

**InterGen:
A Brief Review of
Key Model-Based Findings**

by

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Introduction

Racial inequality is a fundamental fact of social life in America. Socioeconomic differences between minority and majority populations are large and enduring; they have dramatic consequences for the life chances of individuals and groups.¹

Sociologists and other social scientists who study social stratification and inequality use quantitative models to describe and analyze the process of socioeconomic attainment and how it leads to group inequalities. They use these models to answer questions such as “What is the nature of the process by which individuals attain education, occupation, and income?” and “How do patterns of status attainment vary by group and what consequences does this have for inter-group inequality?”²

Unfortunately, some of the important insights that quantitative models of social stratification “reveal” to specialists are not generally evident to students and laypersons. Non-specialists have an intuitive, “common sense” grasp of the fact that education and advantaged social background confer benefits in status attainment and that racial discrimination imposes penalties. But they rarely have the technical background needed to use quantitative models to decipher how inter-group inequality is generated by effects that impact individuals during their lifetimes and also extend across generations.

The goal of the InterGen program is to provide a bridge between social science models of status attainment and racial inequality and the layperson’s more intuitive understanding of these processes and outcomes. This document provides a review of the key findings from the research literature that can be explored using the InterGen program. It assumes that the reader is familiar with the InterGen program. If this is not the case, the *InterGen User’s Guide*, available at the InterGen page of the VLAB-RESI website, provides a discussion of the program, its features, and how to use it.

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<http://vlab-resi.tamu.edu/vlab.htm>

¹ See Oliver and Shapiro (1995) for an overview of racial inequality in America. Alternatively, for a briefer introduction, see Chapter 8 (“Ethnic Inequality”) in Jaret (1995).

² Important early statements in this literature include Duncan (1967; 1968), Duncan and Duncan (1968), Featherman and Hauser (1976; 1978), and Jencks (1978). A recent review of the state of this literature can be found in Hamilton (2000).

Description and Purpose of the Program

The InterGen program is an educational tool geared to helping students explore the social processes that generate racial inequality and perpetuate it over time. In particular, it is geared to showing how discrimination in status attainment generates inter-group inequality that is then transmitted and perpetuated across generations. InterGen is also geared to illustrating two non-intuitive aspects of the inter-generational transmission of inequality. One is that inequality resulting from discrimination is greater than might be expected based on its “direct” impact due to the fact that inter-group inequality “compounds” over generations. The other is that, even under optimistic scenarios, inter-group inequalities generated by past discrimination are likely to persist for several generations *after* discrimination is reduced or even eliminated.

The InterGen program allows students to design and manipulate a “virtual” stratification system. This then allows them to perform model-based investigations:

1. the processes that create ethnic inequality;
2. the dynamics that transmit inequality across generations; and
3. the “compounding” of inequality over generations of sustained discrimination; and
4. the persistence of inequality even *after* discrimination is reduced by policy interventions and/or social change.

InterGen is inspired by sociological theory and research on status attainment processes and the impact that racial discrimination and the “inheritance” of disadvantage has for long-term trends in racial inequality.³ The goal of the program is to help make the key substantive findings of this technical research literature accessible to non-specialists. It does so by permitting them to explore and manipulate models of intergenerational stratification processes via an intuitive, easy-to-use model interface. More specifically, the InterGen program:

1. Presents a simplified model of status attainment that embodies key features of social stratification processes without being unnecessarily detailed and complicated;
2. Depicts status attainment processes via graphical representations that highlight basic causal connections in an intuitive and easy to understand way;

³ Among the more immediate inspirations are articles by Duncan (1967), Lieberman and Fuguitt (1967), and Daymont (1980).

3. Uses graphical methods to present the quantitative implications of stratification processes for group attainment levels and inter-group inequality on key stratification outcomes (e.g., education and socioeconomic status);
4. Permits users to manipulate the basic parameters of the overall stratification system via easy to use “point-and-click” selection boxes; and
5. Provides immediate graphical feedback on the impact that changes in parameters of the stratification system have on group attainment levels and inter-group inequality.

Another significant feature of the InterGen program is that draws on the new technologies of the World Wide Web and web-based software.⁴ Thus, this instructional tool is available to educators, students, and other interested parties who have access to the World Wide Web.

In sum, the program is offered with the hope that it can help provide undergraduate students and interested lay persons a useful introduction to racial stratification and inequality using intuitive, graphical representations of models and outcomes that are faithful to the research literature but convey the logic of analysis and key findings in a manner that is accessible to students with little or no background in quantitative models of stratification and inequality.

