

DEMOGRAPHIC DESTINIES

Interviews with Presidents of the Population Association of America

Interview with Alberto Palloni PAA President in 2006



This series of interviews with Past PAA Presidents was initiated by Anders Lunde
(PAA Historian, 1973 to 1982)

And continued by Jean van der Tak (PAA Historian, 1982 to 1994)

And then by John R. Weeks (PAA Historian, 1994 to present)

With the collaboration of the following members of the PAA History Committee:
David Heer (2004 to 2007), Paul Demeny (2004 to 2012), Dennis Hodgson (2004 to
present), Deborah McFarlane (2004 to 2018), Karen Hardee (2010 to present), Emily
Merchant (2016 to present), and Win Brown (2018 to present)

ALBERTO PALLONI

PAA President in 2006 (No. 69). Interviewed by Dennis Hodgson, Karen Hardee, and Emily Merchant at the PAA meetings at the Marriott Wardman Park Hotel, Washington, DC, March 31, 2016.

CAREER HIGHLIGHTS: Alberto Palloni was born in 1949 in Chile, where he grew up. He received his Bachelor's degree in Sociology from Catholic University of Chile in 1971, and his Ph.D. in Sociology from the University of Washington in 1977. Prior to moving to the University of Wisconsin in 1980, he was at the University of Texas, Austin from 1977-1979, the United Nations Population Division in New York City in 1979, and the University of Michigan from 1979-1980. Dr. Palloni is currently the Samuel H. Preston Professor of Sociology, Emeritus, at the University of Wisconsin, Madison.

In the following paragraphs, he provides an overview of some of his major accomplishments:

I have been a NIH Merit Scholar on R37 AG025216, co-PI of the Mexican Health and Aging Study (MHAS) R01 AG025216, R01 AG018016 and past Director of Fogarty International Center award for Global Research Training in Population Health D43 TW001586 and PI of the Study PREHCO with R01 AG016209. The main themes I currently study are the trajectory of health, mortality and longevity in low to middle income countries, demographic characteristics of the aging process (including intergenerational transfers, disability and health), and the theory and formal models of relations between early childhood conditions and adult health and socioeconomic conditions. In the last few years I have proposed theory and models to understand adult health and mortality disparities as a function of early conditions, developed a formal model to assess the consequences for adult mortality of the so-called Barker frailty and Barker effects, and estimated empirically the implications of such relations for the future trajectory of health and survival in low to middle income countries. With NIA support, I am developing micro and macrosimulation models to assess the impact of delayed effects of early conditions on adult morbidity, disability and mortality. The novel feature in these models is the integration of modules designed to assess the impact of mediating pathways involving the epigenome and its association with maternal and child nutrition.

I have also contributed extensively to the study of mortality trends, health and mortality disparities and to the literature on the Hispanic paradox. I continue this work illustrating disparities in SES mortality and health gradients across Hispanics and non-Hispanics in the US and Mexican born individuals.

In collaboration with colleagues Guido Pinto and Hiram Beltrán-Sánchez, I recently (August 2015) released a massive data base containing nearly 450 life tables for 20 countries in Latin America and the Caribbean covering the period 1850-2010. The database, LAMBdA, is publicly available and plans are being designed to attempt harmonization with already existing mortality databases. The database is the foundation of new empirical analysis that attempt to illustrate the effects the consequence of Barker frailty.

I have been the PI on several NIH funded projects that led to the collection of data on older people in seven countries in Latin America (SABE) and in Puerto Rico (PREHCO), and two NIA funded projects to test the conjecture that a significant part of adult US and European health and mortality disparities are rooted in conditions experienced early in life. I continue to participate in the data collection project MHAS in Mexico now in its fifth wave. An important part of the work in MHAS, PREHCO and SABE involves models for the study of obesity and smoking and the impact that of these on current and future patterns of adult mortality.

HODGSON: We're at the 2016 PAA meetings in Washington, D.C. and we're about to begin an interview with Alberto Palloni, who's the 2006 president of the Population Association of America. You can introduce yourself and tell us your current position.

PALLONI: I'm retired. I'm emeritus at the University of Wisconsin, Madison. I am planning to start a new career and I'm continuing to do demographic work on a limited basis and eventually probably will cease altogether.

HODGSON: That sounds good. And I'm Dennis Hodgson. I will be participating in this interview with Karen Hardee and Emily Merchant. This is a tradition in the PAA, to interview every past PPA president. It goes all the way back to the 1940s. So again, what we would like to do is start out with like an intellectual biography about how you got into demography. I would love to have you begin the story in terms of where you grew up and maybe your undergraduate years, and we'll move on from there.

PALLONI: Okay. I grew up in a small city in Chile, called Viña del Mar. I was part of a very close-knit group of Italian migrants who arrived recently after World War II. At home we spoke a dialect, Piedmontese, which is a dialect from the north, rarely Italian, because my parents and my relatives were not very well-educated and spoke different dialects. In Italy at that time, Italian, I believe, belonged to the more educated people. I went to a French school, Sacré Coeur, which is a congregation of priests that originated in France. There I had to speak French and in general I had to speak Spanish because I was in Chile. So I quickly picked up three languages, actually four, if you count the dialect which I was never able to speak, but I understood it perfectly. It is one of those strange things. Why can I not speak this dialect, so close to French.

So anyway, I graduated in 1966 from high school. I was 16 years old, just way too young to know what to do with myself. And I ended up going to sociology for reasons that I still don't understand at all. I think it was a friend of mine who, weeks before I had to make a decision, told me, look, sociology is great; it's the new science! I said, what is sociology? So he told me a little bit. And I said, that sounds great. I wanted to get out of Viña del Mar and I wanted to go to Santiago, the capital. I wanted to be away from my family. I think that that was what forced me to go, but I could have been, I don't know, an astronomer, I could have been a chemical engineer, I could have even been a philosopher, because I was accepted in all those schools.

So I went to the Catholic University in Santiago, to the department of sociology, where I had my first encounter with demography, which was an unfortunate encounter. It was taught by a former graduate from the University of Louvain in Belgium. He had been at INED [in Paris] and had been a student I think of one of the very famous demographers like Louis Henry or Jean Bourgeois-Pichat or Roland Pressat. But he was an awful teacher and I had no interest in demography at all. I hated it with passion and I flunked the course. [laughter] It's the only course I ever failed in my life and I still look back and I say, my God, how can I be here?

So to make the story short, I flunked another exam. It was a formal exam which was the English test they gave me before I came to the U.S. The American Embassy used to interview applicants and you had to be able to speak English and the guy who interviewed me in the embassy quickly realized after 30 seconds that I had no idea—I knew how to read English, I could understand some, but I was totally nil when it came to communicating. So he told me, you have to go to learn English.

And of all places I ended up at the University of Texas at Austin to learn English. This was in June of 1973. The coup, the military coup, occurred on September 11. If I had not flunked the exam in English I wouldn't be here. I'm almost sure of it. So that was a second kind of random thing that happened.

Then the reason why I wanted to come to the U.S. was to study mathematical sociology, formal sociology. I had followed Hubert (Tad) Blalock's career, you may remember.

HODGSON: Blalock was at Washington at that time.

PALLONI: No, here comes the thing. He was in North Carolina. The year that I was supposed to come here, Tad was in UNC and had just resigned and moved to Washington. I had been accepted to North Carolina, not to Washington.

HODGSON: And you did it because you wanted to follow him.

PALLONI: I wanted to follow him. It was by chance, because he wrote me about six months before he quit in North Carolina. He said, look, I'm sorry. I've been following your trajectory, but I'm leaving. I'm going to the University of Washington.

I said, can I get admitted to Washington? He said, I don't know, but just apply. So it was a special application and I was accepted. Instead of flying from Santiago to North Carolina, Chapel Hill, I ended up in Seattle, a place that I had no idea where it was. It was so far up north I said, my God, where is this?

Here comes the third random event. A year before I moved to Washington, Sam Preston [PAA President in 1984] moved from Berkeley to Washington. And Tad Blalock told me, you have to take Sam Preston's course in demography. And I said, I'm not going to do this.

HODGSON: Because you had your demography experience.

PALLONI: I already had had it. I said, forget it, no. He finally convinced me. And actually, talking to Sam and knowing that he was such a nice person, I took it and I fell in love with it.

HODGSON: There you are.

PALLONI: So I'm here in part because of a series of truly random events. And—

HODGSON: I've got one quick question.

PALLONI: Sure.

HODGSON: To go back just a little bit, because I'm thinking, here you are in Chile, in Santiago, 1970, you're graduating, and it was such a wild time.

PALLONI: It was incredible. I even—

HODGSON: How about the politics of Chile and Santiago? We know you didn't like demography. We know you were a sociology major—

PALLONI: I was very left leaning. I was in the sociology department, where the most important things that were being taught were the French Marxist School and classic Marxism. You know, we read *Capital*. I learned a great deal from the French school. But anyway, it was a time to be on the left, a time to support a lot of political activities. I always was withdrawn from that. I didn't want to go to demonstrations and I didn't like to participate in political meetings. I wanted to study. I wanted to do my things. And so I was considered kind of a marginal member of the group. But I do remember the time that I was studying, I remember shootings in the street, and it used to—

HODGSON: There was a lot going on, [Fernando Henrique] Cardoso was there—

MERCHANT: All of the people from the development and dependency were all there.

HODGSON: And *Dependency and Development [in Latin America]* came out in 1970 [published originally in Spanish, 1969; Portuguese, 1970; English, 1979].

PALLONI: Exactly. And those people were an important engine behind [Salvador] Allende, because the people who supported Allende were not just Marxists, they were people from the Christian Democratic left who were involved with the Cardoso/[Enzo] Faletto work. There were others—

HODGSON: Faletto was at the University of Chile.

PALLONI: That's right. Faletto was in Chile.

HODGSON: Not Catholic University, University of Chile.

PALLONI: He was at the University of Chile. Cardoso briefly passed through. I think he slipped by in one of the other institutes. He wasn't in the university, I remember. At that time they founded a center called CEREN [Centro de Estudios de la Realidad Nacional], which was a center where there was a lot of intellectual activity, in which I took part as well.

HODGSON: You were a part of this.

PALLONI: Well, there were two different participants: the militants, the guys who organized, who went to marches, who faced the police; and the guys like me, who preferred to stay away. Yeah, I agreed with a lot of the things [they were doing] but I didn't want to get involved. I didn't want to get terribly involved, let's put it that way. And I wanted to escape from Chile. That was the reason why I ended up applying for a Ford Foundation fellowship, which I got in part because of a friend of mine who was involved with the Ford Foundation. So there you have it, a leftist person—

HODGSON: So you did want to get out then?

PALLONI: —a person from the left who is applying to the Ford Foundation. [laughter] Look, when you think about it you say, no, no, no; this is really unlikely. So yes, I was part of that, and at the beginning it was a very intense period. And then you could tell it was all coming to an end.

HODGSON: So when you were in Washington, Blalock was there, and you had that initial interest in quantitative sociology. Was it really that one Preston demography course that got you into demography?

PALLONI: Yes, absolutely. Although I must say there were two other demographers there. Pete Guest, who later became editor of *Demography*, I did not have a great deal of contact with Pete but he was an intellectual stimulus there. And the second person is James McCann. James McCann died a long time ago. He was one of the smartest persons I have ever met, but also one of the most self-effacing and [self-]destructive individuals, in the sense that he would have great ideas, he would write something that was, in my view and the view of others, great, but he would toss it into the garbage can. He thought it was just bad. He died peacefully. Jim, Sam, and Pete were part of the protective entourage I had in Washington. There was another, a political scientist, Michael Hechter, who also was

very important in my career. And a final person is Herb Costner, a methodologist who was also part of that group of people who were doing causal models—

HODGSON: With Blalock?

PALLONI: Yeah, with Blalock. Costner was the one who taught a course in methods, which I still remember, you know—one of the best courses I've ever had. But in addition to that I had contact with people in the department of statistics, because I wanted to take courses in statistics. In Washington at the time, Statistics was in the Math Department, if I remember correctly. So I took a bunch of courses in stochastic processes and things of that sort.

HODGSON: Now, did your sort of intrigue with mortality come from Preston—

PALLONI: Yes.

HODGSON: —or was that always there?

PALLONI: No, no. I don't think I was ever interested in mortality. I don't understand. It was Sam.

HODGSON: It was a viral infection. [laughter]

PALLONI: It was Sam, in fact. And Sam actually encouraged me to write. These are things that I shouldn't say, probably. There was a paper that was published by Ron Gray, which was about the decline of mortality in what was called then Ceylon, which is now Sri Lanka.

HODGSON: That was malaria that went down two thirds—

PALLONI: There you go.

PALLONI: So there was this guy Meegama who had put this argument that the decline of malaria explains the entirety of the decline of mortality in Ceylon.

HODGSON: I remember that.

PALLONI: And Ron Gray came on board with another argument. And Sam was involved because he was writing his famous paper at the time and he said, "Write a column on Ron Gray." So I wrote this and it was an immature student manifestation of his ignorance. I wanted to demonstrate that I knew a lot, and I was overly critical. The comments appeared in *Population Studies*. This was my first publication.

And I still remember that Sam was in touch with James Trussell at the time for some reason. And he sent him a letter and he said that he had read the comment that I had written and told Sam, "You grow them vicious!" So that was my start. I have a good relation with Ron Gray, even after that. That was my first [publication]. Yeah, the interest in mortality is entirely Sam's responsibility.

HODGSON: Now Washington had an ongoing demography center at the time?

PALLONI: Yeah.

HODGSON: Were there any grad students there?

PALLONI: Very small group, I must say—one of the first population centers.

HODGSON: Because everybody was coming when you were coming in '73.

PALLONI: Right. Exactly. It was one of the first center grants, if I remember correctly. And it was partly I think that went together with the census project. The first micro census data were produced at Washington under Sam's guidance, and that coincided with the creation of the population center. And as far as students, there was only one student who was an RA [with whom] I had a close relationship. The others were the type who would say, Palloni is a rate-buster.

HODGSON: So you did well?

PALLONI: I did very well. I actually got an award--their Howard Woolston award to the best graduate student of, I don't know—

HODGSON: In Washington.

PALLONI: Yeah. And I do have the experience of taking the prelim in demography. Sam and Jim McCann generated problems. This was an exam in demography where they wouldn't ask me, summarize the demographic transition theory. It was like a math exam—they [proposed] problems that they couldn't even solve. They realized this after the exam. I went to Jim McCann and said, "But how do you solve this?"

HODGSON: I hope this was a take-home exam?

HODGSON: No, no, no. This is in a room as big as this one. I was the only one there and I was struggling with this thing. I said, how can I solve this? You had five hours. It was one of those old-fashioned five hours and you had a short break. You were not allowed to talk with people. This was an exam that was one problem after the other.

HODGSON: It was burning down your memory at that time.

PALLONI: No. They told me, we tailored it [for you]; we thought that you were going to do very well. And I did okay but not great. And then I realized that some of these problems they could not even solve. How do you solve this? Well, let's see. The argument they used was, we're not interested in the solution; we want to see your train of thought.

HODGSON: Interesting.

PALLONI: Great excuse but, you know, I got sick [from] stress before, during, and after.

HODGSON: So you did finish your Ph.D. awfully quickly. It was pretty fast.

PALLONI: Yeah, it was fast. That was the only thing that I did.

HODGSON: And you had a couple of short stays before you arrived at Wisconsin. Anything about Texas and Michigan that you can relay?

PALLONI: Well, I went to Texas and Texas did have a population research center.

HODGSON: It had a Latin American focus, if I remember.

PALLONI: Harley Browning was the main guy there. It was a very good experience for me in Texas, but unfortunately, I was overloaded with teaching. I taught eight different classes the first two years.

HODGSON: Eight different ones.

PALLONI: Eight different ones.

HODGSON: And you hadn't taught these before?

PALLONI: Never. I taught everything from introduction to sociology all the way up to advanced demographic techniques, going through political sociology. It was a matter of some faculty had grants and were not teaching, and somebody had to cover [for] them. And in some universities the assistant professors usually take the burden.

HODGSON: So they lost you by asking you to do this?

PALLONI: In part it was because of this.

HODGSON: Eight courses in two years—new courses—is, for somebody just out, it seems—

PALLONI: Yeah. I was also to produce papers, too. But the experience in Texas was good. I met a lot of people there who had some influence on my career, like Dudley Poston, and Parker Frisbie, Omer Galle. Omer Galle I think of as an icon, not just in my career, but my life. A fantastic human being.

HODGSON: So you get out of Texas and you end up in Michigan?

PALLONI: Okay. So here comes the other lucky thing or unlucky, however you want to see it. John Knodel was taking a year of leave and John Liddell was teaching these basic courses in Michigan. And the Michigan pop center didn't know what to do with these courses and—

HODGSON: These were basic courses in demography?

PALLONI: There were two. They were in demography and population of society—[those] are the core courses that we usually teach.

HODGSON: Got you.

PALLONI: And John was leaving. Nobody was ready to take them all. And Al Hermalin [PAA President in 1993] had heard that I was willing to move and so he convinced me. Al Hermalin is another important person in my life, because when I went to Michigan, he became like a father to me. I mean, I was really—well, anyway, I ended up teaching for a year. Unfortunately, they didn't have a position, otherwise I would have stayed in Michigan.

