

A response to Gorard on social segregation

Harvey Goldstein^{*a} and Philip Noden^b

^a*University of London, UK,* ^b*London School of Economics and Political Science, UK*

We welcome Stephen Gorard's contribution, which gives us an opportunity to clarify some of the key issues in this important debate. Gorard makes the following points.

The first is that we come to the same conclusions as previous research. This is not in fact true; we provide a much more detailed breakdown of changes in segregation than before (e.g. at LEA level and by LEA characteristics), and the results of adopting a modelling approach rather than a classical indicator approach do lead to different kinds of insights into the processes of segregation (see below).

Gorard's second point is that we were not measuring segregation. He rightly points out that segregation is a characteristic of variation among institutions.

Unfortunately he fails to understand the key features of the multilevel model that we use. The model uses the characteristics of the students within each school, where the basic response is whether or not they are receiving free school meals (the measure of deprivation used by us and Gorard). The important parameter of the model is the between-school variance of the school proportion of pupils receiving free school meals. The variance is a characteristic of a group of schools and is thus a statistic defined at the school level, as required. In addition we introduce a variance defined at the LEA level that allows us to measure segregation at that level also within the same model. Furthermore, we introduce further predictors in our model, such as the presence of selective schools within an LEA, that allows us to investigate whether the between-school variation is related to such factors. This flexibility is what makes our modelling approach so useful. In addition we can test the various assumptions of the model, as we point out in our paper, to check whether our representations of the data are adequate. Gorard's discussion of our model misses these points and he appears not to have grasped the nature of the multilevel modelling approach.

Gorard's third point exemplifies a common misunderstanding of the nature of statistical modelling as applied to social data. He argues that since we have the 'total population' of the schools being studied for the period of concern, probability statements, including significance tests, are irrelevant. On the contrary, social

*Corresponding author. Bedford Group for Lifecourse and Statistical Studies, Institute of Education, 20 Bedford Way, London WC1H 0AL, UK. Email: H.Goldstein@ioe.ac.uk

scientists are really interested in the underlying processes that produce the observed outcomes. Thus, for example, suppose we allocated pupils to schools in a purely random fashion and calculated the proportions eligible for free school meals in each school. We would certainly observe differences, but these would have arisen purely as a result of random sampling even though we would have counted the whole 'population'. Thus, in making comparisons between schools we must take account of such sampling variation and this is precisely what statistical models of social processes do. Plewis and Fielding (2003) also make this point.

Gorard takes us to task for omitting crucial information and, in particular, he asks 'which predictors were actually used?'. There is nothing mysterious or hidden here, nor is there anything unusual in mentioning a list of further factors that might be used in more detailed modelling. It is perfectly clear from our tables which predictors were used in our models. The models included only predictor variables identified at LEA level (namely the presence of selective schools and the proportion of schools with control over their own admissions). Consequently, Gorard's difficulties of interpretation (what he describes as our 'good maths but poor science') do not arise.

While we do welcome this debate, we are somewhat disturbed at the lack of understanding of multilevel modelling procedures that seems to have occasioned Gorard's reaction to our work. Multilevel modelling is a fairly new technique that is being applied ever more widely within the social and other sciences. While we would certainly agree that simply using such a model does not automatically guarantee answers to all the outstanding issues, we do suggest strongly that in the field of measuring segregation it is an approach that has considerable potential for answering questions at a much greater level of detail and complexity.

Finally, it is worth reiterating that the models that we have used can be applied to tackle a wide range of issues in the measurement of inequality more generally. We gave the example of the variability of examination and test scores in our paper, but measures of household income and poverty could all be modeled in a similar fashion. The great advantage of this approach, given the availability of data, is that it can simultaneously take into account a range of predictor variables and sources of variation at a number of levels of aggregation. Far from being 'retrograde' as Gorard claims, it offers researchers a great opportunity to explore new and exciting areas of research.

Notes on contributors

Harvey Goldstein is Professor of Statistical Methods at the Institute of Education, University of London.

Philip Noden is a Research Officer at the Centre for Educational Research at the London School of Economics and Political Science.

Reference

- Plewis, I. & Fielding, A. (2003) What is multi-level modelling for? A critical response to Gorard (2003), *British Journal of Educational Studies* 51(4), 408–419.