Overview of the InterGen Model

The InterGen program presents a simple model of the attainment process that generates status outcomes and transmits advantage and disadvantage across generations. A graphical representation of this model is shown in Figure 1.

The model is obviously highly simplified. This suits InterGen’s intended function to serve as an educational tool illustrating key principles that govern the generation of inter-group inequality and its persistence over time. InterGen does *not* try to model status attainment and inter-group inequality in its full complexity. It is neither necessary nor desirable to do this to illustrate the theoretical and substantive principles involved. Indeed, presenting a complex model would likely make it more difficult for users to explore the relevant theoretical issues. Thus, the model is kept simple *by design* in order to make it easier for students to use the program and understand its substantive implications.

This graphical representation of the model depicts several key

⁴ Specifically, InterGen is a Java applet which is loaded from a web page and runs under Java-capable web browsers.

elements of an inter-generational stratification system. The first is *attainment outcomes* – namely, education and socioeconomic status. These are designated separately by generation with “parent’s” attainments distinguished from “respondent’s” attainments.

The second important element is a *structured attainment process* – a system of causal linkages connecting attainment outcomes to “resources” that influence these outcomes. In the visual language of the causal flowgraph in Figure 1, causal influence flows from left to right when lines connect variables.⁵ Thus, for example, respondent’s education is determined by parent’s education and parent’s socioeconomic status; and respondent’s socioeconomic status is determined by respondent’s education and parent’s socioeconomic status. These graphical connections between variables translate into a system of linear regression equations whose coefficients represent the quantitative expression of the causal linkages depicted in the figure.

The third element seen in the figure is the inter-generational linking of attainment outcomes. The three panels in the figure (moving from left to right) indicate that respondent’s status attainments are linked to the attainments of the previous (parent’s) generation and also indicate that the respondent’s attainments will become resources shaping the next generation’s status attainments.

Several important aspects of the InterGen model are not depicted in Figure 1. The strength of the connections between the variables is not indicated in Figure 1, but the user is able to manipulate them and make them weak or strong. Substantively, this is important because it affects the degree to which the past influences the present. Discrimination also is not depicted in Figure 1, but the user can control the degree to which racial discrimination prevents minorities from “converting” resources into attainments at the same rate as whites. Finally, the InterGen model has a highly simplified ethnic system consisting of “whites” and “blacks” with the ethnic mix in the population is fixed at 80% white and 20% black. This particular ethnic mix is a relatively arbitrary choice and has no bearing on the model’s implications for the level of white-black inequality or its trends over time.⁶

The major features of the model have now been introduced. The next sections discuss the substantive implications of the results obtained using the program’s default settings.

⁵ This figure is displayed by clicking on the program’s “Model” button.

⁶ In the Windows version of the program, the user can change the ethnic mix in the population. This has implications for *absolute* status levels for minority and majority groups, but not relative comparisons.