A year before, Sam had moved to the United Nations and became their population division director. And he called me, he said he had a project on mortality and that he needed help, and I ended up in the United Nations just for the summer. The idea was that I would stay longer. And there I met another person who was very important, Larry Heligman, who recently died. The two of us generated pretty much single-handedly, under the direction of Sam, the United Nations mortality model, which came after the Coale and Demeny life table model. [The UN model] had a larger input coming from developing countries—life tables—which was very sparse in the Coale and Demeny models. So that was produced there. We produced also a software—actually mostly Larry—to do indirect techniques.

Remember at the time indirect techniques in demography was an important core of what was being done, at least by demographers with an international bent.

HODGSON: So you were looking for a job while you were still in Michigan?

PALLONI: I was.

HODGSON: Wisconsin at the time was huge.

PALLONI: Well, Wisconsin's interest had come too late when I made the decision to go to Texas. And if I had received the offer from Wisconsin, probably I would have gone to Wisconsin. But when I moved to the UN, Aage Sørensen, the chair, heard that I was kind of floating, so they recruited me and I have never moved. The verb move should not be used here. And I'm still there.

HODGSON: Who was there at the time? Larry Bumpass was there?

PALLONI: Oh, Larry Bumpass [PAA President in 1990], Jim Sweet, Hal Winsborough.

HODGSON: Was [Norman] Ryder?

PALLONI: Karl Teuber. No, Ryder [PAA President in 1972-73] had moved—

HODGSON: To Princeton.

PALLONI: —two or three years before I arrived—to Princeton. There is an anecdote about Ryder that I don't think very many people know. When you enter the social science building where we were housed, there is scribbling on the wall with lines suggesting the stature of professors: Bumpass, Sweet, etc... and high up, almost at the level of the ceiling, there was a line marking God's stature. Above it, was Ryder's....

The big project there was the '40-'50 census project. And Hal, who was a visionary in all things computer related, had for the first time bought a large Vax computer. You probably remember the Vax. To run a regression would take you not a day as it would with a Frieden machine, but it would take you two, three hours. So they had the Vaxes there; it was an extremely active period. It was intellectually extraordinarily stimulating. Bob Hauser was there and Rob Mare [PAA President in 2010] was there. Betty Thomson was there as well. And then the survey started, the Sweet and Bumpass family survey. So it was nonstop activity.

HODGSON: Were there particular people that you worked with, colleagues that you connected with?

PALLONI: I had quite a bit of interaction with Rob Mare. I worked a little bit with Larry Bumpass and with Bob Hauser. Hauser and Featherman; Featherman had started the aging center. It was the first time then that I met a young Richard Suzman. But the people that I worked most were Rob, Larry, Bob Hauser, and Featherman.

HODGSON: Now, when I look at your extensive publications, they go for pages. There seems to be a real pattern. There's a continual focus on mortality and a focus, more so now I think than before, on aging and the biodemography of aging. And you seem to have an intermittent connection with criminology, oftentimes with John Hagan.

PALLONI: Yes.

HODGSON: And you have an historical focus on Latin American big trends, to mortality, fertility trends. And you've got a theoretical inclination. I think you did diffusion theory.

PALLONI: Yes, I did.

HODGSON: And you had a couple of more empirical looks at Malthusian theory.

PALLONI: Yes. That's the way it goes.

HODGSON: And already we're getting into an unusual breadth there, in terms of theory and quantitative, historical, and real contemporary concerns. I love the internal colonialism in it.

PALLONI: That's Michael Hechter's influence.

HODGSON: Like a blast from Chile in undergraduate years.

PALLONI: Well actually, when I arrived in Seattle and I worked with Michael, I became interested in Italy. This is my parents' land. I learned everything that there was to learn about Italy. In Italy there was a neat application of Michael's theory of internal colonialism. So I did that. But, you know, this breadth issue is a curse and a blessing. It's a blessing because, I don't know, it makes it more entertaining.

But it's a curse because you can become schizophrenic. I mean I was doing at some point population and development. I was teaching a course in survival models and then advanced demographic techniques.

HODGSON: Did some AIDS work for a while?

PALLONI: Oh, yeah, I did. That was an important period, the AIDS model thing.

HODGSON: That's my general question. So we can see patterns there. Now, since you did this, can you see an evolution of interest in demographic topics over the course of your career?

PALLONI: It's all converging into modeling factors that affect longevity. Here is where comes in my underlying interest and what I hope to pursue, which is evolutionary biology, and to place mortality decline, mortality improvements, into the larger canvas of human evolution, and [to ask] where is this thing going? Is longevity here to stay? I have a series of recent papers that are not in my vita, some of which are being presented here, about modeling and the so-called Barker Effect, that is, the influence of early conditions on late health and adult mortality. The idea is to translate the theories that are there, from developmental biology mostly, into a formal model that is demographic in content. That in itself is—

HODGSON: So this is something you're not going to do in a year?

PALLONI: No. I'm looking at four or five years, if my longevity allows.

HODGSON: That's good.

PALLONI: The idea is that you can make predictions about what will happen with life expectancy in particular countries. So, for example, the predictions that we're making are that the mortality improvements in Latin America will or come to a halt pretty much generally, unless there are really earth-shattering improvements in medical technology, to arrest, for example, the advances of cancers

or cardiovascular disease or diabetes, for that matter, and everything that is related to diabetes. So that's a prediction that comes from this model. And then I want to link this with evolutionary biology, because after all, if it has to do with developmental biology and you're experiencing effects on survival, it must have something to do with fitness.

I must say Ken Wachter, Shripad Tuljapurkar and Jim Vaupel are demographers who have stepped into this thing. They are actually working on what he calls evolutionary demography. Wachter, for example, is doing this not with developmental biology, but with genes—you know, the pleiotropic kind of theory. And formalizing that and putting it in a population context I think is very exciting. It's only a few of us who are working there, so—

HODGSON: Well, that's good. So if you look back, what would you say was your most important publication?

PALLONI: One that I think nobody ever read except Ansley Coale, who decided to publish it in *Population Index* when he read it. You know, Ansley was the mastermind of *Pop Index*. [Richard] Hankinson was the editor. You remember that *Population Index* published only one paper per issue then.

HODGSON: Right, with the chart or table on the cover.

PALLONI: So this paper was presented in a WFS [World Fertility Survey] conference and it was about formalization of birth interval dynamics.

HODGSON: Sounds technical.

PALLONI: Very technical. But the idea was, if I have information on birth interval, how can I produce estimates of total fertility rates.

HODGSON: Got you.

PALLONI: You remember this is the [World Fertility Survey] WFS and we're studying birth intervals, etc. So it was presented in a conference at WFS. I wasn't there because my son was being born more or less at the same time. It was presented by Griffith Feeney and German Rodriguez was the discussant, and they liked it. And Ansley wrote to Sam or something, I can't remember. So I sent him the paper and he just published it as it was. I don't think anybody has ever read that paper other than those three people—

HODGSON: You're most proud of that one.

PALLONI: I'm very proud because it showed what I could do with what I had learned. The second paper is a paper that I did with Rob Mare, which was never published. It's a working series paper from 1986, I believe.

HODGSON: It was never published?

PALLONI: No, we submitted it to the *Journal of the American Statistical Association*. They came back with a positive review but with a three- or four-page-long set of [suggested] improvements. I mean, I'm talking about petty details. And I talked with Rob and I said, "Look, Rob, I don't have time for this." And he said, "I don't have time, either." And there it was. It died right then and there.

HODGSON: Wow.

PALLONI: It was a paper about how you can model health and mortality using spouse data, a microanalysis of mortality. This is in the early 1980s. If you have spouses you can do something really interesting, so we proposed a set of what were called bivariate survival models, where you have two survival times jointly determined. I still work on those models, like I used them in class as a teaching tool, but it was never published. I have been told not to cite it because it's not published. I did a paper with Doug Massey on migration that came out in the *American Journal of Sociology*, where we applied the same model, but instead of looking at mortality we were looking at migration of siblings and fathers. The model is identical. You just give different names to the various variables. We were trying to test the theory of influence of social networks on migration: that if a sibling migrated, it was more likely that the next sibling would migrate, or if a parent migrated first—and then we constructed an index of future migration. By simply knowing in each household how many people have migrated, what is their kinship, you can predict migration rate for the future. And that appeared in *AJS* and was joint[ly authored] with Doug Massey and students.

HODGSON: Now during this time period, when I think back like from '77 up until the end of the twentieth century, the demographic variable that I think was the hottest one, was fertility. And here you are continually focusing on mortality and—

PALLONI: No. Let me correct you. The paper in *Population Index* was pure fertility.

HODGSON: There you go, that's true. And as we move into the 21st century, do you think your intrigue with mortality has proven to be—in terms of international, long-lasting consequences—actually the 21st-century demographic trend?

PALLONI: I think you hit an important point. If you compute the rate of publications, grant proposals, or whatever that are mortality driven, it has increased; it hasn't decreased. I think it has to do with fertility [now being considered] unimportant. Now we're caring about longevity and whether there is variance in longevity across countries, and whether it's going to be with us for a while. Fertility has become kind of what mortality was before.

HODGSON: Fertility seems predictable these days.

PALLONI: Well, yeah. The range of variation—

HODGSON: Mortality is the one we don't know if there is an end point in longevity or not. We have these new trends like middle-aged, US white males increasingly—

PALLONI: And the disparity is the most interesting work in this period. This is being done really in mortality. I think mortality is a vehicle to produce collaborations with the biological types, which [are] more difficult in, say fertility or even migration or some of the other areas. The health mortality field is very fertile territory, where you can see collaborations between demographers and biologists.

HODGSON: We've got about twenty minutes left and we've got two more topics. We've got a topic on PAA itself as an institution and we have a topic on demography as a discipline, your thoughts on that one. So it looks like you're more intrigued [by] demography as a discipline. Maybe we can zip through some quick questions on PAA. Can you remember your first PAA meeting?

PALLONI: Yes. It was in Seattle, the only time that PAA took place in Seattle. I don't understand exactly why it hasn't been there since. It was in 1975, and I was a year away from getting my Ph.D., I think. It was in downtown Seattle and I remember two people in that meeting. I went to all of the sessions. This was a very small thing. I mean, we're talking about maybe a thousand. A thousand seems too big to me. It was a small hotel, a small group of people. [*Editor's note: the attendance at the Seattle meetings in 1975 was 595.*] I remember Ansley Coale. And I remember James Trussell. Those were the two sessions that I went to that are memorable to me.

HODGSON: And they're vivid, that's good.

PALLONI: Yeah. And that was my first.

HODGSON: Since you've been going to these things for an awfully long time, do you see any trends or changes that have happened, in terms of PAA over the years, since '75 to now?

PALLONI: Well, let's put it this way. There are two types of trends, human, in quotes, and disciplinary—no, there's a third: organizational. So the group used to be small—I'm talking about the human part now. The group used to be small. It was like going into a family reunion. You remember it.

HODGSON: I do.

PALLONI: Everybody knew each other. Now you compare this [today]—completely different beast altogether. Maybe it is because younger people are displacing older people and they know a lot less about you, and so you think that nobody knows you.

HODGSON: It could be our aging as opposed to—

PALLONI: That's an alternative explanation; that's fine. So that's one thing that impressed me right away this year. And you know, Washington DC is usually the site for the largest meetings anyway.

HODGSON: Uh-huh, government.

PALLONI: Yeah. So if you go to the meeting in San Diego, it wasn't this big. But still, the demography meetings are massive, I will say. [*Editor's note: the attendance of 2,331 people in San Diego in 2015 was a record high until the 2016 meetings in Washington, DC, where the attendance was 2,735.*] Compared to the American Public Health Association, no, it's infinitesimal. [*Editor's note: the APHA expects 12,000 attendees at its 2016 meeting: <http://www.apha.org/annualmeeting>.*] So that's the human part of the PAA.

The organizational part—you probably don't know this or maybe you do. When I was president we had to struggle with three things. The website was a major problem, and it was a problem for the preceding president and the one who followed. A lot of energy was devoted to it and the website that the PAA has now is a result of those activities during—

HODGSON: The website we are talking about is the annual meeting component.

PALLONI: The website of the PAA and the annual meeting. Remember it still is the case that the annual meeting is handled at Princeton. But Princeton was financing this, PAA wasn't.

HODGSON: Right.

PALLONI: And then we had this website that was really complicated. And it's has become something that is good. But how do you create a website? Well, you have to go to some organizations that already have a website and imitate them so you don't—

HODGSON: Plagiarism.

PALLONI: But it's difficult because PAA is very small and PAA meetings are very, very particular. They're not similar to other [organizations], say the Economics Society. So that's one thing. Second thing was the fund, the Population Fund.

HODGSON: Oh, yeah.

PALLONI: The year that I was president, I think was the first time that there was a push to move this. And the reason that it happened was because we decided to go to the Gates Foundation to ask for money. Now the reason for [needing] money for the PAA is that PAA is always in a very fragile financial situation. There is a fund there for emergencies. If the meeting can't happen because there is a bombing or something, we have to pay huge amounts of money.

HODGSON: That would wipe out that fund.

PALLONI: Right. And so we wanted to make sure that there was a fund in addition to that. So the first thought was the Gates Foundation. PAA has something to offer. So we went to the meeting with the Gates Foundation and I still remember Charlie Hirschman was there. I was there, and I a few other people trying to convince the Gates Foundation that this is—

HODGSON: A million dollars.

PALLONI: No, five hundred.

HODGSON: Five hundred.

PALLONI: But they said you put five hundred [and we'll match it].

HODGSON: Okay.

PALLONI: So now we're reaching the \$1 million mark.

HARDEE: That's good.

PALLONI: That fund now is being used for lots of things. First, to support Princeton's efforts with the website. Second, we have little grants we give to students or to post-docs or pre-docs, for people who come from abroad the ability to fund their travel, hotels. And so that fund gives a lot of flexibility. But I must say, when we were creating it, there was resistance in some corners of PAA. I mean, I respected very much the opinion of those people. PAA is not in the business of generating funds like other organizations. PAA is a different organization. It's like we wanted to preserve our identity, and generating a fund this way will make us different.

HODGSON: I do want to save a little time because you're very excited about the discipline of demography. What do you think the most important issue facing demography as a discipline might be?

PALLONI: To preserve its core. I think demography as a core existed years ago. We are talking about Ansley Coale, we're talking about Keyfitz, Bill Brass, Sam [Preston]. Then we're talking about, you know, the Princeton group, the British group, Wrigley and Schofield. I have the impression that with a few exceptions that probably are Berkeley, Penn, and perhaps—but I'm in doubt about this—Princeton, that core is disappearing. It's dissolved and I don't know whether it's for good, for better, or worse, but it is not there any longer.

If you ask how many people know formal demography and use formal demography to formulate a problem and solve it, there are very few. You can count them with the fingers of one hand. The only place where I think this is being done systematically is in Rostock, the Max Planck Institute, where they're forming people that do this. So this core is being preserved [in Germany], a little bit at INED in France and in some of the US institutions I mentioned before.

Other than that, I think demography is going in many directions, some of which are very good, some of which are—I don't know what the future is. But demography was invaded by other disciplines. It's being colonized by economists and all sorts of other disciplines.

HODGSON: This is going to be my follow-up question. You obviously think of yourself as a demographer and you've got that focus on that core. I will imagine that there's a good chunk of people presenting today and tomorrow who don't self-identify as a demographer.

PALLONI: Absolutely.

HODGSON: They see themselves as economists, sociologists. Some still do think of themselves [as demographers] but more and more it's not.

PALLONI: That's exactly right.

HODGSON: Do you think it might be this shift in our data source, and then the European countries now don't have censuses and everything is household survey data with a standard of techniques that economists are quite familiar with, quantitative sociology—

PALLONI: Or survey specialists.

HODGSON: —and you ask questions about family change, and you ask questions about morbidity and mortality and you ask questions about fertility that from someone coming from this core background, some of those are demographic questions.

PALLONI: Yeah.

HODGSON: But the people that can do them don't necessarily think of them that way.

PALLONI: That's right.

HODGSON: They think this is a very important economic question.

PALLONI: Or, you know, public health problems, yeah.

HODGSON: And we're sharing data and we're sharing techniques that aren't part of that core, more and more.

PALLONI: Right. Exactly. I think that that's exactly right. You've [said] it a lot better than I could.

HODGSON: Now, is there anything that we can do about this?

PALLONI: Well, the question is whether you need to do anything about it.

HODGSON: Okay, that is a question.

PALLONI: For example, if I think about people working on health, the amount of funds going into data collection of health data is giant. The people who participate in this enterprise are very diverse. There are one or two demographers, but that's it. Think about the National Research Council reports on health disparities across countries in 2011 and 2013. There were some demographers there, but very few. A large fraction of members were from epidemiology, from economics, from different academic constituencies. If you had done that, say, twenty years ago, there would have been only demographers. So now the question is, were those panels better than they would have been had you had only pure demographers? And the answer is, I don't think so. So in a way perhaps we shouldn't do anything.

From a different perspective, I once wrote a paper about the tool kit of demographers that was published, or buried, I should say, in *Genus*. Remember *Genus* was the journal the Italians had? Well, it was published and I said, you know, this is a tool kit. You have to know how to construct a life table. You have to have a cohort/period approach.

HODGSON: This might be very generational.

PALLONI: As I was saying, if you can't do this, if you're not able to use these models in your head to formulate a problem, maybe the problem will be ill-formulated. Is that right? I don't know. Certainly the stuff I'm working on now, or the stuff, for example, that Josh Goldstein in Berkeley works on now, or the things that Ron Lee produces or stuff that Sam continues to produce, one after the other—I think Sam retired and plays golf: where does he get the time to do this?—those things would not be possible without this core we are talking about. Those products are very valuable, so I would say the core is useful. Is the core necessary for other things? Maybe not. Maybe a sufficient condition, but it's not necessary. In the case of the work that I was citing--Josh and Ron and Sam--it is a necessary condition. You can't do it if you don't do it that way.

