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Ethnic Preferences and Residential Segregation: A Commentary on Outcomes from Agent-Based Modeling

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Mark Fossett's new research, published here in the Journal of Mathematical Sociology*, is arguably the most important advance in studies of residential segregation in the past decade. While this study of the role of preferences in creating the patterns of residential separation does not answer all the questions about how preferences create separation in the residential mosaic, it provides a major extension of Schelling's seminal work of three decades ago. The paper shows clearly that preferences do matter and that the set of simulations leave little doubt that residential preferences and their underlying social dynamics have the capacity to generate high levels of ethnic segregation. The agent-based modeling technique, on which the results are based, is a major advance on previouswork using agent-based modeling and will set the standard for further studies of the underlying processes that create residential separation in U.S. cities.*

Keywords: preferences, segregation, discrimination

THE CONTEXT AND CONTRASTING VIEWS OF SEGREGATION

More than three decades ago, Thomas Schelling published what is one of the most influential papers on the behavioral aspects of social choice and selection. That paper, *Dynamic Models of Segregation*, published in this journal in 1971, outlined a theoretical structure that sought to explain why groups clustered together, whether in the lecture hall or in residential neighborhoods. He argued that small differences in the "preference" of an individual to be with others of a similar type (ethnicity, e.g.), could lead to quite distinct patterns of separation in the population. The paper drew on the individual preferences tradition in economics to show that micro-level voluntary choices and economic

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competition can create or maintain macro-level patterns of residential segregation along ethnic and socio-economic dimensions.

Despite the centrality of the studies of preferences, much of the research on residential separation, especially that by sociologists, continues to emphasize the role of discrimination in the housing market as the primary explanation for the continuing patterns of residential separation (Yinger, 1995). The studies by Massey and Denton (1993) and Bobo and Zubrinsky (1996), which did examine preferences, argued that they were not sufficiently powerful to explain the patterns of separation. Much of the work by these sociologists dismissed or downplayed the research by economists and demographers who suggested that economics (housing affordability) and preferences were important factors in understanding the continuing separation in the residential mosaic (Pascal, 1967; Clark, 1986, 1991, 1992). The division between those who emphasize economic and preference explanations for separation and those who emphasize discriminatory actions in the housing market has created a contentious debate for the past decade and a half.

In his review of studies of preferences and their role, Fossett re-examines the debates between Galster (1988), Massey and Denton (1993) and Yinger (1995) on the one hand, and Clark (1986, 1989, 1991, 2002), Cutler, Glaeser, and Vigdor (1999) and Pascal (1967) on the other. The larger debate, however, is not just about the role of preferences but about the nature of the explanations for residential separation in general, although this debate is not extensively articulated in the present paper. The debate emerged out of what I saw as an unsupportable one-dimensional explanation for the patterns of residential separation. From my research, it was clear that discrimination alone was insufficient to account for the extent and continuing nature of residential separation. A review of survey evidence on reasons for moving, an analysis of affordability and the potential differences created by alternative preferences suggests a more multifaceted explanation for continuing separation. While discrimination undoubtedly played a role in the patterns of separation, it was far from the only factor and perhaps not even the most important factor in explaining separation. The debate stimulated a re-assessment of the reliance solely on discrimination as the explanation and a recognition that the explanation for continuing segregation is multi-dimenionsal.

Several papers sought to provide an empirical basis for preference-based explanations for separation. Those papers showed that there was an empirical basis for Schelling's theoretical model and extended the empirical analysis from black white preference relationships to multi-ethnic explanations for residential separation patterns (Clark,

1991, 1992). Research on actual mobility related expressed preferences to actual behavior and showed that behavioral selections were even more likely to generate separation than expressed preferences. However, as Fossett so presciently notes, these studies did not show "how" preferences created the patterns of separation, and no model provided an explanation of how preferences and the urban structure intersected to create patterns of residential segregation. Thus, the thrust of the current paper is to use simulation methodology to explore the theoretical question. That is, is it reasonable to entertain the hypothesis that social distance and preference dynamics could generate and sustain significant levels of segregation in the absence of discrimination? As we will see later in this discussion, the answer is yes.

The conclusions drawn from survey data on preferences have been quite variable. Fossett's review documents the variations in interpretation of the preference literature and, compatible with other discussions of preferences, he points out that indeed it is *both* white and black preferences which define the likely outcomes of preference-based behavior. Fossett argues, and other literature confirms, that *both* white and black preferences are likely to create patterns of segregation. Certainly, the recent paper by Farley and Krysan (2002) acknowledges that residential preference held by whites and blacks are not compatible with integration even though they, like many other critics of preference studies, revert to a discussion of white hostility to explain these preferences (Zubrinsky & Bobo, 1996). In addition, some of the studies tend to downplay the intersection of race and class in the possible selection of white and minority neighbors despite the increasing evidence to the contrary (Clark, 2002).