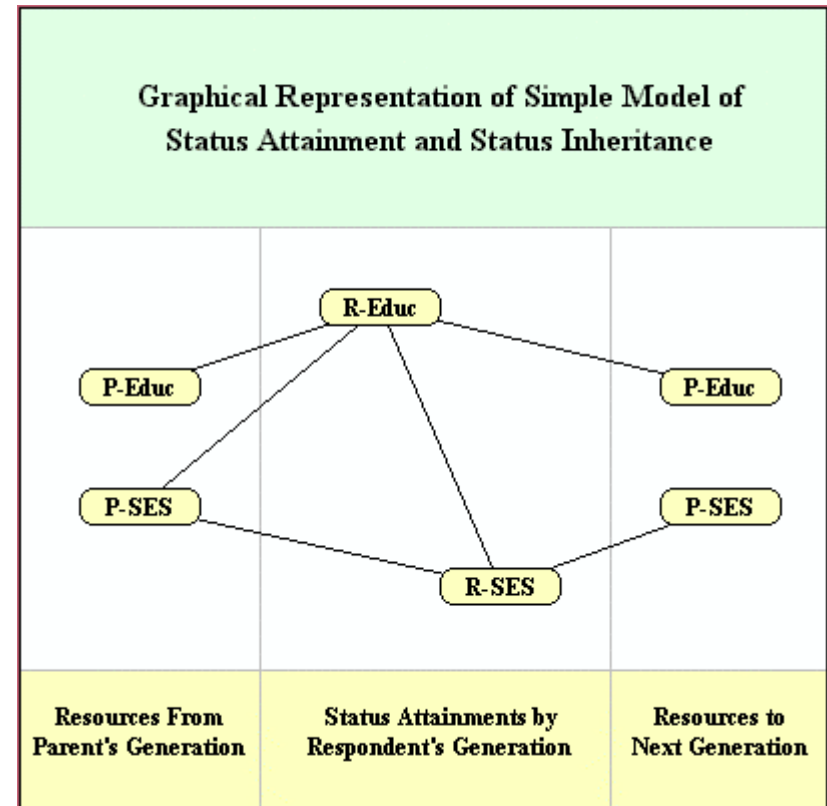


Figure 1

Substantive Overview of Default Settings

Research on social stratification shows that individual educational attainments are shaped by “socio-economic origins”.⁷ This is reflected in the InterGen model by the fact that parental “resources” of education (P-ED) and socioeconomic status (P-SES) may exert effects on respondent’s educational attainment (R-Educ). The strength of these effects is determined by the setting of the program’s “R2-Educ” selec-

⁷ Blau and Duncan (1967) provided an important statement of this view. It has been articulated and refined by others including Jencks (1987) and Featherman and Hauser (1976; 1978).

tion box. The default setting of 50% implements moderately strong effects. This choice reflects an assumption that quality of schooling, access to higher education, and the like are closely tied to socio-economic origins. Standard interpretations of these effects point to a variety of specific underlying causal mechanisms. Greater socio-economic resources are associated with greater access to better primary and secondary schooling (e.g., affluent suburban schools, private schools, tutors, etc.); more responsive treatment by teachers and school administrators; positive role model effects; positive neighborhood and school effects; greater wherewithal to cope with the costs of higher education, and so on.

Research also shows that individual socio-economic attainments are shaped by education and “socio-economic origins”. This is reflected in the InterGen model by the fact that respondent’s education (R-Educ) and the parental “resource” of socioeconomic status (P-SES) may exert effects on respondent’s socio-economic attainment (R-SES). The strength of these effects is determined by the setting of the program’s “R2-SES” selection box. The default setting of 50% implements moderately strong effects. This choice reflects an assumption that socio-economic status is closely tied to socio-economic origins. Standard interpretations of these effects point to several underlying causal mechanisms. Education provides specific and general “human capital”. Parental socio-economic status provides “social” and “cultural” capital. Both facilitate socio-economic attainment.

Finally, research shows that discrimination limits education and socio-economic status attainments by minorities. The default setting for discrimination is 35% for both education and socio-economic status in Period 1. These large negative effects reflect the impact of institutionalized, state-supported in the eras of slavery and “Jim Crow”. Arguably, the effects should be even larger if the settings are conceived as applying to the South rather than the nation as a whole.

The default settings for discrimination in Period 2 are only 5%. This reflects optimistic assumptions regarding social change where virulent forms of state-supported discrimination have been dismantled and where anti-discrimination law, affirmative action policies, and changing racial attitudes serve to reduce informal discrimination based on racial prejudice and statistical discrimination based on stereotyping.⁸ Quantitative assessments of the impact of discrimination in the Post-Civil Rights Era are controversial. But most researchers would view this scenario as highly optimistic.

⁸ For a recent overview of racial discrimination in socio-economic attainment see Hamilton (2000).

Brief Comment on Technical Aspects of the Model

InterGen measures education and socio-economic status as percentile scores that range from 0 to 100. Since percentile scores reflect ranking when compared with others, the overall population distributions are stable over time and this focuses attention on relative inequality rather than absolute inequality.

This simplifies interpretation by eliminating the factor of “structural mobility” (i.e., general societal change leading to systematically higher educational and occupational attainments). It also reflects the fact that subjective concerns about status and inequality are shaped by relative attainments more than absolute attainments.⁹

Modeling percentile scores using inter-generationally-linked status equations presents some interesting technical problems.¹⁰ The InterGen program solves these problems by incorporating special algorithms that insure that the status attainment processes generate “global” status distributions for each generation that have means and dispersions characteristic of percentile score distributions (i.e., means of 50 and standard deviations of 28.6).