HODGSON: So it sounds like you're a little equivocal about that.

PALLONI: Yeah, I'm always equivocal.

HODGSON: If we define the future in terms of this core set of techniques and tools, then you are a little pessimistic about it.

PALLONI: Yes.

HODGSON: But you're open to the possibility that maybe there's emphasis on the tools—

PALLONI: It's not necessary for some researchers.

HODGSON: It's less necessary.

PALLONI: It's less necessary for some, yes. Thanks for the correction. It's less necessary for some type of research, definitely.

HODGSON: Okay.

PALLONI: And it's probably totally dispensable in other research that we do here at PAA. But there is a little bit of nostalgia, you know. This happened to me three months ago. A student in a university that has a center, I said to him, well, this is the kind of thing William Brass—[and he said,] William who? And I said, really, did you study demographic techniques? Yeah, I had a basic course in [demography]. This person is in PAA and—

HODGSON: Right.

PALLONI: —considers himself a demographer, but doesn't know who William [Brass is]. I would presume if I asked him about Nathan Keyfitz, he would say, I have no idea who that is.

HODGSON: Isn't that something.

PALLONI: And I think those are the fathers of this discipline. You know, sometimes I've asked myself, what would Kingsley [Davis], Ansley [Coale] or Nathan [Keyfitz] think—

HARDEE: Think now?

PALLONI: —think if they were—

HODGSON: Came back?

PALLONI: Yeah.

HODGSON: Right.

PALLONI: Would they be pessimistic? Would they be happy that the discipline has expanded? It has expanded. Disappearing, this is a problem.

HODGSON: Right.

PALLONI: And I wonder whether that happens to everything that develops. Once it develops, the seed disappears, right? The thing that bothers me a little in demography is that if you go to the physical sciences or to the biological sciences, drastic transformations have occurred. I mean, think about biology. They discovered DNA! So everything that came after that changed completely. That was a shift in paradigm. We haven't had a shift in paradigm in population studies at all. I mean, what do we have? New methods, maybe. They come from statistics. Do those shape the foundations of the discipline? No.

HODGSON: We have shifts in policy focus.

PALLONI: Right. But that is not the foundation of the discipline.

HODGSON: No, it's not the foundation of the discipline.

PALLONI: So what changes that we have now are driven by things that have nothing to do with shifting in paradigms of science, and the disappearance of the core and those conditions is worrisome. But, you know, I would still think that it—

HARDEE: I'm going to ask a follow-up question. When my kids' elementary school was built on to, the kids had to be displaced [during the construction]. And when they got back in, they didn't have

enough space. I said, they didn't have a demographer working with them on projecting how many kids there were going to be in the neighborhood? So my question to you is, do you think we're doing a good enough job training that kind of basic demographer?

PALLONI: No. No. And actually, I'm glad that you brought that up. That was a point that I had [wanted to make] here. Remember back, say, twenty years ago, applied demography was in existence? Applied demographers are a very lively subset of PAA, and it's a subset that shows that we can teach demography to people who want to do things other than teach in academia. It's something that I insisted on all of the time when I was at Wisconsin: we should not try to teach to train professors only.

HARDEE: Yes.

PALLONI: We should try to teach people to do—in fact Jim Sweet created a course that was applied demography. Paul Voss was there. And I'm glad that in the PAA this group has enlarged. I'm not too happy that it hasn't enlarged in other areas but it has enlarged in this area, because if this area becomes influential, then the population centers will have to almost—

HODGSON: Keep the core going.

PALLONI: That's right. They keep the core but it's applied to things that are quote unquote less theoretical. Policy is relevant. We used to do predictions in counties in Texas about the number of school children that were expected. I'm talking about many years ago. That work was always looked upon kind of dismissively, [as though to say,] this is not demography, where are you going to publish this stuff. Well, it's interesting, I know. Yes, this was one of the points that I had to make about applied demography, which I think—

HODGSON: We have about a minute left. Do you have any other points you would like to make? Have you had a chance to directly ask about the discipline?

PALLONI: The one point that I had here that we haven't talked at all is the international presence of population studies. Back when I was growing up as a demographer, the IUSSP [International Union for the Scientific Study of Population] was a powerful institution. It was a powerful institution that assembled demographers from everywhere, including the US. The IUSSP now is in a weaker position and PAA remarkably is much stronger, I think. And I think that that entails a loss, a loss of diversity in ways of thinking. IUSSP is struggling with funding. PAA is not struggling any more, as far as I know. But this makes it a little bit more provincial. Although I must say that if you look at the program, there are a fair amount of things that are international, but somehow IUSSP coalesced all these things in a very articulated way, whereas in the PAA they're part of a particular session or a handful of sessions. And I think that this goes back to the point that you were making before, that IUSSP grew up from classics like Louis Henry and Jean Bourgeois-Pichat, who were worried about the relation [between] population and development; fertility was the key thing. Remember all of the disputes about whether population enhances development or not: nobody hears about that anymore.

HODGSON: No.

PALLONI: Within that was the issue of fertility. This is what made IUSSP very—

HODGSON: It got too focused. Now, another sort of way of looking at it is you have a whole set of 21st-century concerns that are transnational, particularly environmental, [such as] climate change—

PALLONI: Well, migration.

HODGSON: —migration, all connected with population—

PALLONI: Absolutely, yeah.

HODGSON: —in a significant way. And you would imagine that an international organization, a scientific population, would be the ideal place where those types of concerns that don't really have the nation as the focal point of policy making [could be explored]. But we have to do something that's humanity wide—

PALLONI: Right.

HODGSON: —if we're really going to have an impact on that kind of—

PALLONI: It's very paradoxical, that it's decreasing exactly when it's most needed. It is difficult to explain. A lot of it is a reluctance—I don't know, I really don't know. I have my theories about why it's happening. But I think it's a sad thing. The migration issues, for example, that they are dealing in Europe right now should be a prime concern to demographers, right?

HODGSON: Yeah.

PALLONI: To health researchers, to migration researchers, to family people. What organization is taking—

HODGSON: Refugee issues in general.

PALLONI: Yeah. And IUSSP sponsored and participated in a panel organized by the Population Committee of the National Research Council. This is another point that I didn't make, the importance of that [the Population Committee of the National Academies]. I think of it as the people who think ahead for demography in general because they do have international concerns. They did, together with IUSSP, a series of publications on refugees, the demography of refugees—this is about ten years ago, fifteen years ago—that is very contemporary. It should be revisited. I should attribute a great deal of importance to the National Research Council's Committee on Population in marking the route ahead. Those are mostly demographers. There's a few economists, but they're mostly identified with demography.

HODGSON: Now, our hour is up and I would like to thank you so much for being here today.

PALLONI: Thank you very much. Thank you for having me. I feel good to have told you how important randomness is to generate population presidents.

HODGSON: Thank you.

Videotaped by Alex Poole

Transcribed by Michelle Taylor

Audited for accuracy and edited for clarity by Revan Schendler, June 2016

Reviewed and approved by Alberto Palloni, July 2016

REPRODUCING INEQUALITIES: LUCK, WALLETS, AND THE ENDURING EFFECTS OF CHILDHOOD HEALTH*

ALBERTO PALLONI

In this article, I argue that research on social stratification, on intergenerational transmission of inequalities, and on the theory of factor payments and wage determination will be strengthened by studying the role played by early childhood health. I show that the inclusion of such a factor requires researchers to integrate theories in each of these fields with new theories linking early childhood health conditions and events that occur at later stages in the life course of individuals, particularly physical and mental health as well as disability and mortality. The empirical evidence I gather shows that early childhood health matters for the achievement of, or social accession to, adult social class positions. Even if the magnitude of associations is not overwhelming, it is not weaker than that found between adult social accession and other, more conventional and better-studied individual characteristics, such as educational attainment. It is very likely that the evidence presented in this article grossly underplays the importance of early childhood health for adult socioeconomic achievement.

This article has two central goals. The first one is to argue that research on social stratification, on intergenerational transmission of inequalities, and on more-specialized issues regarding factor payments and wage determination will be strengthened by studying the role of early childhood health. I will show that inclusion of such a factor is not easy because it requires one to integrate the theories in each of these fields with new theories that link early childhood health conditions and health in later stages in the life course, particularly physical and mental health as well as disability and mortality.

The second goal of the article is to marshal empirical evidence, albeit partial and incomplete, to verify that early childhood health matters for achievement of or social accession to adult social class positions. The evidence I gather supports the argument that even if the magnitude of the associations is not overwhelming, it is not weaker than that found between adult social accession and other, more conventional and better-studied individual characteristics, such as educational attainment. For a number of reasons identified later, I suggest that, if anything, the empirical evidence presented in this article grossly underplays the importance of early childhood health.

The problem I investigate is by no means new. It has been actively researched by a growing and influential number of social and biological scientists. Although they are producing many insights and accumulating knowledge at a fast pace, much of the area remains

*Alberto Palloni, Center for Demography and Ecology, University of Wisconsin-Madison, 1180 Observatory Drive, Madison, WI 53706; E-mail: palloni@ssc.wisc.edu. This article is based on a presidential address delivered at the 2006 annual meeting of the Population Association of America, Los Angeles, March 30–April 2. I am most grateful to Sam Preston, Larry Bumpass, and Hal Winsborough for their detailed comments and encouragement. Aimée Dechter, Bob Hauser, Ross Matsueda, and Betty Thomson provided suggestions at various points. The workshop organized by the Sociology Department at Northwestern University was a precious opportunity to discuss some of the ideas contained in this article. I owe a large debt that no wallet could repay to the graduate students and associates who supported me and provided important insights from start to finish: Gilbert Brenes, Mary McEniry, Carolina Milesi, Malena Monteverde, Beatriz Novak, Alyn Turner, Carolina Santamaria, and Robert White. Janet Clear deserves gratitude for her painstaking editorial work at all stages and incarnations of this paper. Finally, I would like to thank the editors of *Demography* for their patience and suggestions that enabled me to transform a speech into a paper. The research work on which this article is based was supported through infrastructure, research, and training funding from the National Institute of Child Health and Human Development, the National Institute on Aging, and the Fogarty International Center. Funded projects include the Center for Demography and Ecology (R24HD047873), Center for Demography of Health and Aging (P30AG017266), Health Conditions of Elderly Puerto Ricans-PREHCO (R01AG016209), Health Conditions Among Elderly in Latin America (R37AG025216), and Fogarty International Training in Population Health (D43TW001586).

unexplored territory, with only a handful of landmarks to orient those who venture into it. The landscape of what we actually know contains gaping holes and, as is always the case with a relatively new research area, is populated by conjectures that are only incompletely, if at all, supported by empirical evidence.

In the next section, I define two concepts required to outline the nature of the problem: child health status and social class. I then set the stage by describing the context of persistent socioeconomic status (SES) gradients in health and mortality.¹ Against this background, I then formulate the main research problem and three testable hypotheses. I argue that its investigation should have nontrivial payoffs because it will enable us to understand hitherto ignored but potentially relevant mechanisms through which societies reproduce inequalities across generations. In the section on social class attainment and the heritability of social class positions, I evaluate what is known and, more important, not known, about social mobility, intergenerational transmission of inequalities, and determinants of adult socioeconomic status. This section navigates findings originating within separate disciplines, each approaching the problem somewhat differently, often without referring to either discoveries or knowledge gaps in the others, but each contributing to our understanding of the processes that manufacture inequalities. I then translate theoretical propositions into a simple representation of relations in which early child health status plays a key but not central role. The path model borrows from the literature on intergenerational transmission of wealth and social mobility but explicitly identifies effects of child health status and paths of influence that have generally been ignored in the more conventional literature. The relations postulated in this model are then estimated with data from the U.K. National Child Development Survey (NCDS; British cohort of 1958). These, in turn, become inputs in a Monte Carlo simulation model that permits a more precise assessment of the magnitude of effects of childhood health on accession to adult social class positions. In the concluding section, I emphasize that early childhood health is an important, albeit not the most powerful, determinant of social stratification. It is a nonignorable mechanism through which social inequalities could be reproduced across generations.

WHAT IS CHILD HEALTH STATUS AND WHAT ARE SOCIAL CLASSES?

Before focusing on the research problem, I need to define two basic concepts. In doing so, I will refer to both the latent construct we ought to be measuring and the actual empirical approaches we conventionally use to do so. It is not surprising that there is a gap between the two, and this gap, as it turns out, is an important stumbling block that limits further advances in the area. *Child health status* and *social classes* are two concepts that are used freely as if we all understand them in the same way. We do not. Unlike physicists, and for better or worse, we speak different languages.

Child Health Status

Child health status refers to more than what we can normally measure (things such as birth weight, number of chronic conditions, or assessment of health status by third parties). Most of what child health status really is remains concealed by such feasible measures. To assess it properly, we should also include a consideration of factors in utero and those that surround gestation, such as placental growth and exposure to harmful or unbalanced hormonal environments, to toxins and drug residues, to infectious diseases (such as rubella), and to deviations from an adequate supply of micronutrients. Child health status involves factors that characterize delivery and those experienced immediately after birth, including nutritional uptake (with or without breast-feeding) and exposure to or contraction of viral and bacterial infections known either to impair early growth or to trigger deleterious sequelae

1. Hereafter, and for reasons that will become clear in the next section, I will use the acronym *SES* to refer to a position in an ordered hierarchy as if *SES* were a measure of strata or social class.

later in life (Barker 1998). Then there are also the commonly invoked, but not necessarily more appropriately measured, conditions such as early physical growth and development (not just their *levels* at a given age but also their *rate of change* over critical age intervals). Similarly, we should measure exposure to and contraction of illnesses, some of which could be acute, such as rheumatic heart fever, and others chronic, such as allergies and asthma. Finally, we need to identify more-transient and apparently harmless episodes of infections, some of them with rather striking long-term effects, particularly if not treated in a timely or appropriate manner. The occurrence of these episodes can be elicited through face-to-face interviews with parents, caretakers, nurses, or attending physicians. More difficult to do, and less tractable in terms of measurement, is the identification of exposure to higher-order interaction effects—that is, the occurrence of episodes of illness (or failure to reach a growth milestone) *at a given age and at a given stage of development*. Proper consideration of these higher-order effects requires increased knowledge of the physiology of growth and development, of the way the body triggers compensating mechanisms if exposure occurs during critical times, and of the physiological negotiation that bodies beleaguered by malnutrition or illness carry out, favoring the growth and functions of some organs in exchange for blunting the growth and functions of others.

The preceding description belongs to the physical dimensions of health status. But over the last decade or so, it has become clear that child health status should also include mental health—not just extreme mental impairments but also deviations from emotional stability, mild depression, adoption of dysfunctional behavioral styles, or the experience of disorders such as attention deficit and hyperactivity, even if present in mild forms. Furthermore, a great deal more should be done to empirically assess general fitness, lack of frailty, levels of energy and alertness, and the adoption of motivations and aspirations, as well as assessments of self-esteem. These are all features, sometimes visible to the naked eye, that can be temporarily undermined even by mild deficiencies in micronutrients such as iron (Honig and Oski 1984; Lozoff et al. 1998; Nokes, van den Bosch, and Bundy 1998; Thomas, McKelvey, and Sikoki 2006) or, more decisively, by overt poor nutrition (Glewwe, Jacoby, and King 2001; Popkin, Richards, and Montiero 1996). Assessments of general fitness require close observation of what children actually do, of what they can do but never undertake for lack of appropriate stimulation, and of what they are unable to do even if exogenously motivated. As I will show later, some evidence suggests that traits such as physical frailty, tightly introverted personality, inability to control emotions, and lack of endurance and persistence all exert powerful effects on children's behaviors toward others, on the behaviors of others toward them, and, ultimately, on their ability to manipulate external conditions in their favor. Although these are nontrivial characteristics in a world of open competition for economic positions, they are not conventionally incorporated in the assessment of what child health status is.

The relevance of what we, as a rule, *do not* measure when we refer to child health status becomes painfully obvious upon reviewing an impressive report on the science of early childhood development published by the National Research Council (2000). The report suggests that health and well-being of children depends closely on the health and well-being of their parents. This effect is mostly environmental rather than attributable to the heritability of genetic propensities. The authors argued that children's mental and physical health, including the ability to develop well-controlled and balanced temperaments, constructive personalities, and an adaptive behavior management style, depends on things as trivial as sleeping habits and on much less trivial phenomena such as exposure to elevated stress, experience with material and social insecurity, environmental stimulation, and even on how discipline is taught to them.

The claim that health status of children, broadly conceived, could be sculpted early in life and as a response to exposure to conditions ranging from maternal hormones in utero to peer groups in school, is not just a quirk in the literature on child development. First,

similar findings have been uncovered in animal studies, which have shown, for example, that the position occupied by adults in complicated social hierarchies depends strongly on very early experiences that control and constrain, among other things, brain development and social functioning (Knudsen 2004; Meaney 2001; Suomi 1999).

Second, the literature on child development identifies quite precisely social conditions that can imperil, impose forbidding constraints on, or enhance the early development of, traits that are highly valued in the job market. The quantity and quality of maternal care, the environments experienced at home, in elementary school, and, now more than ever, in child care centers—whose quality is in direct proportion to family income—all contribute to manufacture child health status broadly conceived. The particular menu of factors present in any one individual case shapes a social and psychological environment within which personality and behavioral styles that influence later economic success are programmed (Cunha et al. 2005).