As I noted above, the discussion of whether preferences can generate separation is a subtext of the larger issue of the reasons for separation by ethnicity in the residential fabric. Fossett may be unaware of research that has investigated the effects of discrimination within the context of other socio-economic variables (he writes, there have been no attempts to model the role of discrimination in the context of other factors). However, Galster and Keeney (1988) and Clark (1993) have provided models in which discrimination has been entered into a logit regression model to estimate, after controlling for the size of the black population, age, educational status, and socio-economic status, the power of discrimination as an explanatory variable in creating the patterns of segregation. The evidence from these models suggests that discrimination may play only a small role after controlling other factors that may influence segregation. These results are consistent with evidence on surveys of how much discrimination households report experiencing in their search for housing (Armor & Clark, 1995). Still,

it is true that audit studies suggest that up to 15–25% of households may experience discrimination in their search for housing. Of course, how much of that is translated into patterns of separation is still a subject of debate and discussion.

AGENT BASED MODELING AND THE FOSSETT STUDY

As Fossett notes, simulation and agent-based modeling are methods of "exploring segregation dynamics in ways that are simply not feasible using other methodologies." The basic approach that Fossett explores is well established as a mechanism for testing alternative formulations of behavioral responses. Indeed, Fossett acknowledges that the social sciences have been slow to use these methodologies to examine social processes. Still, within the last decade there has been a growth in simulation and agent-based modeling as witnessed by Epstein and Axtell (1996).

I agree with Fossett's comment that his model, SimSeg, outlined in the current paper, is clearly an advance on previous attempts to simulate the Schelling conceptualization. Other attempts by Epstein and Axtell (1996) and Bruch and Mare (2004) are not as rich as the formulation that Fossett sets out in the current paper. Zhang (2004) does use a similar methodology to Fossett and comes up with similar conclusions but limits his analysis by focusing only on housing price. We have been waiting for some time for such an agent-based approach that seriously attacks the question of the role of preferences. Fossett's paper provides substantial evidence that his decade-long approach to the problem has taken us a major step forward in understanding the process of segregation. The paper will move both the theoretical debate and the empirical analysis forward to another level.

In the SimSeg model, the active agents are "virtual households that seek to satisfy housing goals within a virtual housing market."[1] The heart of the model is a process that creates a virtual city (Fossett is careful to note that it is a simulation experiment, not an empirical analysis) in which agents (households) make choices on the basis of preferences for 1) housing quality, 2) neighborhood status and 3) ethnic combinations. He uses multiple ethnicities, and by introducing housing quality and neighborhood status Fossett brings the model closer to a "real city" than previous attempts to provide a simulation model of the Schelling conceptualization.

[1]Fossett provides a brief history of the project and the documentation of validation tests by programmers funded through NIH.

Fossett runs the simulations multiple times and varies the inputs and the parameters of the model. The paper is rich in its presentation of the model. In addition to his verbal discussion of the models and their results, the subset of simulated maps provide a striking visualization of his findings. In this commentary the central issues, of course, are what does he find and what are the unanswered questions? These two topics form the heart of the remainder of this commentary.

OUTCOMES, CONTRIBUTIONS AND UNANSWERED QUESTIONS

The results of the simulation can be summarized into three major findings. First, Fossett shows that ethnic preferences have the theoretical capability, within the constraints of his model, to produce substantial levels of ethnic segregation *without* discrimination. Second, ethnic preferences and social distance dynamics not only generate high levels of majority minority segregation but also high levels of minority-minority segregation, Third, hyper-segregation can arise in the context of the simulation model and is an outcome of the interaction of housing quality, neighborhood quality and ethnic preferences. He summarizes the totality of his findings with the notion that ethnic segregation may be sustained by *multiple sufficient causes*, including preferences and discrimination. I would add that, as the model specifically takes housing quality into account, the sufficient causes are economics (affordability), preferences and discrimination. That the outcome validates arguments I have made elsewhere re-emphasizes that we may be converging on a more balance view of how separation is created in the residential environment (Clark, 2002). The model, of course, also allows us to go beyond the findings on preferences and provides us with a tool to examine other formulations of status, affordability and preferences and to further test these first outcomes.[2] It is a solid step toward truly understanding how preference-based choices affect separation in the city.

