cluster reduction unstressed position favored the phenomenon. This explains, for example, why a word as *outro* ‘another’ (where the cluster is in unstressed position) presented a rate of 39.8% of cluster reduction whereas the word *grande* ‘big’ did not present cluster reduction (where the cluster is in stressed position). The importance of the linguistic environment indicates that lexical items with similar characteristics are likely to undergo the sound change. This explains why individuals have consistent linguistic behavior as leaders and non-leaders. Once the phenomenon started with a given lexical item it will evolve dynamically through lexical diffusion in words which present similar environmental conditions. From this perspective actuation of a sound change might be understood as triggered by a lexical item which will spread the innovation through the lexicon in similar environments. Leaders will be those speakers whose lexicon has been more affected by the phenomena whereas for non-leaders their lexicon is less affected. This indicates that linguistic representations are dynamic and reshaped by speakers’ usage of their language, supporting a rich memory model of language change. The facts we have just discussed account for the regular and orderly manner in which successful innovations are diffused throughout a given language: the interaction between the linguistic environment and the lexicon through the individual. Thus, sound change reflects a complex interaction at various levels of a dynamic system where the lexicon, community, language structure and the individuals play a crucial role.