Several PAA Presidential Addresses, beginning with Preston's (Preston 1984) in the middle 1980s and then followed, among others, by Cherlin (1999), Bianchi (2000), and McLanahan (2004), examined the state of children in the United States and the social forces that shaped their living conditions. In some cases, these forces erode children's positions relative to adults (Preston 1984), increase the resource disparities between children born to parents in different social classes (McLanahan 2004), and establish conditions that could result in deterioration of children's well-being (Cherlin 1999). In other cases (Bianchi 2000) the transformations—particularly in terms of one of the most important inputs, parental time—appear to be more positive. On balance though, the evidence reviewed by these authors suggests the existence of macro-social forces gathering strength in the early to mid-1970s that, to some extent at least, have potentially detrimental influences on children's lives and experiences. For the purpose of this article, what matters is whether the macro-social conditions identified by these researchers erode (or improve) children's health as it is broadly conceived. If this is the case and if children's health status does indeed shape social accession, we can anticipate future increases (or decreases) in inequality and less (or more) social mobility as long as the impact of this erosion (or improvement) differs by social classes.

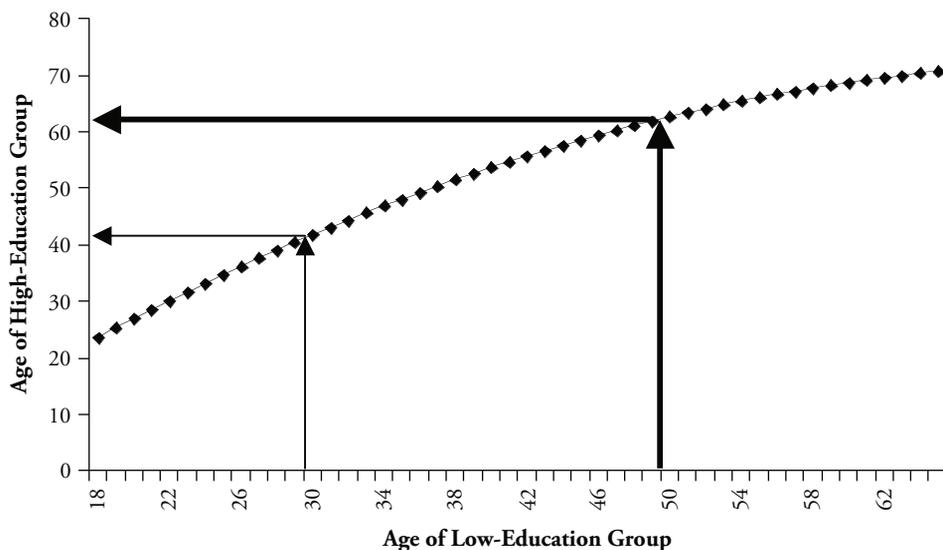
Needless to say, what we conventionally measure as child health is far from reaching the core of states and traits that apparently matter so much. Child health status is a multidimensional concept that often is translated into and confused with very narrow, one-dimensional indicators. This is a key reason why I think that the evidence I provide in this article about the effects of early health grossly underplays their importance. I will have to make do with the available measures, even though they may reveal just the tip of the iceberg.

Social Class

Although it is a somewhat heavy-handed simplification, I define *social class* as a position in a hierarchy usually endowed with material, social, symbolic, and ideological resources. Conventionally, we identify these resources by using income, wealth, power, occupational prestige, or educational attainment. I remain cognizant that neither are all of these metrics equally legitimate nor do they always lead to similar inferences when employed in isolation or jointly. I am also mindful that the concept of social class in some literature (Wright 1980) is designed to portray something altogether different from a rank ordering of social categories. In this article, I will use the concept to refer to ordered niches occupied by incumbents whose lives depend on the bundle of resources with which such positions are endowed. What matters for the study of social stratification is the class one can attain, the manner of the attainment, the degree of friction opposed to the passage from one class to another, and the actual sources of such friction.

In the section that follows, I evaluate the state of a very well developed area of research, namely, that dealing with observed health status and mortality inequalities at adult

Figure 1. Age Equivalence of Mortality Rates for High- and Low-Education Groups^a



Source: National Health Interview Survey linked to the National Death Index (projected to 2005).

^aMembers of the high-education group are those with a college degree or more; members of the low-education group are those with less than a high school diploma.

ages. I show that, paradoxically, one of the potential explanations for those inequalities rests on the idea that they originate in health status inequalities experienced at early ages. This leads to the formulation of the main problem and the identification of three testable hypotheses in the section that follows it.

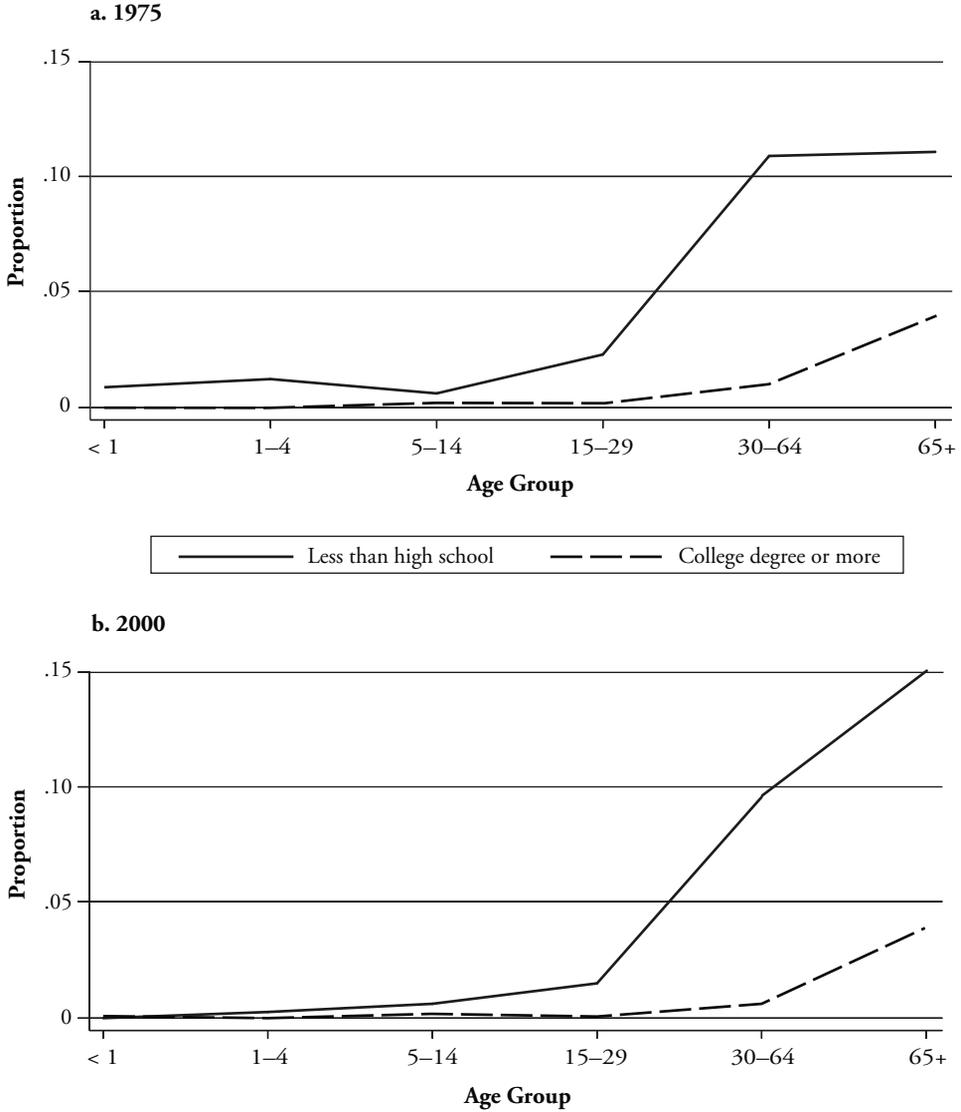
HOW SOCIAL STRATIFICATION INFLUENCES HEALTH STATUS AND MORTALITY

A great deal of research has been devoted to the understanding of mortality and health differences by social classes: why are these differences so strong at most ages, so persistent over time, so graduated across measures of social class, so pervasive across measures of health, and so global? Figures 1 and 2 display an admittedly modest sample of this regularity applicable to the United States. These figures contrast mortality and self-reported health of U.S. college-educated individuals (i.e., those with a college degree or more) with that of individuals with less than a high school diploma. Both figures were constructed using data from the National Health Interview Survey (NHIS) and the NHIS linked to the National Death Index for the period 1989–2003.²

Figure 1 was constructed using mortality rates for 2005. It displays the age an individual with a college education (or higher) would have to attain to be exposed to the same mortality rate as an individual with less than a high school education at another age. For example, a person in the low-education group experiences the same mortality rate at age

2. The basic information used in these two figures was kindly provided by Elizabeth Arias of the National Center for Health Statistics (NCHS).

Figure 2. Proportion With Poor Self-Reported Health, by Education and Age, 1975 and 2000



Source: National Health Interview Survey, 1975 and 2000.

30 as an individual in the high-education group experiences at age 40. A person in the low-education group experiences the same mortality at age 52 as a person in the high-education group does at age 62. This difference of 10 years applies to the bulk of the age span examined here. The slope of the curve is not constant, however, suggesting that the difference narrows to less than 10 years at older ages. This is wholly consistent with research that identifies a convergence and even crossover of mortality curves at older ages, a

phenomenon sometimes attributable to selection (Vaupel, Manton, and Stallard 1979) and other times to age misreporting (Preston et al. 1998).

As shown in other research (Elo and Preston 1996; Feldman et al. 1989; Lauderdale 2001; Lynch forthcoming; Preston and Elo 1995; Preston and Taubman 1994; Rogot et al. 1992; Ross and Wu 1995; Sorlie, Backlund, and Keller 1995), these differences have not diminished since at least the mid-1970s. Because the differences are so persistent and invariant over time, Figure 1 represents the situation well for at least the last decade. Furthermore, the differences are so well-graded that omitting groups with educational attainment levels between the extremes, as shown in Figure 1, does not weaken the argument.

Figure 2 displays line graphs of the proportion of individuals, by age, who in 1975 and 2000 self-reported their health as poor from age 15 onward. The figure shows differences that are so large that they are not even amenable to the same metric used before. It suffices to verify that the proportion of individuals older than age 30 who self-report bad health is, on average, nearly three times as high for those who are less-educated as for those who are highly educated. Although the observed differences start at age 15—the age at which individuals begin to provide a report on their own health—I will show later that they also are found at younger ages. If there are changes in the magnitude of differences observed in 1975 and those observed in 2000, they are not easily discernible. Indeed, if anything, there is an increase, albeit small and not statistically significant, in the difference at older ages.

A finding entirely consistent with the above differences in self-reported health status emerges from the 1988 and 1994 National Health and Nutrition Examination Surveys (NHANES) and the Quebecois Nutritional Survey of 1990 (QNS). This study found a significant SES gradient on the quality of diet and macronutrient intake for populations aged 18–75 (Dubois and Girard 2001). The contrast is in the expected direction: individuals with low SES are less likely to have a superior diet and adequate quality food intake than individuals with high SES.

But the health and mortality cleavage between social classes starts much earlier than age 15. Indeed, disparities tend to sprout early in the lives of children and appear to expand as they grow. Studies by Currie and colleagues with the National Longitudinal Survey of Youth (NLSY) in the United States and Canada (Currie and Hyson 1999; Currie and Moretti 2005; Currie and Stabile 2003) and work by Case, Fertig, and Paxson (2005) and Case, Lubotsky, and Paxson (2002) with the 1958 NCDS suggest that disparities in health status are visible at early ages, that the expected SES gradients are commonplace, and that these disparities expand with age. Further evidence to support this contention comes from a well-known data source. Figures 3 and 4 display gradients of reported health status among children in the NLSY by maternal income (in quartiles). These figures refer to the proportion of children whose mothers reported the presence of at least one health/limiting condition at the time of the survey.³

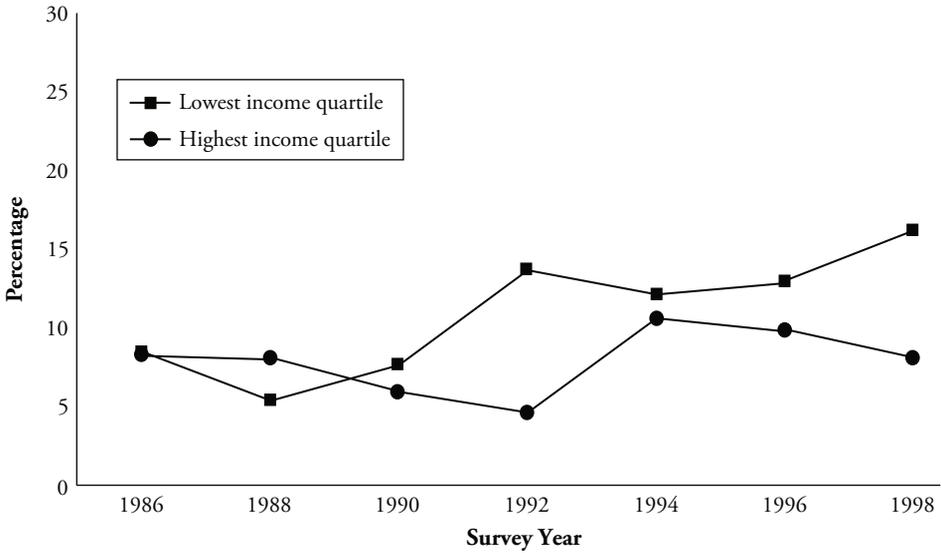
Clear differences exist across the lowest and highest income quartiles as early as ages 3–5 (in Figure 3) and ages 6–9 (in Figure 4). Using education of mother or other, equally coarse indicators of socioeconomic status does not in the least alter the picture. The differences show no signs of weakening over time.⁴

This evidence is consistent with findings regarding other indicators of health status. Miller and Korenman (1994) used data from the NLSY and showed that an SES gradient in *nutritional status* existed in the United States, much as was the case for the U.S. adult population in NHANES and the Quebecois data set. Miller and Korenman showed that poor

3. The respondents could choose from among 18 limiting conditions, including learning disability, asthma, hyperactivity, chronic ear infections, allergies, speech impairments, heart conditions, and epilepsy.

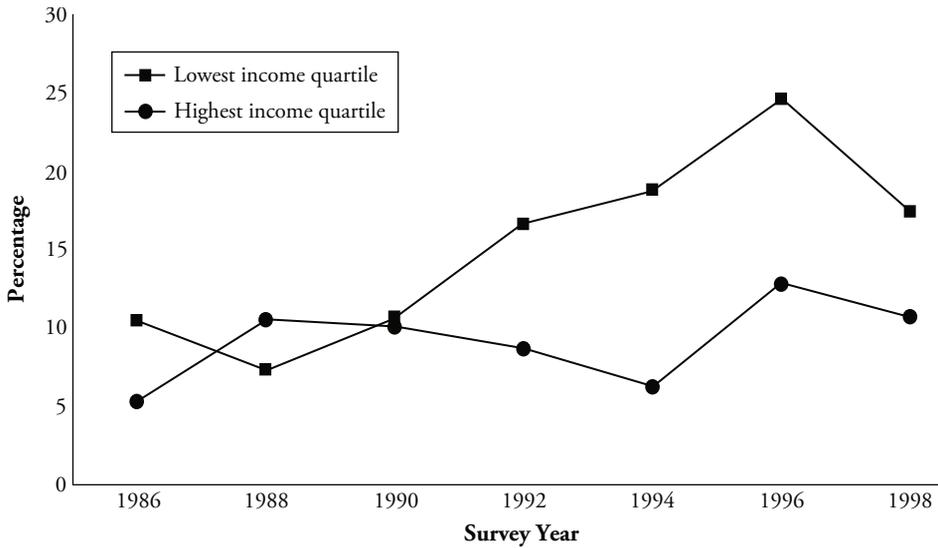
4. A similar inference can be drawn from the Early Childhood Longitudinal Study, Kindergarten Class of 1998–1999 (ECLS-K), the cohort data on kindergarteners who have been followed for four years now.

Figure 3. Percentage of Children Aged 3–5 With Any Health Condition, by Mother’s Income



Source: National Longitudinal Survey of Youth 1979.

Figure 4. Percentage of Children Aged 6–9 With Any Health Condition, by Mother’s Income



Source: National Longitudinal Survey of Youth 1979.

children were more likely to fall short, literally, relative to standards of adequate physical growth and development.

It is worth reiterating that using income instead of education, or vice versa, as an indicator of social class does not lead to different results. Moreover, other indicators of socioeconomic status or surrogates of social class, such as permanent income or, better yet, wealth, usually lead to steeper differences, at least for health outcomes at adult ages.⁵ It would not surprise me if the SES gradient of child health status were steeper when social class position is assessed with a measure of wealth rather than with maternal education or income.

