NOTES

1. WHAT IS THE MATTHEW EFFECT?

1. The text of Matthew (13:12) comes from the King James translation of the Bible, which Merton praised for its stately language. The New Revised Standard Version (NRSV) of the same verse reads as follows: "For to those who have, more will be given, and they will have an abundance; but from those who have nothing, even what they have will be taken away."
2. Stratification theorists associated with the former camp include McClelland (1961), who attributes differences in economic development among nations largely to levels of achievement motivation in their populations, and Davis and Moore (1945), who trace inequalities to the scarcity of talented personnel available to fill a society's most functionally important positions. Theorists in the latter camp include most conflict theorists from Marx onward, who generally attribute inequalities to the subjugation and exploitation of subordinate groups by dominant groups or classes. Insofar as conflict theorists recognize that dominant groups use their resources to command still more resources, they implicitly acknowledge the operation of Matthew effects. Turner (1984:73) notes that Lenski's (1966) theory of stratification, which synthesizes elements of conflict and evolutionary theory, clearly recognizes that when dominant groups consolidate power, they use that power to gain and consolidate still more power. Similarly, Marxist theories of stratification stress that investing capital to accumulate still more capital is a systemic feature of capitalism. Power and wealth are thus seen to create self-amplifying feedback loops.

3. As the name implies, the concept of the Matthew effect is an ancient one. Merton initially attributed the idea to the author of the biblical gospel according to Matthew, where it actually appears twice (first in 13:12 and again in 25:29). Merton later noted that variations of the saying appear also in Mark 4:25 and still again in Luke 8:18 and 19:26 (Merton 1988:609n). He credits theologian Marinus de Jonge for tracing the idea even further into the past. De Jonge notes that "it is highly likely that [Jesus] took over a general saying, current in the Jewish (and/or Hellenistic) Wisdom circles—see, e.g., Proverbs 9:9, Daniel 2:21, or Martialis, Epigr. V 81: 'Semper pauper eris, si pauper es, Aemiliane. Dantur opes nullis [nunc] nisi divitibus' ["You will always be poor if you are poor, Aemilianus. Wealth is given nowadays to none but the rich."] (Merton 1988:609n). Merton introduced the notion of Matthew effects, though not yet by that name, into the social sciences as early as 1942, when he remarked on the "accumulation of differential advantages for certain segments of the population, differentials that are not bound up with demonstrated differences in capacity (1973 [1942]:273).
4. The saying appears in two very different metaphorical contexts. In Matthew 13, Mark 4, and Luke 8, it accompanies the parable of the sower whose seed, when it falls on fertile ground, yields a rich harvest. In Matthew 25 and Luke 19, it appears in the context of the parable of the talents, urging the greatest possible development of what we are entrusted with. Though the latter parable is economic on a literal level, those who invoke it to justify extreme economic inequalities will be hard-pressed to reconcile their interpretation with Jesus's numerous other teachings on wealth and poverty (Wallis 2005).
5. Public awareness of the importance of feedback loops in nature and society is likely to grow in coming years as we begin to recognize their role in creating runaway change. Knowledge of feedback loops is essential to understanding the dynamics of climate change (Homer-Dixon 2007).
6. Merton (1968b:105) defines functions as "those observed consequences which make for the adaptation or adjustment of a given system." I have amended this usage slightly, replacing "adaptation and adjustment" with "sustainability," on the grounds that the latter term suggests connections and applications of functionalism to a host of vital contemporary issues, such as energy, environment, and war, without (I hope) unduly distorting Merton's original concept.

7. Downward spirals of disadvantage operate in a similar manner, except that diminishing advantages are deamplifed rather than amplified.