Discrimination and Equilibrium Inequality

The results generated by the InterGen model under the program’s default settings reveal many interesting findings. One obvious finding is that discrimination produces group differences in status outcomes. This is hardly surprising and requires little comment. It is readily evident in Figure 2 – a “screen shot” of the graph generated by clicking on the “Status Levels” button of the InterGen program. The figure shows that a stable pattern of white advantage in status outcome emerges under the regime of strong discrimination implemented in Period 1.

⁹ Thus, the subjective experience of deprivation and poverty is tied closely to the fact that the poor have a material standards of living and life chances that are inferior to their more well-to-do contemporaries. It is not moderated by the fact that the standards of living and life chances of the poor today may well surpass those of the well to do of generations in the distant past.

¹⁰ The interested reader can find a discussion of these issues in the document focusing on “technical” issues posted at the InterGen page of the VLAB-RESI website.

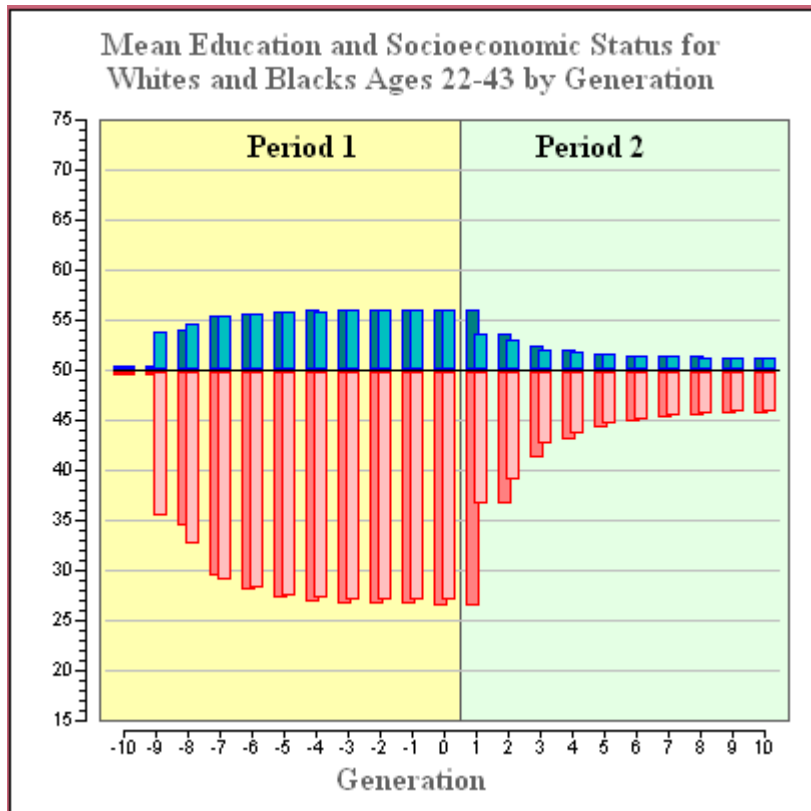


Figure 2

The graph depicts the pattern of average status levels for whites and blacks on education and socio-economic status over time. A generational time line is on the horizontal or “x” axis of the figure and the vertical or “y” axis gives a scale for status levels. Color-shaded bars depict white and black status levels as deviations from 50, the value that would obtain for each group under a system where race did not factor into stratification dynamics.

Another finding may be less obvious. It is that a stratification system (i.e., a specific configuration of model parameter settings) will, if left unchanged, eventually produce an “equilibrium” pattern of racial inequality and group status outcomes. Thus, for any set of attainment rules and pattern of discrimination, a stable pattern of racial inequality and group status outcomes always emerges. Once it

is reached, it will persist indefinitely until the stratification system changes. This is also evident in Figure 2.

Focusing on Period 1, white and black status levels are initially identical (the model always starts from an initial position of group equality) but they begin to diverge sharply as the Period 1 stratification system operates on successive generations. Changes in status levels are dramatic during the first several generations of Period 1 reflecting the immediate and cumulative consequences of the stratification dynamics in place. After several generations the status levels stabilize; that is, they approach equilibrium or steady state values. This will always occur and thus warrants the following conclusion:

Any stratification system, if left unchanged to operate for a sufficient period of time, will produce a long-term equilibrium pattern of inequality.

This finding is demonstrated again in Period 2 where a new stratification system takes effect. (The shading of the background for the figure reflects the transition from Period 1 to Period 2.) The transition is followed by several generations of changing status levels but eventually a new equilibrium pattern of inequality is reached and maintained.