To complete the picture and to confirm that SES gradients are pervasive across the life course, I focus on infant mortality and birth weight. Although differences in infant mortality have gradually shrunk since at least 1960, progress has been slow, and during recent years it has slowed down (Mathews and MacDorman 2006; Mathews et al. 1998; Prager 1994). The ratio of infant mortality rates for the low-educated group to those of the highest-educated group among whites fell from about 2.18 in 1985 to about 1.89 in 2003. Most of this change took place between 1985 and 1995. Among black mothers, there was a mild decrease in the ratio (from 1.47 to 1.44), but during the years 1995 to 2003, the ratio increased. Thus, the closure of the SES gap is proceeding, but at a sluggish pace.⁶

Similarly, there are important social class contrasts in the proportion of low birth weight (figure not shown), a widely used proxy for the health status of recently born infants that will play an important role in the remainder of this article. Differences in the proportion of low birth weight newborns have persisted across a wide spectrum of SES indicators and across race as well. During recent periods, the gap across these population categories has narrowed. The convergence is due not so much to an improvement among those who are worse off in the SES ladder as it is to the deterioration among those who are better off.⁷

SELECTION AND THE IMPORTANCE OF EARLY HEALTH STATUS

To formulate the main problem precisely, I will make a detour and reverse the order of factors involved: rather than asking what it is about early health status that matters for social stratification, I will first ask what it is about social stratification that matters for health status. Doing so will help me identify precisely the theoretical importance of early health status as a mechanism of social stratification.

To start, I will focus only on the adult health and mortality gradients identified earlier. A somewhat stylized explanation for their existence is one that invokes a direct effect of social class on health status and mortality. Competing interpretations assign varying importance to a number of resources acquired, possessed, and used by virtue of one's own social class location. Thus, for example, higher income can purchase better health care and facilitate implementation of more timely preventative strategies. Similarly, higher levels

5. This is true in the case of mortality: mortality differences by socioeconomic status are consistently much steeper when one uses assets rather than income or education as an indicator of social class (Mare and Palloni 1988; McDonough et al. 1997; Spittel 2003).

6. The argument that the pace of the reduction in differences should be expected to slow down because of "floor" effects could be used to counter the idea of sluggish progress. But if true, how can one explain that in countries where infant mortality is much lower than in the United States (Northern Europe, Japan), SES differences in low birth weight are either nonexistent or lower than those in the United States?

7. The implementation of technological innovations fostering early but successful termination of complicated pregnancies is a possible factor in the increased proportion of low birth weight mothers among the better educated. All differences in proportions of low birth weight across the two educational groups at the extremes (less than high school and college degree or more) are statistically significant. The importance of this fact is questionable because the focus here is on large populations, and virtually any minor difference can result in statistical significance. For my arguments, it is more relevant that what used to be a sizeable contrast between groups contracted in a rather odd way. Low birth weight is a rare event, with no more than 10% of the exposed white population and no more than 15% of the exposed black population ever experiencing it. What is important is the fact that the magnitude of the differences between extreme education groups is roughly equivalent to between 30% and 50% of the mean value of the statistic of interest. This contrast is socially and statistically significant.

of education and refined socialization can encourage the adoption of behavioral styles that are beneficial for the health of individuals. Exposure to less stressful lifestyles, frequently associated with advantageous positions in a hierarchy of power, prestige, and money, are conducive to lowering the risks of onset of at least some chronic illnesses and disability (Adler and Ostrove 1999; Smith 1999).

However, observed SES health and mortality gradients may be wholly or, more likely, partially explained by health selection. This is a process whereby healthier individuals early on in their lives and careers are more likely to access advantageous social positions than those who experience worse health status. If higher social classes are, in addition, endowed with resources that have beneficial health effects, then SES gradients will be expanded beyond and above what one would observe if the selection process had operated alone.

The literature invoking selection processes is by and large confusing because *selection* is a word used freely with an astonishing lack of discipline.⁸ The selection process I refer to here is one that requires that early childhood health status constrain individuals' choices and access to resources over part or all of the life cycle, or during critical periods early in life, so that the social class attained as an adult is a partial outcome of early health status.

The knee-jerk reaction to this explanation of health and mortality gradients is that one should "adjust" or "correct" for selection before making inferences about the genuine impact of social class membership on the SES gradient of health and mortality. But this argument misses the point altogether. If such a selection process does indeed exist and if it is efficacious, one should not just adjust or correct for it but understand it thoroughly; if it is relevant at all for the gradient of adult health and mortality, it must *per force* be an important mechanism of social stratification. Here, as in other examples in social sciences, the selection process is as intriguing and relevant as the process one is interested in studying.

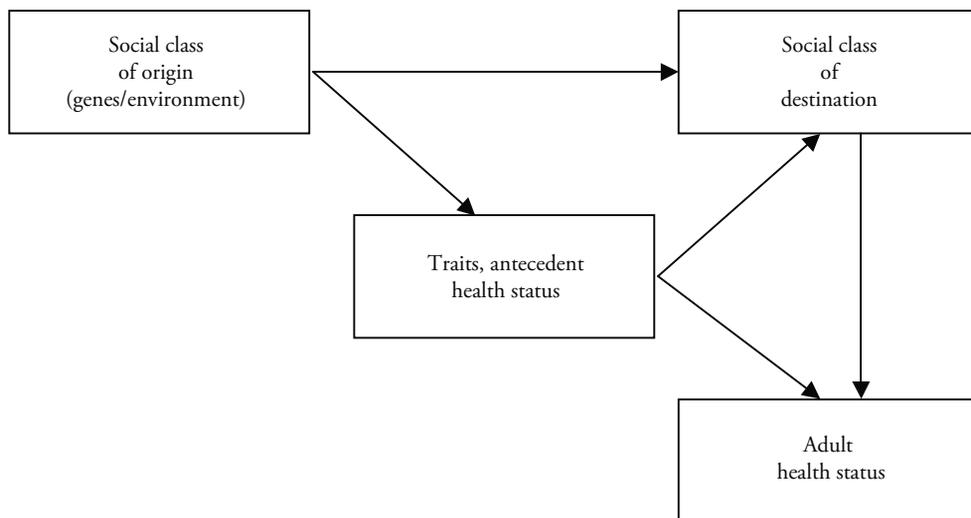
Selection as an explanation for adult social class differences in health and mortality is prominently mentioned in a much-cited report on mortality differences in the United Kingdom, the so-called Black Report (Black et al. 1980). Appropriately, the role of selection has been studied most in depth in the United Kingdom (see, e.g., Blane, Davey Smith, and Bartley 1993; Chandola et al. 2003; Davey Smith et al. 1998; Fox, Goldblatt, and Adelstein 1982; Fox, Goldblatt, and Jones 1985; Illsley 1955, 1986; Manor, Matthews, and Power 2003; Power, Manor, and Fox 1990, 1991; Power and Matthews 1997; Power, Matthews, and Manor 1996; Stern 1983). But U.S. scholars are beginning to take the issue seriously.

Much of the literature on the problem of selection has derived new impetus from the surprising growth of both theory and evidence about the relation between early childhood conditions and adult health and mortality (see Barker 1991, 1998; Barker and Martyn 1992; Blackwell, Hayward, and Crimmins 2001; Davey Smith 2003; Elo and Preston 1992; Hayward and Gorman 2004; Kuh and Ben-Shlomo 1997; Preston et al. 1998). Though the building is far from complete and there are design flaws and cracks in the foundation that need to be fixed, there is a scaffold mounted on fairly solid ground that allows us to peer at the SES health and mortality gradient from an alternative point of view. With this new perspective, one can interpret empirical regularities pertaining to the SES gradient in adult health and mortality somewhat differently. A simplified representation of these relations is portrayed in Figure 5.

The main message from Figure 5 is very simple: the relationship between adult social class and adult health status could be due to the contribution of two very different mechanisms. The first operates through a direct effect of social class characteristics on health: by virtue of occupying a particular social class, an individual is empowered (through money, time, information, or access to services, for example) to minimize health risks. The second

8. There are exceptions to this. See, for example, Adams et al. (2003) and Smith (1999), who investigated the role played by wealth and explicitly considered the existence of reverse causality (health status determining wealth) as well as important selection mechanisms, including the one I am concerned with here.

Figure 5. A New Problem: Relations Involved in “Selection”



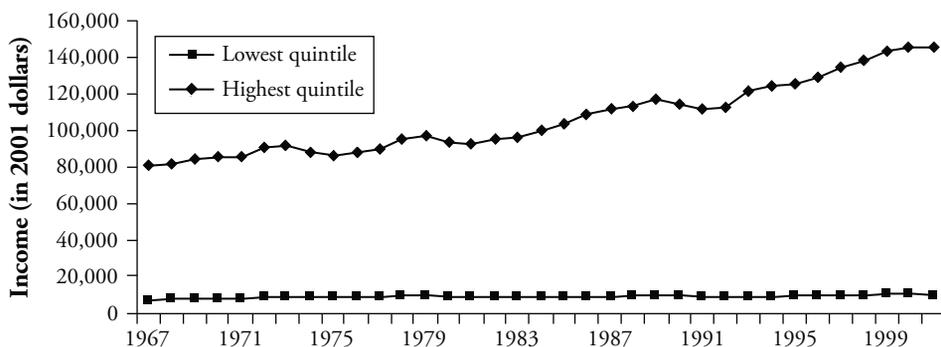
mechanism is one that requires that antecedent health status—very likely through complicated paths rather than the simple one implied by Figure 5—weaves and blends conditions that influence accession to a social class and sometimes may have important direct effects on adult health status. If this second mechanism is feasible, three propositions follow: (1) early health status must have nontrivial impacts on the allocation of individuals by social classes or SES positions, directly or indirectly; (2) to the extent that early health status is determined by parental socioeconomic standing and perhaps also parental health status, an individual’s life chances are constrained by the social class into which he or she is born; and, following from the first two propositions, (3) early health status is a mechanism through which social classes and social inequalities are reproduced over time.

What remains to be done is to search for empirical evidence supporting each one of the first two propositions. It will then be possible to evaluate the potential magnitude of the effects implied by the third one.

SOCIAL CLASS ATTAINMENT AND THE HERITABILITY OF SOCIAL CLASS POSITIONS

What do we know about how individuals attain certain social classes? What do we know about the influence of class of origin? And what, if anything, do we know about the role that early health plays in these processes? Does luck have anything to do with this? Does parental social class overwhelm all other relations?

One can turn for an answer to several literatures, including social stratification and social mobility, labor market theory, and intergenerational transmission of inequalities, poverty, income, and wealth. There is a well-established corpus in each of these fields, and the journey through them leads to the identification of a few regularities that are well-known and others that are less known or less agreed-upon. Very little of it, however, involves or

Figure 6. Real Household Income of the Lowest and Highest Quintiles, 1967–2001

Source: U.S. Census Bureau (2005).

even refers to the role of child health.⁹ These regularities are part of the background against which my story plays and can be classified as one of three varieties: (1) U.S. income, wealth, and wage inequalities have been rising steadily for more than 15 years, regardless of whether one uses individuals, families, or children as units of analysis; (2) the heritability of adult social class in the United States has been relatively high, and, at least over the last 20 to 30 years, there are no clear signs of a decline; and (3) labor markets reward quite heavily traits such as educational attainment and cognitive performance. They also reward personality traits and characteristics that are less tangible than a diploma. Despite this, wages, income, and social class positions continue to be affected through unspecified mechanisms by parental social class, regardless of education, cognition, and personality.

Inequality in the United States

Figure 6 shows the trajectory of (household) real income in the highest and lowest quartiles from 1967 to 2001. The figure shows that sizeable inequalities have opened up, reinforcing the boundaries between social classes. Indicators other than real income produce the same result. This suggests that processes of accession to social classes are more consequential than they would be if the United States were a thoroughly egalitarian society.

Heritability of Social Class

I will summarize first what we know from the social mobility literature and then what is known in economics about the heritability of income and wealth. In a recent article, Ferrie (2005) suggested that exceptionalism regarding social mobility, a distinctive characteristic of American society in the first half of the twentieth century, has diminished considerably and that by the time one reaches the labor market experience of the 1940 cohort, this distinctive feature of U.S. society had completely eroded. In Ferrie's pessimistic view, social mobility ceased to expand by 1940. Hout (2005) reached similar conclusions regarding educational attainment. He claimed that "the United States made significant progress in erasing class differences in educational opportunities for cohorts born between 1900 and 1950. Since then progress has slowed to a halt" (p. 280). Hout found that parental income

9. Two notable exceptions tackle the problem head on: a recent contribution to the literature in the United States (Johnson and Schoeni 2006) and another dealing with the 1947 British Cohort Study (Wadsworth 1986).

matters more now for educational success of recent cohorts than it did for cohorts born between 1940 and 1954. And because educational attainment exerts important effects on adult economic success, the consequence is that rigidity in the social class distribution ceased to erode: one's origins mold one's social class destination a bit more now than used to be the case for our parents and grandparents.

In studies using the General Social Survey in 1990 and a combination of the Occupational Changes in a Generation Surveys (OCG) and Survey of Income and Program Participation (SIPP) data sets in 1998, Grusky and DiPrete (1990) and Hauser (1998) reached similar conclusions regarding the relationship between prestige, education, and income associated with one's own occupation and those associated with one's father's occupation. There are only weak temporal changes in the effects of parental education and occupational prestige score (SEI) on individuals' own education and occupational SEI. This prompted Hauser to state that "there is no global trend in the intergenerational persistence of occupational income or education from the 1960s to the 1990s" (p. 1). It is important to note that the findings from the OCG refer only to men, whereas those from the SIPP apply to both sexes. In all cases, the findings are for all racial/ethnic groups in the United States.

There are exceptions to the regularity identified by Hauser. Some progress has been made differentially by gender, race, and ethnicity, but these changes are not powerful or sweeping enough to undermine the global slackening of the process that detaches one's class origins from one's class of destination.

A dense literature in economics tries to account for the intergenerational relationship between parents' and offsprings' wages, permanent income, and wealth (Bowles, Gintis, and Osborne Groves 2005; Chadwick 2001; Chadwick and Solon 2002; Charles and Hurst 2003; Fertig 2003; Grawe and Mulligan 2002; Hyson 2003; Johnson and Reed 1996; Katz 1999; Katz and Murphy 1992; Mayer and Jencks 1993; Mayer and Lopoo 2005; Mazumder 2005; Solon 1992). In this literature, a magic constant exists that appears much like Avogadro's number: .4. This constant is the approximate elasticity of an offspring's income relative to the father's income. More recently, Mazumder (2005) argued that when one employs more robust measures of permanent income, the magnitude of the elasticity increases to about .6, at least for the period after 1980.

If one uses the estimated range of .4 to .6 and agnostically accepts the middle value, it is impossible to escape the conclusion that there is a lot of "stickiness" in income across generations, namely, that one's income tends to remain within bounds determined by one's parents' income. Thus, if we ignore the somewhat weak evidence that suggests an increasing trend in the elasticity of permanent income, we find, for once, remarkable consistency between the work of economists and sociologists. If the true value of elasticity is .5 (the middle of the range of .4 to .6) and one's father is 50% over the median income, one will be 25% over the median. This is not a bad outcome if one is lucky enough to have a genotype fabricated by parents who are 50% over the median. But it is a bad outcome if one is born to parents who are 50% below the median.

In summary, there is no evidence of recent significant improvements in social mobility, and there is considerable inertia or rigidity in the stratification system. To what is this attributable? What is the role of individual traits such as cognitive performance, schooling, credentials, and personality characteristics, and what, if anything, is determined by the power of our parents' socioeconomic positions ("wallets") or simply by just plain luck?¹⁰

10. Not being a gambler, I use the word *luck* to refer mostly to unmeasured or badly measured characteristics (residual variance) and not just to pure random forces. Similarly, I use the term *parental wallet* to refer to measured parental SES. Surely, there is no need to reiterate that other social, familial, cultural, and ideological dimensions are also reflected by indicators of SES. Without being condescending, I need to remind the reader that, here and elsewhere in the article, references to *wallets* implies reference to a number of factors other than those strictly related to actual wealth, most of which are not known or are not measured well.

To find an answer to these questions and to reintroduce the role of early child health status, I turn now to the third set of findings regarding the functioning of labor markets.

What Do Labor Markets Reward?

Bowles and colleagues (Bowles, Gintis, and Osborne 2000, 2001, 2005) tackled the explanation of heritability of income head on and identified mechanisms we ought to have in mind to explain it. The first empirical regularity highlighted in their work is this: if we try to explain the correlation between parents' and offspring's income by using the most important among the known predictors of income—namely, schooling, labor market experience, and cognitive performance—we account for not more than one-half to three-fifths of the original correlation. The second empirical regularity in Bowles et al.'s research findings is this: variables measuring occupation, education, or income of one's parent typically remain significant predictors in earnings equations that include measures of years of schooling, schooling quality, and either childhood or adult measures of cognitive functioning. To put it more bluntly, parental SES continues to matter after all other factors the researcher can measure are controlled for. We have to conclude that what matters for accession (in the form of income at least) are parental characteristics, conventional market-relevant factors, and luck, or as we call it more elegantly, residual variance. Of this there is plenty to go around, for the unexplained variance in these models usually tops .6. Is there anything else?

Bowles and colleagues suggested that we are missing something large and important—the role of personality traits—that, depending on economic contexts, could play a central role in social class accession. This is not new. In his work on sources of inequalities in earnings, Taubman (1975) hinted at the role of tastes as well as characteristics such as discipline and hard work. Later, Jencks (1979) called attention to the fact that industriousness, perseverance, and self-discipline make an important difference for both higher occupational attainment and earnings. He went as far as to assert that “noncognitive” skills are as important overall as cognitive skills, even when background factors are controlled for.

Recent work has shown that height in men and obesity in women matter in nontrivial ways for wages. It is surely not height and obesity per se that matter, but what they represent or signal to others (Cawley 2000; Judge and Cable 2004; Moss and Tilly 1996; Persico, Postlewaite, and Silverman 2004; Register and Williams 1990). The importance of these traits was also confirmed by Osborne Groves (2005) and was repeatedly invoked in work by Heckman and Rubinstein (2001). Their appraisal summarizes the main findings much better than I could: “It is common knowledge outside academic journals that motivation, tenacity, trustworthiness, and perseverance are important traits for success in life” (Heckman and Rubinstein 2001:145).

