Chapter 7
A Language Shift Simulation Based on Cellular Automata

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ABSTRACT

Language extinction is a widespread social phenomenon affecting several million people throughout the world today. By the end of this century, more than 5100 of the approximately 6000 languages currently spoken around the world will have disappeared. This is mainly because of language shifts, i.e., because a community of speakers stops using their traditional language and speaks a new one in all communication settings. In this study, the authors present the properties of a cellular automaton that incorporates some assumptions from the Gaelic-Arvanitika model of language shifts and the findings on the dynamics of social impacts in the field of social psychology. To assess the cellular automaton, the authors incorporate empirical data from Valencia (a region in Southern Europe), where Catalan speakers are tending to shift towards using Spanish. Running the automaton under different scenarios, the survival or extinction of Catalan in Valencia depends on individuals' engagement with their language. The authors discuss how a cellular automata theory approach proves to be a useful tool for understanding the language shift.

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INTRODUCTION

History tell us of a great many ancient cultures that disappeared a long time ago. These cultures had their own social, economic and political structures, their own cultural and artistic expressions and, often, their own languages. Usually, the extinction of a culture also implies the extinction of its language. For example, Etruscan, Egyptian and Assyrian were languages spoken in the past that are not spoken today. This is why people refer to them as dead languages. But language death is not only an ancient event; the last speaker of Vegliot Dalmatian died in 1898, and languages still continue to die today (the last speaker of Eyak, a native Alaskan language, died last year). In fact, language extinction is currently a widespread social phenomenon throughout the world, and the process will accelerate over the coming years. UNESCO (2003) estimated that, by the end of this century, more than 5100 of the approximately 6000 languages currently spoken around the world will have disappeared.

When a language dies, the community of people that speak that language lose an element of their identity and their cultural framework is impoverished as a result. In fact, the most likely future of that community is their extinction as a culturally different group and their assimilation into a larger cultural group. Hence, the death of a language implies an irreversible impoverishment of the world's cultural diversity. Given the large number of languages affected by extinction, language death is a major cultural problem today because (a) it affects several million people, and (b) the cultural wealth of humankind is significantly reduced.

Obviously, a language dies if its speakers also die, due to genocide for example. Destruction of habitat or loss of economic resources can also impel some communities of people to emigrate. Abandoning the traditional lifestyle and adopting a new cultural pattern usually results in abandoning the traditional language and adopting the language of the new habitat. The result is the death of the language traditionally spoken by the community. This process of acculturation, including the abandoning of the traditional language, is easy to observe in people who migrate to cities from rural communities (Palacios, 2004)[1]. In terms of language, acculturation means that these people shift from their traditional language to a new one.

If there are two or more languages in a community, a hierarchical structure is frequently adopted, with one becoming the dominant language (DL) and the other the subordinate language (SL). It is possible for both languages to coexist within such a hierarchy for long periods of time, but political, social and/or economic events can disturb the equilibrium. In these cases, the speakers of the SL may notice that their language has lost value relative to the DL. They may then decide that it is no longer useful and stop speaking it in all domains of use. The result is the extinction of the SL. Hence, we can define language death due to language shift as a process in which a community of speakers stops using their traditional language and speaks a new one in all communication settings (Mühlhäusler, 1996)[2]. In this study, we focus on the analysis of language shifts and their consequences for the SLs.

Based on studies of the death of two languages in Europe, namely a variety of Scottish Gaelic and an Albanian dialect spoken in Greece, Sasse (1992) introduced the Gaelic-Arvanitika model. This model stated that one of the main factors involved in maintaining a language across generations is transmission within the family. If transmission of the language within the family fails, i.e., the parents speak to their children in a language other than their own, the non-transmitted language will die quickly because the language shift process will be completed in approximately two generations. Although the Gaelic-Arvanitika model is biased towards a European cultural, social, political and economic context, it provides us with an overall