Inequality “Compounds” Over Generations

Figure 2 also provides evidence of two additional important findings. They can be stated as follows:

The impact of discrimination on inequality is immediate in the first generation subjected to its effects.

When status inheritance dynamics are at work, the impact of discrimination on inequality “compounds” over generations.

The first finding is obvious and requires no comment. The second is revealed in the fact that status differences between whites and blacks grow and are amplified as the stratification system in place in Period 1 operates on successive generations. The reason for this can be explained in the following way. Discrimination adversely affects minority attainments in two ways. First, it directly limits the current generation’s ability to translate resources into attainments. Second, discrimination’s impact in the past limits the social background resources that are available to the current generation. Thus, inequality widens over generations as successive minority generations inherits an ever-deteriorating “starting” position.

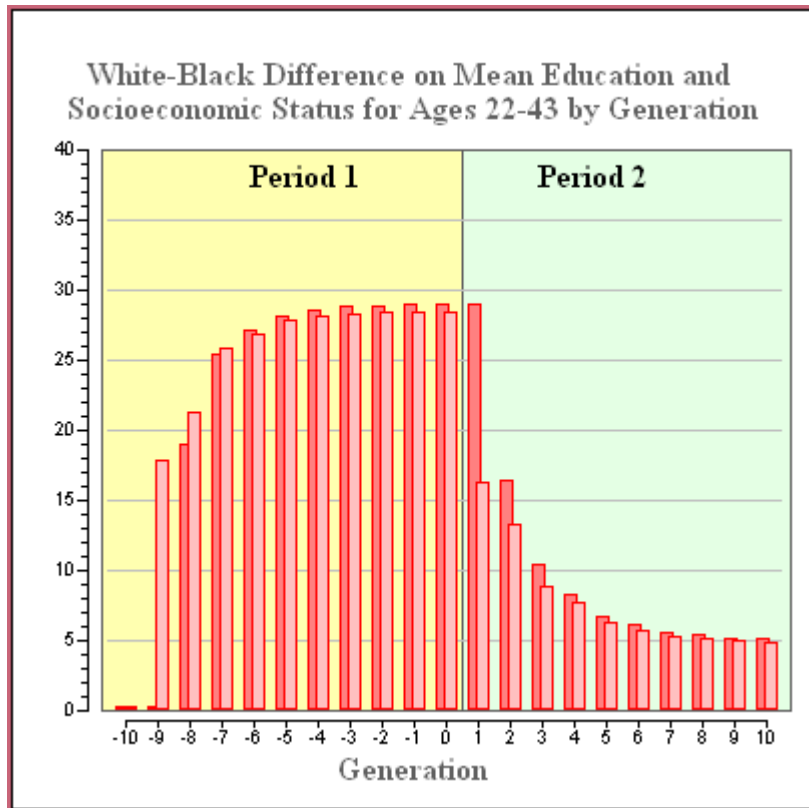


Figure 3

Figure 3 presents the graph generated by clicking on the InterGen program’s “Inequality” button. This depicts inequality between the average status levels for whites and blacks on education and socioeconomic status over time. Color shaded bars depict white and black inequality as deviations from 0 (zero), the value that would obtain if race did not factor into stratification dynamics.

The compounding of inequality over generations seen here is very dramatic. The first minority generations affected by discrimination experience significant inequality as a result of its “direct” impact. But later generations experience even higher levels of inequality – about 10 points higher in fact – due to the building, cumulative impact of past discrimination.

Inequality Persists After Discrimination Declines

Figures 2 & 3 also reveal another important finding reflected in the results for Period 2. It can be stated as follows:

When status inheritance dynamics are at work, the impact of discrimination on inequality will persist for many generations.

This is seen in the fact that, even though discrimination is sharply reduced when a new system of stratification is implemented and begins to operate at the beginning of Period 2, white-black status differences do not immediately drop to levels that might be expected based on the dramatic reduction in direct discrimination.

To be sure, inequality does drop noticeably as new generations benefit from the lower levels of direct discrimination. However, the new long-term equilibrium levels of inequality of “only” about 5 points are not approached for several generations. The reason for this is that the impact of past discrimination continues to confer disadvantage on future generations via low levels of parental resources provided to new minority generations. Thus, while the direct impact of discrimination in attainment processes falls dramatically at the beginning of Period 2, there is no parallel reduction in minority disadvantage in social background resources. This changes much more slowly and its consequences continue to “linger” and perpetuate inequality for many generations.