In a thorough review of the literature, Farkas (2003) concluded that a new paradigm is emerging to understand stratification outcomes. A growing body of research shows how habitual behavior and personality traits that are separable from cognitive ability but that could be related to it develop from birth to adolescence. They, in conjunction with more-conventionally studied characteristics, also play a role in school success, occupational attainment, and earnings. Bowles and colleagues (2005) provided a compelling argument that such attributes (and perhaps other, more hidden personality traits as well) act as signals that under certain conditions regulate labor markets and guarantee advantageous positions in the competition for jobs, wages, and promotions. The work of Heckman and colleagues (nicely summarized in Cunha et al. 2005) on the wage impact of obtaining the General Equivalency Degree (GED; as opposed to a high school diploma) is a good example of how employers may be discouraged by visible signals from prospective employees regardless of their formal credentials. Though GED graduates tend to score better on standard tests, they earn considerably less in the labor market. Heckman and Rubinstein (2001) and Heckman, Hsee, and Rubinstein (2000) interpreted this finding as suggesting that the stereotypical

behavioral and temperament profiles associated with those who are awarded a GED inhibits enthusiasm among employers with needs for dependable and trustworthy employees.

THE INFLUENCE OF EARLY HEALTH STATUS

What can we assert about the role played by child health: how does child health status enter into this very complex picture of inequality, lack of improvements in social class mobility, and lack of market returns to cognition and education on the one hand and to much less tangible traits on the other?

Mechanisms

There are three mechanisms through which early child health could affect later achievement.¹¹ First, achievement could be influenced by effects associated with a critical period or events that can occur (or not occur) within a window of time or age range. For example, deprivation of maternal care before and after delivery or insufficient intake of micronutrients during the first year of life may permanently and irreversibly blunt the development of mental abilities. Such an effect would not occur if the offending conditions were experienced later on in life. Second, cumulative effects refer to consequences produced by repeated insults or exposure to conditions that if experienced in isolation could be inconsequential if not harmless. Third, contingencies refer to processes that develop because exposure to insults occurs while the individual is simultaneously experiencing a particular set of conditions. In the absence of these particular conditions, the original insults would not have a noticeable impact.

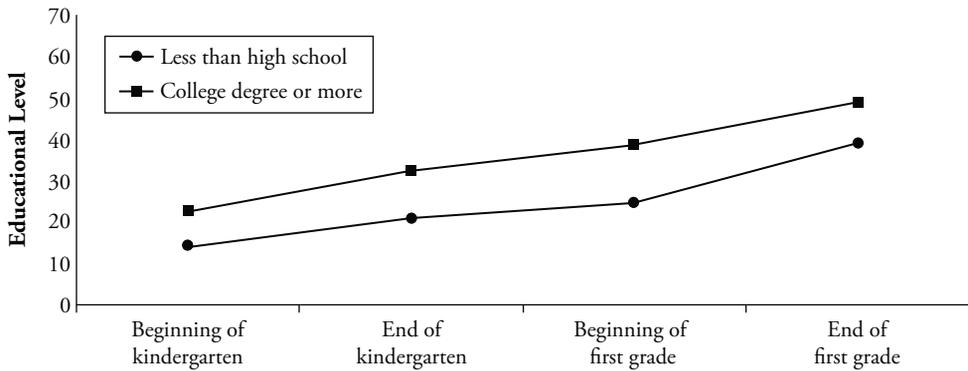
Bad health at a critical period and cumulative effects are not the entire story. Social and familial contexts also matter a great deal. Thus, the importance of early child health depends on macro-social factors and relations that are difficult to identify and estimate. The strength of the impact of early childhood health likely depends on the prevailing social and economic institutions, and it may sometimes wane and sometimes surge as macro forces alter the background against which child health operates. This complicates the task of precisely identifying the nature of relations between early child health and adult socioeconomic status but suggests that one needs to pay as much attention to higher-order interactions as to the simpler, direct effects.

As shown earlier—admittedly with blunt indicators—child health differences by parental social class open up early, as early as one's birth weight is measured, and not only persist but gradually expand. I want to present evidence that child health matters for the acquisition of traits that are handsomely rewarded in the labor market, such as cognitive performance, educational attainment, and personality attributes. If I succeed in doing so, I can then argue that child health status also matters as a mechanism for the transmission of inequalities. Would it not be possible, then, for at least part of the sluggish progress in social mobility and the persistence of intergenerational income heritability to be due to lack of progress in the processes that contract differences in early child health?

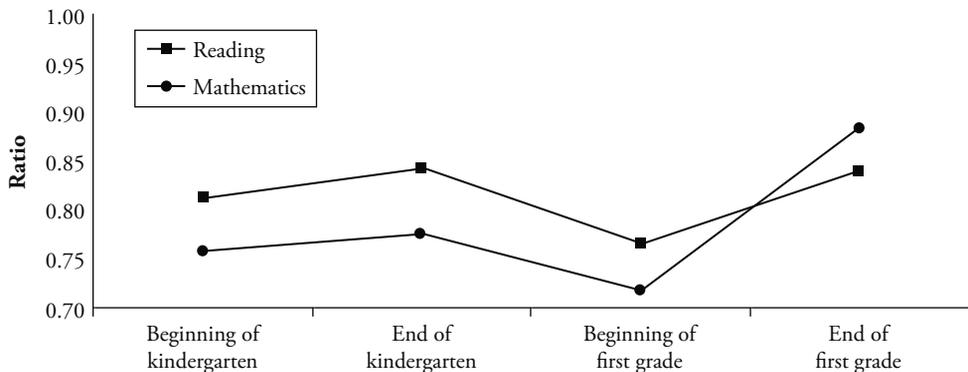
Existing Evidence: The Case of Traditional Traits

At least one market-relevant factor is related to early child health status: early cognitive ability, a trait that correlates strongly with adult cognitive performance, a highly rewarded resource in the labor market. Figures drawn from the ECLS-K data set show that ability gaps by maternal education open up very early, persist or grow with age, and are related to indicators of health status. Figure 7 shows ability gaps in math scores by maternal education. Reading scores show similar results. Figure 8 displays ability gaps in reading and math scores by child health status as reported by mothers. Similar though less pronounced

11. These three mechanisms assemble in a simplified categorization the most important paths of influence cited in the literature (Barker 1991, 1998; Barker and Martyn 1992; Hertzman 1994; Kuh and Ben-Shlomo 1997).

Figure 7. Mathematics Test Scores From Kindergarten to First Grade, by Mother's Education

Source: Early Childhood Longitudinal Study-Kindergarten Cohort 1998–1999.

Figure 8. Ratio of Scores for Children With “Poor” Health Relative to “Good” Health at the Beginning of Kindergarten

Source: Early Childhood Longitudinal Study-Kindergarten Cohort 1998–1999.

gaps are obtained if one uses birth weight instead of child health status.¹² These results are fragile for a number of reasons. First, although the differences in scores are statistically significant, they are small in magnitude. Second, surely some of the associations are due to factors that I am not controlling for (heredity in the case of Figure 7 and poverty and deprivation in the case of Figure 8).

12. These findings are consistent with those reported in the literature, where it is verified that children's cognitive gaps tend to open somewhat during the summer and narrow during the school year. Exposure to school discipline and external stimulation are factors that are invoked to explain this finding (Downey, Von Hippel, and Broh 2004).

The regularity in Figures 7 and 8 is consistent with findings by Miller and Korenman (1994), who showed that impaired growth, possibly generated by poor nutrition or prenatal or postnatal conditions, results in substandard cognitive performance. Other research has shown that child morbidity has a significant independent impact on reading and math performance (O'Brien Caughy 1996). Michael (2004) found that in the NCSD (British Cohort Survey of 1958), breast-feeding—a well-known growth-promoting maternal activity—and birth weight are positively associated with test scores, even after controlling for parental attributes and resources.

Other work has also demonstrated that birth weight, early nutritional status, and growth exert an impact, particularly on early cognition but also on late cognition, even after other factors are controlled for. Research by Case et al. (2005) demonstrated that birth weight and poor health in childhood have an impact on educational attainment and ultimate class attainment. Similarly, albeit with a special sample, Currie showed that the measurable impact of birth weight on the behavior of indicators of adult socioeconomic conditions is far from trivial (Currie and Moretti 2005).

Strong evidence emerging from low-income countries shows a clear relationship between birth weight, early nutrition, physical growth, and cognitive performance. And closer to the point I want to make later, the same literature reveals that these early growth attributes are predictive of schooling and adult labor productivity and wages. There is a large and growing literature on these issues, including work by Behrman (1993), Behrman and Deolalikar (1990), Behrman and Rosenzweig (2002, 2004), Glewwe et al. (2001), Schultz (2005), Selowsky and Taylor (1973), Strauss and Dietz (1998), and Thomas and Strauss (1997).

Existing Evidence: The Case of Nontraditional Traits

Much less is known about the impact of birth weight, or other indicators of early child health, on the acquisition of personality traits that may be important in the labor market. But there are signs that these relations are there for us to discover. In a recent study using the ECLS-K, Stormer and Harrison (2003) found that food insecurity, which probably proxies not just for poverty but for family disorganization, stress, or anxiety, was strongly related to social interaction skills and emotional states. This finding is consistent with other research (Kleinman et al. 1998; Murphy 1983) showing that emotional vulnerability is more frequent among children and adolescents in food-insecure households.

Furthermore, as mentioned earlier, male adolescent height and female obesity matter for early adult wages. A stock of research shows that both height and obesity are related to birth weight, early nutritional status, and early health status. Fogel (Fogel 2004; Fogel and Costa 1997) made his case for the secular mortality decline in Europe by invoking precisely the body of research that relates early exposure to disease, early nutrition, and adult height.

Finally, Dunifon, Duncan, and Brooks-Gunn (2004) found a relationship between one's own family income and tidiness of the household of origin (parental). Thus, indicators of household life organization, net of other factors, appear to influence the ability to access higher incomes. While this result may point to the importance of a trait that is not traditionally studied in this context ("household organization"), it remains to be seen if household tidiness appears more frequently among children who experienced fewer health problems or, alternatively, if tidiness of the household of origin by itself leads to better child health status.

How Is Early Health Status Acquired? The Role of Heritability

We know with some certainty that observed characteristics that are only coarse proxies of child health, such as birth weight, are seemingly passed on from mother to offspring and that this heritability could be partly genetic and partly associated with exposure to common environments. The work by Conley and Bennett (2000a, 2000b, 2001) and more recent

investigations with a unique sample of California women by Currie and Moretti (2005) provide a glimpse into this regularity. There are a few dissenters (e.g., Gorman 2002), but the evidence for modest heritability of birth weight is quite strong.

Beyond the evidence regarding birth weight (and related features, such as height and weight), there is precious little suggesting that child health status is highly inheritable. For the most part, the available evidence suggests that child health status is determined by household and familial environments as well as by parental and individual behaviors.

DATA SET, PATH MODEL, AND ESTIMATION OF PARAMETERS

How can all the relevant hypotheses, conjectures, and empirical regularities I summarized be used to parsimoniously represent the complicated relations I referred to earlier? In what follows, I formulate a simplified path model relating early childhood conditions and adult achievement. The connections work through a number of paths I identified earlier from the relevant literature. Since other models could have fit the data equally well, the results I present are tentative and aim only to demonstrate that the inclusion of early health status is warranted. Because the path model does not rest on latent variables but only on actual indicators that were obtained from those available in a particular data set, I will start with a description of the latter, introduce the path model, and finally estimate the parameters.

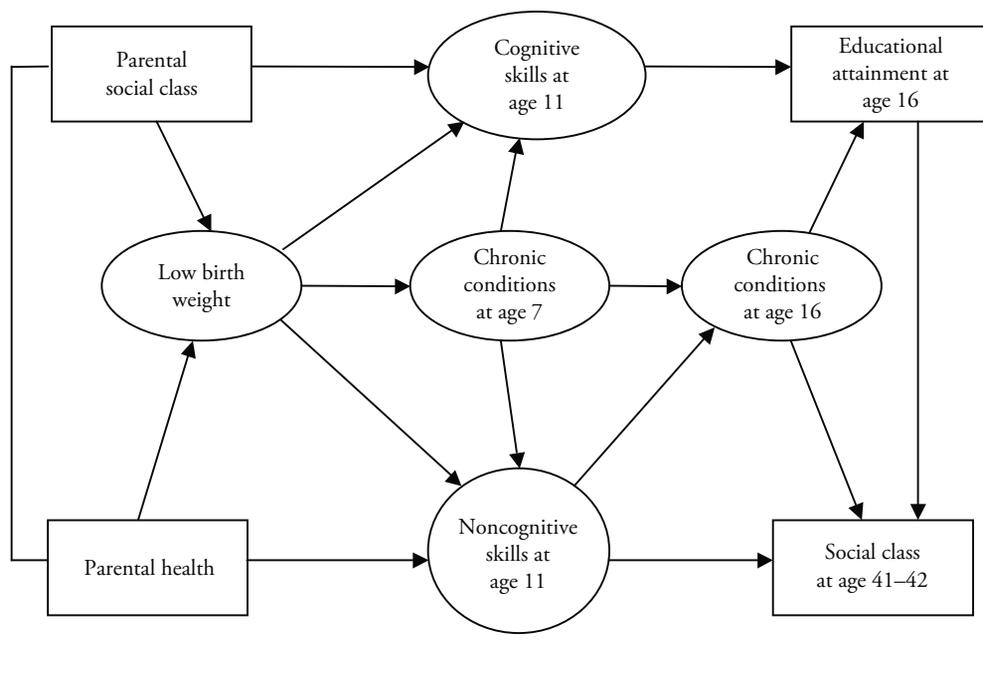
The Data Set

I use the NCDS for the 1958 cohort. The advantage of this data set, which has been used in many previous studies (e.g., Case et al. 2005; Case et al. 2002; Hobcraft 2001; Hobcraft and Mensah n.d.; Kuh and Ben-Shlomo 1997; Kuh et al. 2004; Power et al. 1991), is that it contains rich information on a large number of individuals ($N = 17,198$) from birth until ages 42–43. The study consists of six waves that took place at ages 0, 5, 10, 16, 21, 26, 29–30, and 41–42. Subsamples were examined for special purposes at ages 2 and 3, as well as at ages 20 and 21. I choose only the sample of men ($N = 9,597$) because the information on wages and occupational categories (on which the classification by social class is based) is richer for them. The main disadvantage of the study is that the original sample experiences a great deal of attrition, most of which occurs in the period between the first and third waves, though sample losses are also experienced due to nonresponse in waves in which some key characteristics are measured.¹³ The same panel data, with all their shortcomings, have been used by other researchers, sometimes without adjustments for the potential problems that attrition may create. Thus, the results I produce, though simple and perhaps coarse, are comparable to those obtained by other researchers working with different methods.

The indicators I use are as follows. First, social class is measured as is conventional in the United Kingdom, with a discrete variable taking on values from 1 to 6 representing types of occupational categories that range from manual labor to managerial positions. In this exercise, I treat this variable as continuous. Second, educational attainment is a discrete variable, not a continuous one, representing whether an individual passed enough o-level exams (five) to be able to pursue postsecondary education. This measure is very coarse because many individuals who pass the minimum number of exams never pursue higher education. Thus, the subpopulation passing at least five o-level exams is very heterogeneous with respect to their earning potential. For this reason, it is likely that I will underestimate the effects of education. Third, I employ indicators of health status at birth (a dichotomous variable for low birth weight), age 7, and age 11 (a continuous variable for the number of

13. In this article, I do not attempt to address attrition and the complications it may create. The sample of males is reduced from about 9,697 to about 1,340 because of attrition as well as nonresponse in the last wave. In a different study, my colleagues and I adopt a methodology to adjust for the effects of attrition and nonresponse. Preliminary results suggest that the most important conclusions presented in this article withstand the test of a more rigorous treatment of panel attrition and nonresponse.

Figure 9. Structural Equation Model



limiting health conditions diagnosed by a physical exam by an attending physician). Fourth, cognitive ability is measured using a standardized score from a cognitive test implemented when the cohort members were age 11. Finally, to proxy for noncognitive traits, I use three indicators: the score received on a scale of maladjustment at age 11, an indicator for low height (a binary variable attaining value 1 if individual height is below the first quartile) at age 11, and a teacher-assigned score of “attractiveness.” Because there was no available indicator for parental health, I resorted to the use of a dichotomous variable attaining the value of 1 if the mother was obese (body mass index above 30) when she gave birth. This very rough measure surely does not capture all it should and may reflect conditions that are not part of the model.¹⁴

Path Model

The main features and relations of the path model are illustrated in Figure 9. Figure 9 makes explicit the nature of some of the linkages between early conditions and adult health and socioeconomic status already introduced in Figure 5. It includes not conceptual constructs but actual indicators available in the 1958 NCS. Figure 9 is more satisfying than Figure 5, but it is still a formidable simplification. Not only does it represent relations between indicators rather than latent constructs, but in an effort to simplify, I have omitted relations

14. In ongoing research (Palloni et al. 2006), my colleagues and I indirectly estimated maternal birth weight and found that its effects are more salient and relevant than those associated with maternal obesity at birth. In any case, because the proxy for maternal health status is not very accurate, the part of the model that connects child and parental health is very fragile.

that indeed will be considered (such as the direct effect of cognitive skills on social class or that of low birth weight on chronic conditions at age 11 or educational attainment at age 16) and others that perhaps exist but will not be examined at all. Despite these shortcomings, the key ingredients to estimate effects of early health status are represented in the path model. Early health status is molded by parental health and family background, and it affects both conventional and unconventional personal attributes that matter in social class accession, sometimes directly but more frequently through other variables.

