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Segregation in networks

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Abstract

Schelling [Schelling, T., 1969. Models of segregation. American Economic Review 59, 488–493; Schelling, T., 1971a. Dynamic models of segregation. Journal of Mathematical Sociology 1, 143–186; Schelling, T., 1971b. On the ecology of micromotives. The Public Interest 25, 61–98; Schelling, T., 1978. Micromotives and Macrobehavior. W.W. Norton and Company, New York] considered a model with individual agents who only care about the types of people living in their own local neighborhood. The spatial structure was represented by a one- or two-dimensional lattice. Schelling showed that an integrated society will generally unravel into a rather segregated one even though no individual agent strictly prefers this. We generalize this spatial proximity model to a proximity model of segregation, examining models with individual agents who interact 'locally' in a range of more general social network structures. The levels of segregation attained are in line with those reached in the lattice-based spatial proximity model.
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1. Introduction

Segregation has been for some time one of the most important socio-political and public economic issues in the USA and has also increasingly become one in many Western-European countries. As segregation has increasingly been recognized as one of the most important public

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policy issues in countries such as the UK, the Netherlands, France, and Germany, various countries have started evaluating and questioning the effectiveness of decades of integration policies (see e.g., Baldwin and Rozenberg, 2004; Commissie Blok, 2004). The widely accepted view is that these policies have essentially been failures as integration simply did not happen. As Phillips (2005), chairman of the Commission for Racial Equality in the UK, puts it, "we are sleepwalking our way to segregation". The main objective of this paper is to improve our understanding of this issue.

The prevalent form of integration policy in countries such as the UK and the Netherlands has been one of promoting multiculturalism by focusing on the individual citizens' preferences.[1] The idea was that promoting openness and tolerance with respect to diversity would allow integration to take place.

Individual preferences are exactly what the spatial proximity model of Schelling (1969, 1971a, b, 1978) focuses on. Schelling considered a simple model with individual agents who only care about the types of people living in their own local neighborhood. The spatial structure was represented by a one- or two-dimensional lattice. Schelling showed that an integrated society will generally unravel into a rather segregated one even though no individual agent strictly prefers this. This segregation seemed due to the spontaneous dynamics of the economic forces, with all individuals following their incentives to move to the most attractive locations. In doing so, they create externalities for other people, who will respond to their changed incentives, and so on.

The preferences considered in the spatial proximity model are said to be mild, as everybody would be happy in a perfectly integrated society.[2] Pancs and Vriend (2007) examined the robustness of the spatial proximity model. They showed that the model can be further simplified (rendering the individual preferences even more salient as an explanatory variable of segregation) and that these proximity preferences may be even more extreme in favor of integration. This focus on mild individual preferences or preferences that even favor integration is not to say that institutional constraints or racism may not hinder integration. But what the model shows is that even without such obstacles one should perhaps expect segregation. It seems that any integration policy must be based on a good understanding of these spontaneous dynamics.

The idea that people care about their spatial proximity can be justified by the fact that this is where people mow their lawns, where their children play outside, where they do their shopping, and where they park their car. The social environment is, however, not limited to this spatial proximity. People also interact through networks of friends, relatives, and colleagues, and through virtual communities on the Internet, and they are likely to have preferences with whom they do this, just as they have preferences regarding their spatial proximity. Similarly, segregation need not necessarily occur at the spatial (neighborhood) level. One might conceive of people who are socially segregated despite being spatially integrated.[3] Therefore, a better understanding of the phenomenon of segregation in more general network structures seems desirable.

In this paper we will make some steps to generalize the spatial proximity model to a proximity model of segregation. That is, we will examine models with individual agents who interact 'locally' in a range of network structures with topological properties that are different from those of regular lattices, while having mild preferences regarding with whom they interact. We stick to standard

[1] This focus can be explained by the practical difficulties with other policy measures aimed at integration (see Pancs and Vriend, 2007, for details).

[2] As this occurs without any of the individuals involved explicitly designing this outcome, the sleepwalking metaphor may seem appropriate.

[3] This appeared to be the case with some of the recent terror suspects in the Netherlands and the UK.

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