Has Fossett resolved the debate that he poses in the review section of the article, i.e., the debate between those who emphasize the role of social distance and preferences and those who emphasize the primary role of discrimination? Fossett says no. However, my reading of the paper suggests that he is too cautious. To the extent that we accept his model formulation, and to the extent that we accept his findings

[2]The code for a simple formulation (useful for classroom teaching) and a more complicated formulation of SimSeg is available on the Web at www.simseg.com

that segregation can arise from preference dynamics, then at the least we must move away from the argument that discrimination is the primary force in creating the urban mosaic. To my mind he has not only conceptually re-established the primacy of preference dynamics but has also demonstrated its relevance in a context that is as close to a real world context than we are likely to come in the near future. It is his finding of high levels of status segregation that re-emphasizes for me the interplay of economics and preferences in the creation of ethnic patterns in the city.

Fossett's conclusion that segregation created by discrimination could be potentially maintained by preference dynamics is questionable in the increasing evidence of declining levels of segregation and increasing tolerance (Glaeser & Vigdor, 2001). The increasing evidence of substantial black and other minorities in the suburbs is additional evidence that the residential mosaic is changing, and changing quickly.

While to my mind the paper has made a major move forward in the thorny debates about segregation and the role of preferences, there are some questions that are not completely addressed. Some of these questions might be examined within the framework of the model, while others are closer to how we conceptualize the notions of preference and social distance. Any preference model, beginning with Schelling's, requires a preference function. Schelling used a step function, and at least one working paper has raised questions about the nature of the function. Bruch and Mare (2004) argue that with a continuous preference function rather than a stepped function, agent-based simulation models do not produce high levels of segregation. However, the Bruch and Mare arguments for a continuous preference function are based on only a few points drawn from survey data and are a tenuous basis for a continuous function. In addition, their agent-based model does not include housing or neighborhood preferences so we cannot make a direct comparison with the current paper. Moreover, Fossett is careful to move away from a simple stepped preference function and provides a heterogeneous preference function that embeds variation around set points rather than the simplistic 50% rule invoked by Schelling. Clearly, the form of the preference function is a topic which can be explored within the structure of the Fossett SimSeg model.

There is still some debate in the literature about the way in which preferences are formed. Some researchers equate preferences with prejudice. However, that seems over-reaching, and literature on the formation of preferences does not seem to support that conclusion. Perhaps we can distinguish them by following common usage, where preferences can be viewed as a neutral term and

prejudice interpreted pejoratively. In ordinary usage, preference is taken to simply mean "likes better," while prejudice is equated with a preconceived notion or even as a synonym for bigotry. However, there is a debate about the way in which preferences and prejudice operate in creating residential separation in the urban fabric. In those debates, preference, which is sometimes linked with ethnocentrism, is often set against prejudice as an explanatory variable in creating the patterns of racial separation. In-group preference, or ethnocentrism, can be linked to the notions of group difference in socio-economic status. (See Allport (1954) and Clark (2002) for a discussion of ethnocentrism.) That minority households in general are likely to have lower incomes, to be female-headed and to have less education may mean that they are less preferred as neighbors than households of similar "class backgrounds" (Leven (1976) discusses the role of class and choice) and of similar ethnicity. Clearly, from the findings in the model, class matters in the residential choice process. Where once large numbers of whites expressed strong unwillingness to live in neighborhoods with African Americans, that proportion has declined substantially over the last three-decades. The increasing expression of "racial tolerance" yet continuing separation in the residential mosaic suggests that the reactions to different ethnic groups may indeed be a response to class differences rather than expression of prejudice to persons of other races and ethnicities. The paper would have been enriched with a discussion of these issues and the contributions of Allport (1954) to the nature of the tolerant personality.

Fossett's paper is a tour de force and moves our studies of segregation, preferences and the formulation of the urban fabric much closer to understanding how and why our cities create neighborhoods with differing racial, ethnic and status characteristics. That the findings fit within a conceptualization of the research paradigm that suggests complexity in the processes of residential segregation resonates with my own views and research on the problem. Beyond that parallelism, the findings will generally advance social science research on the problem of residential patterns in U.S. metropolitan areas. In the broadest context, the research will force us to examine the way in which we tackle these thorny social issues and force us out of our narrow disciplinary boxes. The findings also bolster my arguments that while we need to maintain fair housing laws and practices, they alone will not change the patterns of separation of poor minorities from more wealthy majorities. Only greater economic opportunities and increased housing affordability will likely have an impact on separation in large U.S. metropolitan areas.

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