Estimation

First, I estimate the path coefficients for a structural equation model that represents the factors and relations influencing adult social class just as portrayed in Figure 9. The regression coefficients of this very simple model, estimated using M-Plus (estimates of path coefficients and standard errors available upon request), answer two questions. First, does early health, assessed by birth weight and two measures of presence of chronic conditions at ages 7 and 11, exert nontrivial effects on social accession, and if so, where exactly? Second, how much of the effects of parental class is transmitted through early health as a mediating mechanism; how much of these effects operates through cognitive performance, schooling, and noncognitive traits, or even directly?

To answer the first question, I highlight the most important results from the structural equation model. First, the effects of low birth weight on health status at age 7 are strong and statistically significant, even after I control for parental social class. Second, cognitive performance at age 11 is powerfully influenced by both low birth weight and health status at age 7, even after I control for parental social class and maternal health background. These two results suggest the existence of a critical period-type of effect. Third, health status at age 7, but not low birth weight, matters for health status at age 11, even after I control for social class of origin. Fourth, the indicator of educational attainment at age 16 is strongly related to cognitive skills at age 11 but not to any of the indicators of early health status. An interesting point is verified here: two of the three measures I use to capture unconventional market traits (height at age 10 and the score of maladjustment at age 11) have large and significant effects on educational attainment. Both of these traits are strongly related to low birth weight and to chronic conditions at age 7. Finally, social class of destination at age 42–43 is strongly dependent on educational attainment, cognitive status, and parental social class.

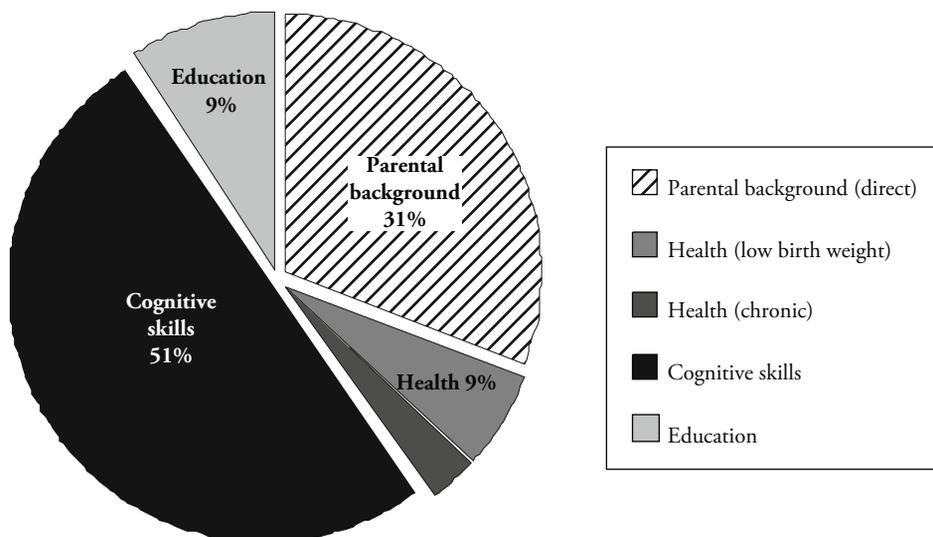
The first conclusion I draw from these results is that any effects that early health may have on social class of destination, however important, work only through cognitive skills and through unconventional market traits. None are direct.

Regarding the second question I posed, note that the initial regression coefficient of offspring's social class on parents' social class is of the order of .29. After I control for all relevant factors I am able to measure in the data set, the magnitude of this effect falls to .085 but is still statistically significant. Thus, I slash the effect to a third of its original value. This result is entirely consistent with the U.S. data examined by Bowles et al. (2005).

To extract more information from the path model, I decompose the effects of parental social class into components associated with the many alternative paths of influences. To do this, I use standard formulae for the path (standardized) coefficients. Figure 10 displays the most important results.

A large fraction, 51%, of the effects of parental on offspring social class is due to the influence of parental class on cognitive performance. About 9% of the original effects operate through son's education; nearly 31% is attributable to the direct effects of parental characteristics. One can surmise that the latter could be a combination of effects associated directly with wealth and with early family environments. Finally, early child health accounts for about 9% of the original parent-offspring relationship. Thus, its role is nearly identical to that of educational attainment. Although it is highly likely that the effect of

Figure 10. Decomposition of Effects of Parental Social Class on Sons' Social Class



educational attainment is underplayed because of the way I measured it, early childhood status, too, was measured poorly. Thus, it may well be that I have been fair and probably produced even-handed lower bounds for both estimates. Moreover, I also underplay the effects of early health status because none of the decomposition of path coefficients I estimated take into account the environmental or genetic effect of maternal health on early health status.¹⁵ I focus only on the effects originating in parental social class.

And what about the role of luck? The residual variance of the model is fairly substantial, about .70, and it represents the many unknown factors about social class determination or the many poorly measured variables, not just luck. The estimated residual variance in my model is remarkably similar to what Mulligan (1999) and Bowles and colleagues (2005) obtained from a number of U.S. studies in which the dependent variable was wages instead of social class.

Translating Estimates From the Path Model to a Mobility Matrix

Regression or path coefficients are not enough to tell the story completely. Thus, I resort to the production of a mobility matrix generated by the estimates from the structural equation model. The estimates are readily transformed into probabilities that individuals with parents in one social class will eventually end up in the same or in other social classes. Because the model contains error terms in several equations, there is not a unique mobility matrix associated with them but many alternative ones. I use Monte Carlo simulations to incorporate the role of the error terms. In each iteration, I generate a population with classes

15. As I mentioned earlier, the indicator of maternal health is a poor one, and its effects, not surprisingly, were not statistically significant. Thus, they were not included in the decomposition exercise.

Table 1. Means and Standard Deviations of Probabilities of Individuals Staying in the Same Low or High Social Class as Their Parents: Scenarios 1 and 2^a

	Scenario 1		Scenario 2	
	Mean	SD	Mean	SD
PL ^b	.12	.008	.10	.006
PH ^c	.43	.012	.45	.013

^aFor a definition of scenarios 1 and 2, see the text. PL and PH are the proportion of individuals whose parents belonged, respectively, to a low or high social class and who, upon reaching age 42–43, are in the same social class as their parents. The values are means and standard deviations over 100 simulations.

^bThe difference between scenario 1 and 2 is statistically significant ($p \leq .01$).

^cThe difference between scenario 1 and 2 is not statistically significant ($p > .13$).

of origin and, after applying the estimates from the path model, produce a population distribution at age 42–43 according to class of destination (at age 42–43). This information is then summarized in a mobility matrix. I repeat the exercise 100 times and then calculate robust average measures of mobility (and their associated standard deviations reflecting Monte Carlo variation).

Two caveats are in order. First, the matrix exercise requires me to impose assumptions about the nature of marriage markets as well as about the dynamics of fertility by social class. In this application, I chose the bluntest of simplifications: total homogamy and no net fertility differences by social class. The effects of these two omitted factors are likely to offset one another.¹⁶ Second, the state-space for the simulation ignores adult health status, and individuals are distinguished only by social class of origin and destination. Reintroducing adult health status will help us to assess how much of the gradient in adult health is due to selection processes working through early child health (Palloni et al. 2006).

I design two scenarios and produce mobility matrices for each one of them. In the first scenario, the effects of all variables are set equal to those estimated from the path model (Scenario 1). In the second one, all the effects of early health status are set to zero (Scenario 2). I then choose only one of the many indicators produced by the matrix exercise, namely, the probability that an individual will end up in the same social class as his parents. I refer to these probabilities as a measure of the “stickiness” of the social class system: the higher its value, the stronger the association with parental class, whatever the conduits for the association may be. If early health status played no role at all, the difference in the values of the probabilities between Scenarios 1 and 2 would be nil. But it is not. As the first panel of Table 1 shows, after I remove the effects of health status (Scenario 2), individuals at the bottom will be more upwardly mobile; the proportion of individuals whose parents belonged to a low social class and who, on reaching age 42–43, are in the same social class (or PL) changes from .12 to .10. That is, there is less “stickiness” in the mobility matrix. Those at the top will have fewer chances to be downwardly mobile; the proportion of individuals whose parents belonged to a social class and who, on reaching age 42–43, are in the same social class (or PH) increases from .43 to .45. Only the difference associated with the lowest class is statistically significant, however. The other is expected under stochastic variability. The magnitude of the differences between Scenarios 1 and 2 is very modest. For the lowest social class, the

16. My colleagues and I are pursuing work on the role of these two determinants, but preliminary work suggests that the most important conclusion regarding the effects of early child health is robust (Palloni et al. 2006).

difference amounts to .02, which is equivalent to a relative change of about 17%. For the highest social class, the difference, also .02, is equivalent to a relative change of about 5%. The weighted average of these is roughly 11% and should be taken as an indicator of the contribution of early health status to heritability at the extremes of the social class distribution (although the difference associated with the highest social class is statistically insignificant). This figure is quite close to the contribution of early health status to the association between parental and offspring social class I estimated earlier in the decomposition of path coefficients. Whether the consistency between these two alternative measures of the role of early health status is purely coincidental or reflective of a true relationship remains to be seen.

If one disregards the difference in PH between the two scenarios (because it is not statistically significant), the results support the idea that child health acts as an equalizer of opportunities: if child health were allocated more equitably, it would favor the upward mobility of those at the bottom—who can only be better off—but would not do much for the mobility of those at the top—who can only fall.

CONCLUSION

If I succeeded in showing that early childhood health is a plausible explanatory factor for the intergenerational transmission of inequalities, I accomplished the most important goal of this article. The effects are not overwhelming, but they exist and are comparable to the effects of variables and factors to which we routinely give more attention than early child health. Relative to issues such as poverty, education, and family background, which we frequently associate with transmission of inequalities, the effects we estimate for early childhood health are nonignorable. Keep in mind that the case for early health status is largely understated in part because the measures for early health status are so primitive that they probably capture no more than what is extreme.

The data set is not unproblematic. In addition to the fact that the NCDS represents the life cycle of one cohort in one country over one particular time stretch, it is also plagued by problems of attrition and missing information on key variables that I eschewed blatantly. The model I use to represent observed relations is exceedingly simple and ignores the fact that the variables among which I estimate relations are indicators of latent dimensions, not the dimensions themselves. More realistic modeling should employ latent classes and posit relationships between them and the indicators I chose here or richer ones. A final limitation of my results is that the Monte Carlo exercise that results in a mobility matrix requires an extra step I overlooked altogether: one should estimate higher power of the mobility matrices to assess effects in steady states. This would avoid the criticism that the mobility matrices could be heavily influenced by initial conditions.

One last but key caveat: the supportive evidence for the role of early health offered in this article refers only to a high-income country. In low-income countries, where malnutrition and disease among toddlers and young children are the rule rather than the exception, the influences of interest are likely to be more pervasive and undoubtedly more consequential, even if one is condemned to employ the coarsest of indicators. Once again, the case being made for the importance of early child health is likely to be vastly understated.

REFERENCES

- Adams, P., M.D. Hurd, D. McFadden, A. Merrill, and T. Ribeiro. 2003. "Healthy, Wealthy and Wise? Tests for Direct Causal Paths Between Health and Socioeconomic Status." *Journal of Econometrics* 112(1):3–56.
- Adler, N.E. and J.M. Ostrove. 1999. "Socioeconomic Status and Health: What We Know and What We Don't." Pp. 3–15 in *Socioeconomic Status and Health in Industrial Nations*, edited by N.E. Adler, M. Marmot, B.S. McEwen, and J. Stewart. *Annals of the New York Academy of Sciences*, Vol. 896.

- Barker, D.J.P. 1991. "The Foetal and Infant Origins of Inequalities in Health in Britain." *Journal of Public Health Medicine* 13(2):64–68.
- . 1998. *Mothers, Babies and Health in Later Life*. Edinburgh, Scotland: Churchill Livingstone.
- Barker, D.J. and C.N. Martyn. 1992. "The Maternal and Fetal Origins of Cardiovascular Disease." *Journal of Epidemiology and Community Health* 46(1):8–11.
- Behrman, J.R. 1993. "The Economic Rationale for Investing in Nutrition in Developing Countries." *World Development* 21:1749–71.
- Behrman, J.R. and A.B. Deolalikar. 1990. "Health, Nutrition and Macro-Economic Adjustment With a Human Face: The Analytical Basis for the UNICEF Advocacy and a Case Comparison." Pp. 330–55 in *What We Know About the Health Transition: The Cultural, Social and Behavioural Determinants of Health*, edited by J. Caldwell. Canberra: Australian National University.
- Behrman, J.R. and M.R. Rosenzweig. 2002. "The Returns to Increasing Body Weight." PIER Working Paper 01-052. Penn Institute for Economic Research, University of Pennsylvania.
- . 2004. "Returns to Birthweight." *Review of Economics and Statistics* 86:586–601.
- Bianchi, S.M. 2000. "Maternal Employment and Time With Children: Dramatic Change or Surprising Continuity?" *Demography* 37:401–14.
- Black, D., J.N. Morris, C. Smith, and P. Townsend. 1980. "Inequalities in Health: Report of a Research Working Group." Department of Health and Social Security, London.
- Blackwell, D.L., M.D. Hayward, and E.M. Crimmins. 2001. "Does Childhood Health Affect Chronic Morbidity in Later Life?" *Social Science and Medicine* 52:1269–84.
- Blane, D., G. Davey Smith, and M. Bartley. 1993. "Social Selection: What Does It Contribute to Social Class Differences in Health?" *Sociology of Health and Illness* 15(1):1–15.
- Bowles, S., H. Gintis, and M. Osborne. 2000. "The Determinants of Earnings: Skills, Preferences, and Schooling." Department of Economics, University of Massachusetts–Amherst, Massachusetts.
- . 2001. "The Determinants of Earnings: A Behavioral Approach." *Journal of Economic Literature* 39:1137–76.
- , eds. 2005. *Unequal Chances: Family Background and Economic Success*. Princeton, NJ: Princeton University Press.
- Case, A., A. Fertig, and C. Paxson. 2005. "The Lasting Impact of Childhood Health and Circumstance." *Journal of Health Economics* 24:365–89.
- Case, A., D. Lubotsky, and C. Paxson. 2002. "Economic Status and Health in Childhood: The Origins of the Gradient." *American Economic Review* 92:1308–34.
- Cawley, J. 2000. "Body Weight and Women's Labor Market Outcomes." NBER Working Paper 7841. National Bureau of Economic Research, Cambridge, Massachusetts.
- Chadwick, L. 2001. "Intergenerational Income Mobility Among Daughters in the NLS." Unpublished manuscript. U.S. Department of Health and Human Services, Washington, DC.
- Chadwick, L. and G. Solon. 2002. "Intergenerational Income Mobility Among Daughters." *The American Economic Review* 92:335–44.
- Chandola, T., M. Bartley, A. Sacker, C. Jenkinson, and M. Marmot. 2003. "Health Selection in the Whitehall II Study, UK." *Social Science and Medicine* 56:2059–72.
- Charles, K. Kofi and E. Hurst. 2003. "The Correlation of Wealth Across Generations." *Journal of Political Economy* 111:1115–82.
- Cherlin, A.J. 1999. "Going to Extremes: Family Structure, Children's Well-being, and Social Science." *Demography* 36:421–28.
- Conley, D. and N.G. Bennett. 2000a. "Is Biology Destiny? Birth Weight and Life Chances." *American Sociological Review* 65:458–67.
- . 2000b. "Race and the Inheritance of Low Birth Weight." *Social Biology* 47(1–2):77–93.
- . 2001. "Birth Weight and Income: Interactions Across Generations." *Journal of Health and Social Behavior* 42:450–65.
- Cunha, F., J. Heckman, L. Lochner, and D. Masterov. 2005. "Interpreting the Evidence of Life Cycle Skill Formation." NBER Working Paper 11331. National Bureau of Economic Research, Cambridge, MA.