Once the underlying basis for this pattern is clear, an additional observation can be offered.

The speed with which inequality declines following reductions in discrimination is inversely related to the strength of status inheritance dynamics. In other words, the greater the strength of status inheritance dynamics, the longer inequality resulting from past discrimination will persist after discrimination ends.

This particular finding is not directly reflected in Figures 2 & 3, but simple experimentation with the settings of the InterGen model will demonstrate the effect. Specifically, set the “R2-Educ” and “R2-SES” parameters to lower values in Period 2, and inequality will “dissipate” more rapidly. Set the same parameters to higher values, and inequality will persist even longer at high levels. Research on status inheritance dynamics suggests that they are fairly strong.¹¹ This suggests that, even under optimistic assumptions about reduced discrimination, racial inequality is likely to persist for generations.

¹¹ See, for example, Solon (1992).

Implications for Topical Debates and Policy

The substantive implications of the InterGen model are quite powerful. If new generations are taken to be spaced 20-25 years apart, a considerable amount of time must pass before the consequences of past discrimination are substantially eliminated from the stratification system. This finding and other findings taken from the results of the InterGen model provide some valuable insights into the nature of ethnic stratification. The results are interesting in their own right. But more importantly they are relevant to a number of topical debates and policy issues. Several examples can be noted as follow.

What implication do these results have for the belief, widely held by current generations of whites, that they do not personally benefit from either present or past discrimination? (Review Figure 2 and discuss its implications. Manipulate discrimination settings in Period 1 and consider what happens to whites' status levels in Periods 1 & 2.)

Based on these results, how long would it take to achieve racial equality if a "magical" policy intervention could eliminate all or nearly all racial discrimination in the processes of educational attainment and status attainment? (Review Figures 2 & 3 and consider its implications. Lower the discrimination settings in Period 2 to zero and

Based on these results, what impact would recent proposals to reduce "inheritance taxes" have on trends toward racial equality? (Investigate this by increasing the value of the "R2-Educ" and "R2-SES" parameters of the InterGen model.)

How might these results help explain why whites and minorities hold sharply different views about affirmative action and "reparations"?

The reader is invited to consider these questions and others that may come to mind. Recognize that discussions about these kinds of issues are likely to be complicated because models do not "speak for themselves" when it comes to their possible implications for policy. Much more is involved. Deriving implications for policy involves at least two separate steps. One is understanding the model's results at an "objective", technical level. The other is interpreting these results in light of various social, legal, and moral concerns, which may or may not lead to particular policy views or recommendations. Social science can document causal connections, mechanisms, and consequences. It

does not provide an "objective" basis for assessing these processes and outcomes. Different individuals and groups bring different standards and sensibilities to that discussion and these differences may be more important to the ultimate interpretation than the model results.

Concluding Comments

The InterGen program provides a useful tool that students of racial stratification and inequality can use to gain an intuitive appreciation for many of the concepts used in stratification analysis and the major descriptive findings regarding racial inequality and its persistence across generations. It can also be a valuable catalyst for examining topical debates and policy options in light of basic stratification dynamics and their consequences.

It is important to remember, however, that the InterGen model is greatly simplified relative to "real world" stratification dynamics. Therefore, its results should not be interpreted naively. Thus, I encourage the reader to pursue their interest in racial inequality much further. A fuller understanding of the intergenerational transmission of racial inequality can be obtained by overview readings by Jencks (1979) and quantitative research findings regarding patterns and trends in race differences in status attainment (e.g., Hauser and Featherman 1978; Daymont 1980).

Given the importance of racial inequality in American life, an educated person should get as broad a perspective on this sociological phenomenon as possible.¹²

¹² For the reader who is new to the subject, Jaret (1995) provides a good introduction to many of the topics noted in this discussion.

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Contact Information and Suggested References

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When InterGen is used in instruction, the preparation of student research papers, or other related activities, the program should be identified and referenced appropriately. The suggested citation for the program is:

Fossett, Mark A. 2001. InterGen: A Computer Model for Exploring the Origins and Persistence of Inter-Group Status Inequality. Department of Sociology and Race and Ethnic Studies Institute, Texas A&M University, College Station, Texas.

Similarly, when the VLAB-RESI web site is used in instruction, the preparation of student research papers, or other related activities, the site should be identified and appropriately referenced. The suggested citation is:

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