

Structure and Dynamics of Linguistic Communities: the Cases of Basque, Mazatec, and Tseltal

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Complexity Theory represents a framework unifying natural and social sciences, in which it is possible to provide a quantitative description of social phenomena. In such a framework, in the last years many researchers have addressed problems of linguistics, such as the study of competing languages and language change, evolution, and diffusion in space and time. These topics have been subjects traditionally addressed by historical linguistics.

From the point of view of Complex Systems, languages represent self-organized systems with an interesting twofold nature.

On the one hand, one has to analyze and compare language structures (a problem considered by comparative linguistics), which can be done using various methods to characterize and visualize the usually complex network of relationships, similarities and differences between the dialects of a language or the different languages of a family [1]. One has to choose or integrate between a set of available methods providing tree-like representations or other methods, such as the wave model and its recent developments, revealing more general structures.

On the other hand, there is the problem of describing language change in time and space, i.e., how languages evolve, diffuse, and change by interacting with each other. To this aim the recently developed field of *Language Dynamics* [2] provides a wide set of models which can be used to study how languages interact and compete with each other, evolve and change, and spread across social networks and geographical landscapes. This family of models is related to other research lines such as opinion dynamics, ecological competition models, disease spreading, and genetic evolution.

These two aspects are clearly related to each other. Besides presenting an overview of the current situation, the focus of the contribution is on a possible unification of the two mentioned (structural and dynamical) sides of the problem into methods and tools which would enable us to make quantitative predictions of and comparison with the observed linguistic structures and changes. This is made by illustrating the theoretical study of some examples of linguistic communities, for which the field work of linguists has provided us with reliable and consistent linguistic databases.

The examples considered are

- the dialects of Mazatec, an endangered Otomanguean language spoken in Mexico [3]
- the Basque dialects, spoken North-East Spain and North-West France [4]
- the Tseltal, a Mayan language spoken in the Mexico [5]

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