- Currie, J. and R. Hyson. 1999. "Is the Impact of Health Shock Cushioned by Socioeconomic Status? The Case of Low Birthweight." *The American Economic Review* 89:245–50.
- Currie, J. and E. Moretti. 2005. "Biology as Destiny: Short and Long-Run Determinants of Intergenerational Transmission of Birth Weight." NBER Working Paper 11567. National Bureau of Economic Research, Cambridge, MA.
- Currie, J. and M. Stabile. 2003. "Socioeconomic Status and Health: Why Is the Relationship Stronger for Older Children?" *American Economic Review* 93:1813–23.
- Davey Smith, G., ed. 2003. *Health Inequalities: Lifecourse Approaches*. Bristol, United Kingdom: Policy Press.
- Davey Smith, G., C. Hart, D. Blane, and D. Hole. 1998. "Adverse Socioeconomic Conditions in Childhood and Cause Specific Adult Mortality: Prospective Observational Study." *British Medical Journal* 316:1631–35.
- Downey, D.B., P.T. Von Hippel, and B.A. Broh. 2004. "Are Schools the Great Equalizer? Cognitive Inequality During the Summer Months and the School Year." *American Sociological Review* 69:613–35.
- Dubois, L. and M. Girard. 2001. "Social Position and Nutrition: A Gradient Relationship in Canada and the USA." *European Journal of Clinical Nutrition* 55:366–73.
- Dunifon, R., G. Duncan, and J. Brooks-Gunn. 2004. "The Long-Term Impact of Parental Organization and Efficiency." Pp. 85–118 in *Family Investments in Children's Potential: Resources and Parenting Behaviors That Promote Success*, edited by A. Kalil and T. DeLeire. Mahwah, NJ: Lawrence Erlbaum Associates.
- Elo, I.T. and S.H. Preston. 1992. "Effects of Early-Life Conditions on Adult Mortality: A Review." *Population Index* 58:186–212.
- . 1996. "Educational Differentials in Mortality: United States 1979–85." *Social Science and Medicine* 42(1):47–57.
- Farkas, G. 2003. "Cognitive Skills and Noncognitive Traits and Behaviors in Stratification Processes." *Annual Review of Sociology* 29:541–62.
- Feldman, J.J., D.M. Makuc, J.C. Kleinman, and J. Cornoni-Huntley. 1989. "National Trends in Educational Differentials in Mortality." *American Journal of Epidemiology* 129:919–33.
- Ferrie, J.P. 2005. "The End of American Exceptionalism? Mobility in the United States Since 1850." *Journal of Economic Perspectives* 19:199–215.
- Fertig, A.R. 2003. "Trends in Intergenerational Earnings Mobility in the United States." *Journal of Income Distribution* 12:108–30.
- Fogel, R.W. 2004. *The Escape From Hunger and Premature Death, 1700–2100: Europe, America and the Third World*. New York: Cambridge University Press.
- Fogel, R.W. and D.L. Costa. 1997. "A Theory of Technophysio Evolution, With Some Implications for Forecasting Population, Health Care Costs, and Pension Costs." *Demography* 34:49–66.
- Fox, A.J., P.O. Goldblatt, and A.M. Adelstein. 1982. "Selection and Mortality Differentials." *Journal of Epidemiology and Community Health* 36:69–79.
- Fox, A.J., P.O. Goldblatt, and D.R. Jones. 1985. "Social Class Mortality Differentials: Artifact, Selection or Life Circumstances?" *Journal of Epidemiology and Community Health* 39(1):1–8.
- Glewwe, P., H.G. Jacoby, and E.M. King. 2001. "Early Childhood Nutrition and Academic Achievement: A Longitudinal Analysis." *Journal of Public Economics* 81:345–68.
- Gorman, B. 2002. "Birth Weight and Cognitive Development in Adolescence: Causal Relationship or Selection?" *Social Biology* 49(1–2):13–34.
- Grawe, N.D. and C. Mulligan. 2002. "Economic Interpretations of Intergenerational Correlations." *Journal of Economic Perspectives* 16(3):45–58.
- Grusky, D.B. and T.A. DiPrete. 1990. "Recent Trends in the Process of Stratification." *Demography* 27:617–37.
- Hauser, R.M. 1998. "Intergenerational Economic Mobility in the United States: Measures, Differentials, and Trends." CDE Working Paper 98-12. Center for Demography and Ecology, University of Wisconsin–Madison.

- Hayward, M.D. and B.K. Gorman. 2004. "The Long Arm of Childhood: The Influence of Early-Life Social Conditions on Men's Mortality." *Demography* 41:87–107.
- Heckman, J., J. Hsee, and Y. Rubinstein. 2000. "The GED Is a Mixed Signal." Presented at the annual meeting of the American Economic Association, Boston, January.
- Heckman, J. and Y. Rubinstein. 2001. "The Importance of Noncognitive Skills: Lessons From the GED Testing Program." *American Economic Review* 91:145–49.
- Hertzman, C. 1994. "The Lifelong Impact of Childhood Experiences: A Population Health Perspective." *Daedalus* 123(4):167–80.
- Hobcraft, J. 2001. "Intergenerational Transmission of Inequality in a British Birth Cohort." Invited paper presented at the annual meeting of the Population Association of America, March 29–31, Washington, DC.
- Hobcraft, J. and F. Mensah. n.d. "The Childhood Origins of Adult Health and Well-being: Do Cohort and Gender Matter?" Unpublished manuscript. Department of Social Policy and Social Work, University of York.
- Honig, A.S. and F.A. Oski. 1984. "Solemnity: A Clinical Risk Index for Iron Deficiency Infants." *Early Child Development and Care* 16:69–84.
- Hout, M. 2005. "Educational Progress for African-Americans and Latinos in the United States From the 1950s to the 1990s: The Interaction of Ancestry and Class." Pp. 262–87 in *Ethnicity, Social Mobility, and Public Policy*, edited by G.C. Loury, T. Modood, and S.M. Teles. New York: Cambridge University Press.
- Hyson, R. 2003. "Differences in Intergenerational Mobility Across the Earnings Distribution." Working Paper No. 364. Office of Employment and Unemployment Statistics, U.S. Department of Labor.
- Illsley, R. 1955. "Social Class Selection and Class Differences in Relation to Stillbirths and Infant Death." *British Medical Journal* 2:1520–26.
- . 1986. "Occupational Class, Selection and the Production of Inequalities in Health." *Quarterly Journal of Social Affairs* 2(2):151–65.
- Jencks, C. 1979. *Who Gets Ahead?* New York: Basic Books.
- Johnson, P. and H. Reed. 1996. "Intergenerational Mobility Among the Rich and the Poor: Results From the National Child Development Survey." *Oxford Review of Economic Policy* 12(1): 127–42.
- Johnson, R.C. and R.F. Schoeni. 2006. "Early-Life Events and Health and Labor Market Outcomes in Adulthood." Paper presented at the annual meeting of the Society of Labor Economists, May 5, Cambridge, MA.
- Judge, T.A. and D.A. Cable. 2004. "The Effect of Physical Height on Workplace Success and Income: Preliminary Test of a Theoretical Model." *Journal of Applied Psychology* 89:428–41.
- Katz, L.F. 1999. "Changes in the Wage Structure and Earnings Inequality." Pp. 1463–55 in *Handbook of Labor Economics*, Vol. 3A, edited by O. Ashenfelter and D. Card. Amsterdam: Elsevier.
- Katz, L.F. and K.M. Murphy. 1992. "Changes in Relative Wages, 1963–1987: Supply and Demand Factors." *Quarterly Journal of Economics* 107(1):35–78.
- Kleinman, R.E., J.M. Murphy, M. Little, M. Pagnao, C.A. Wehler, K. Regal, and M.S. Jellinek. 1998. "Hunger in Children in the United States: Potential Behavior and Emotional Correlates." *Pediatrics* 101:1–6.
- Knudsen, E.I. 2004. "Sensitive Periods in the Development of the Brain and Behavior." *Journal of Cognitive Neuroscience* 16:1412–25.
- Kuh, D. and Y. Ben-Shlomo, eds. 1997. *A Life Course Approach to Chronic Disease Epidemiology*, 1st ed. New York: Oxford University Press.
- Kuh, D., M. Richards, R. Hardy, S. Butterworth, and M.E.J. Wadsworth. 2004. "Childhood Cognitive Ability and Deaths up Until Middle Age: A Post-war Birth Cohort Study." *International Journal of Epidemiology* 33:408–13.
- Lauderdale, D.S. 2001. "Education and Survival: Birth Cohort, Period, and Age Effects." *Demography* 38:551–61.

- Lozoff, B.E., N.K. Klein, E.C. Nelson, D.K. McLish, M.Manuel, and M.E. Chacon. 1998. "Behavior of Infants With Iron Deficiency Anemia." *Child Development* 69(1):24–36.
- Lynch, S.M. Forthcoming. "Explaining Life Course and Cohort Variation in the Relationship Between Education and Health: The Role of Income." *Journal of Health and Social Behavior*.
- Manor, O., S. Matthews, and C. Power. 2003. "Health Selection: The Role of Inter- and Intra-Generational Mobility on Social Inequalities in Health." *Social Science and Medicine* 57: 2217–27.
- Mare, R. and A. Palloni. 1988. "Couple Models for Socioeconomic Effects on the Mortality of Older Persons." CDE Working Paper 88-07. Center for Demography and Ecology, University of Wisconsin–Madison.
- Mathews, T.J., and M.F. MacDorman. 2006. "Infant Mortality Statistics From the 2003 Period Linked Birth/Infant Death Data Set." *National Vital Statistics Reports* 54(16). Hyattsville, MD: National Center for Health Statistics.
- Mathews, T.J., S.J. Ventura, S.C. Curtin, and J.A. Martin. 1998. "Births of Hispanic Origin, 1989–95." *Monthly Vital Statistics Report* 46(6). Hyattsville, MD: National Center for Health Statistics.
- Mayer, S.E. and L.M. Lopoo. 2005. "Has the Intergenerational Transmission of Economic Status Changed?" *Journal of Human Resources* 40(1):169–85.
- Mayer, S.E. and C. Jencks. 1993. "Recent Trends in Economic Inequality in the United States: Income vs. Expenditures vs. Material Well-being." Pp. 121–203 in *Poverty and Prosperity in the U.S.A. in the Late Twentieth Century*, edited by D. Papademetriou and E. Wolff. New York: St. Martin's Press.
- Mazumder, B. 2005. "Fortunate Sons: New Estimates of Intergenerational Mobility in the United States Using Social Security Earnings Data." *Review of Economics and Statistics* 87:235–55.
- McDonough, P., G. Duncan, D. Williams, and J. House. 1997. "Income Dynamics and Adult Mortality in the United States, 1972–1989." *American Journal of Public Health* 87:1476–83.
- McLanahan, S. 2004. "Diverging Destinies: How Children Are Faring Under the Second Demographic Transition." *Demography* 41:607–27.
- Meaney, M.J. 2001. "Maternal Care, Gene Expression, and the Transmission of Individual Differences in Stress Reactivity Across Generations." *Annual Review of Neuroscience* 24:1161–92.
- Michael, R.T. 2004. "Family Influences on Children's Verbal Ability." Pp. 49–83 in *Family Investments in Children's Potential: Resources and Parenting Behaviors that Promote Success*, edited by A. Kalil and T. DeLeire. New Jersey: Lawrence Erlbaum Associates.
- Miller, J.E. and S. Korenman. 1994. "Poverty and Children's Nutritional Status in the United States." *American Journal of Epidemiology* 140:233–43.
- Moss, P. and C. Tilly. 1996. "'Soft' Skills and Race: An Investigation of Black Men's Employment Problems." *Work and Occupations* 23:252–76.
- Mulligan, C. 1999. "Galton Versus Human Capital Approaches to Inheritance." *Journal of Political Economy* 107:S184–S224.
- Murphy, M. 1983. "The Life Course of Individuals in the Family: Describing Static and Dynamic Aspects of the Contemporary Family." Office of Population Censuses and Surveys Occasional Paper No. 31, pp. 50–70.
- National Research Council. 2000. *From Neurons to Neighborhoods. The Science of Early Childhood Development*. Washington, DC: National Academy Press.
- Nokes, C., C. van den Bosch, and D. Bundy. 1998. *The Effects of Iron Deficiency and Anemia on Mental and Motor Performance, Educational Achievement, and Behavior in Children*. Washington, DC: International Nutritional Anemia Consulting Group.
- O'Brien Caughy, M. 1996. "Health and Environmental Effects on the Academic Readiness of School Age Children." *Developmental Psychology* 32:515–22.
- Osborne Groves, M. 2005. "Personality and the Intergenerational Transmission of Economic Status." Pp. 208–31 in *Unequal Chances: Family Background and Economic Success*, edited by S. Bowles, H. Gintis, and M. Osborne Groves. Russell Sage Foundation and Princeton University Press.

- Palloni, A., C. Milesi, R. White, and A. Turner. 2006. "Early Childhood Health, Reproduction of Economic Inequalities and the Persistence of Health and Mortality Differentials." Paper presented at the International Seminar on Early Life Conditions, Social Mobility and Other Factors that Influence Survival to Old Age, International Union for the Scientific Study of Population, Lund, Sweden, June 8–10.
- Persico, N., A. Postlewaite, and D. Silverman. 2004. "The Effect of Adolescent Experience on Labor Market Outcomes: The Case of Height." *Journal of Political Economy* 112:1019–53.
- Popkin, B.M., M.K. Richards, and C.A. Montiero. 1996. "Stunting Is Associated With Overweight in Children of Four Nations That Are Undergoing the Nutrition Transition." *Journal of Nutrition* 126:3009–16.
- Power, C., O. Manor, and A.J. Fox. 1990. "Health in Childhood and Social Inequalities in Health in Young Adults." *Journal of the Royal Statistical Society. Series A (Statistics in Society)* 153(1): 17–28.
- . 1991. *Health and Class: The Early Years*. London: Chapman and Hall.
- Power, C. and S. Matthews. 1997. "Origins of Health Inequalities in a National Population Sample." *Lancet* 350:1584–89.
- Power, C., S. Matthews, and O. Manor. 1996. "Inequalities in Self Rated Health in the 1958 Birth Cohort: Lifetime Social Circumstances or Social Mobility?" *British Medical Journal* 313(7055):449–53.
- Prager, K. 1994. "Infant Mortality by Birthweight and Other Characteristics: United States, 1985 Birth Cohort." *Vital and Health Statistics Series 20*, No. 24. Hyattsville, MD: National Center for Health Statistics.
- Preston, S.H. 1984. "Children and the Elderly: Divergent Paths for America's Dependents." *Demography* 21:435–57.
- Preston, S.H. and I.T. Elo. 1995. "Are Educational Differentials in Adult Mortality Increasing in the United States?" *Journal of Aging and Health* 7:476–96.
- Preston, S.H., I.T. Elo, A. Foster, and H. Fu. 1998. "Reconstructing the Size of the African-American Population by Age and Sex: 1930–1990." *Demography* 35:1–21.
- Preston, S.H. and P. Taubman. 1994. "Socioeconomic Differences in Adult Mortality and Health Status." Pp. 279–318 in *The Demography of Aging*, edited by L. Martin and S. Preston. Washington, DC: National Academy Press.
- Register, C.A. and D.R. Williams. 1990. "Wage Effects of Obesity Among Young Workers." *Social Science Quarterly* 71:130–41
- Rogot, E., P.D. Sorlie, N.J. Johnson, and C. Schmitt. 1992. *A Study of 1.3 Million Persons by Demographic, Social and Economic Factors: 1979–1985*. Bethesda, MD: National Institutes of Health.
- Ross, C.E. and C. Wu. 1995. "The Links Between Education and Health." *American Sociological Review* 60:719–45.
- Schultz, T.P. 2005. "Productive Benefits of Health: Evidence From Low-Income Countries." Center Discussion Paper No. 903. Economic Growth Center, Yale University.
- Selowsky, M. and L. Taylor. 1973. "The Economics of Malnourished Children: An Example of Disinvestment in Human Capital." *Economic Development and Cultural Change* 22(1):17–30.
- Smith, J. 1999. "Healthy Bodies and Thick Wallets: The Dual Relation Between Health and Economic Status." *Journal of Economic Perspectives* 13(2):145–66.
- Solon, G.R. 1992. "Intergenerational Income Mobility in the United States." *American Economic Review* 82:393–408.
- Sorlie, P.D., E. Backlund, and J. Keller. 1995. "U.S. Mortality by Economic, Demographic, and Social Characteristics: The National Longitudinal Mortality Study." *American Journal of Public Health* 85:949–56.
- Spittel, M.L. 2003. "A Study of Inequalities in Health: The Role of Wealth Differences and Social Context." Unpublished Ph.D. thesis. Center for Demography and Ecology, University of Wisconsin–Madison.

- Stern, J. 1983. "Mobility and the Interpretation of Social Class Mortality Differentials." *Journal of Social Policy* 12(1):27–49.
- Stormer, A. and G.G. Harrison. 2003. "Does Household Food Security Affect Cognitive and Social Development of Kindergartners?" Discussion Paper No. 1276-03. Institute for Research on Poverty, University of Wisconsin–Madison.
- Strauss, R.S. and W.H. Dietz. 1998. "Growth and Development of Term Children Born With Low Birth Weight: Effects of Genetic and Environmental Factors." *Journal of Pediatrics* 133(1): 67–72.
- Suomi, S.J. 1999. "Developmental Trajectories, Early Experiences, and Community Consequences." Pp. 185–201 in *Developmental Health and the Wealth of Nations: Social, Biological, and Educational Dynamics*, edited by D.P. Keating and C. Hertzman. New York: Guilford Press.
- Taubman, P.J. 1975. *Sources of Inequality in Earnings: Personal Skills, Random Events, Preferences Toward Risk and Other Occupational Characteristics*. New York: Elsevier.
- Thomas, D., C. McKelvey, and B. Sikoki. 2006. "Immediate and Longer-Term Effects of Health on Socioeconomic Success." Presented at the 2006 annual meetings of the Population Association of America, Los Angeles, March 30–April 2.
- Thomas, D. and J. Strauss. 1997. "Health and Wages: Evidence on Men and Women in Urban Brazil." *Journal of Econometrics* 77:159–85.
- U.S. Census Bureau, Housing and Household Economic Statistics Division. 2005. "Selected Measures of Household Income Dispersion: 1967 to 2001 (Table IE-1)." Available online at <http://www.census.gov/hhes/www/income/histinc/ie1.html>
- Vaupel, J., K. Manton, and E. Stallard. 1979. "The Impact of Heterogeneity in Individual Frailty on the Dynamics of Mortality." *Demography* 16:439–54.
- Wadsworth, M.E.J. 1986. "Serious Illness in Childhood and Its Association With Later-Life Achievement." Pp. 50–75 in *Class and Health*, edited by R.G. Wilkinson. London: Tavistock.
- Wright, E.O. 1980. "Varieties of Marxist Conceptions of Class Structure." *Politics and Society* 9:323–70.