2. MATTHEW EFFECTS IN SCIENCE AND TECHNOLOGY

1. The concept of the Matthew effect was only one among many of Merton's enduring contributions to social theory. To gain a sense of the breadth and scope of his intellectual legacy, see Clark, Modgil, and Modgil (1990) and Crothers (1987). Other scholars had similar notions during this period, including economist Gunnar Myrdal (discussed in Chapter 3), who developed the concept of circular causation, and science historian Derek J. de Solla Price (1965:511), who conjectured that "the more a paper is cited the more likely it is to be cited thereafter."
2. Merton attributes the persistence of Matthew effects in part to their positive consequences for science as a whole. Goldstone (1979) challenges this functionalist analysis, arguing that such effects can be adequately explained in terms of individual behavior without recourse to functionalist explanations. Dannefer (2003) has observed that Merton himself was ambivalent about the functionality of Matthew effects in science. As a functionalist, he recognized that such effects highlight the work of exceptional scientists and thereby promote the efficiency of scientific communication systems. Yet he also readily acknowledged the dysfunctions they create when they unfairly overlook the contributions of lesser-known scientists, resulting in resentment and the unintended suppression of talent.
3. Cole and Cole's methodology may understate the strength of Matthew effects in science. The authors' method is to compare the quality of papers by high-ranking and low-ranking scientists as measured by the number of times they are cited. However, as the authors themselves acknowledge (1973:199), some papers by lesser scientists may be overlooked or undervalued. To the extent that this occurs, the Coles' method would underestimate the quality of the work of less eminent relative to more eminent scientists. Thus the Coles' method of measuring quality to gauge the strength of Matthew effects may, ironically, be distorted by the Matthew effect itself.
4. Consider the dispute over whether Dorothy Swaine Thomas received due credit for the Thomas theorem, often attributed solely to her future husband, W.I. Thomas, as discussed in Merton (1995b) and Smith (1999). Merton (1995b:395) observes that Dorothy Swaine Thomas, as

the less renowned coauthor, may have been the inadvertent victim of a Matthew effect compounded by gender bias.

5. In chemistry, *autocatalysis* refers to the process whereby an initial chemical reaction produces catalysts needed to sustain further reactions.

3. MATTHEW EFFECTS IN THE ECONOMY

1. While capitalist economies in particular are fueled largely by the drive to accumulate private material wealth, Merton argued that science is driven more by the pursuit of symbolic than material rewards (1968a; 1988:219–23). Scientists are motivated largely by a desire for "cognitive . . . and reputational wealth"—not only the intrinsic desire for knowledge, but also the extrinsic desire for the recognition of one's peers. This recognition is not achieved by hoarding one's product (scientific knowledge) for oneself, but rather by giving it away freely to the scientific community. Merton contended that the economy of knowledge is not an economy of scarcity, "for a fund of knowledge is not diminished through exceedingly intensive use . . . indeed, it is presumably augmented" (1988:620). In the gift economy of science, the more one gives away, the more one receives, and the resource of scientific knowledge is continually replenished and expanded in the process. It is conceivable that the postindustrial information economies of the future will come increasingly to resemble this idealized gift economy of science, though it is perhaps more likely that science itself will be run increasingly along business lines, with private profitability as its ultimate aim.
2. A million dollars is not what it used to be. The title of energy baron T. Boone Pickens' (2008) autobiography is *The First Billion is the Hardest.*
3. Despite striking convergences between Merton's Matthew effect and Myrdal's circular causation, there are also important differences. Merton, much influenced by the structural-functional theory of his mentor, Talcott Parsons (1951), was inclined to ascribe to social systems a natural tendency toward stable equilibrium, though he freely acknowledged the existence of disequilibrating dysfunctions (Merton 1968b). Myrdal, by contrast, was considerably more skeptical of the existence of natural equilibria of any kind (1957:9ff), doubting even the neoclassical economic orthodoxy that prices are determined through an

equilibrium of supply and demand. Stable states occur, he acknowledged, but they do so by accident when relevant forces happen to be in equipoise. As one force gains strength or another weakens, the system inevitably is set back into motion again and has no "desire" to return to its previous state, or even to another stable state. Dynamism and instability, not order and stability, are the natural order of things in economic and other social systems. Another difference is that Merton's Matthew effects increase inequalities by definition, while Myrdal's circular causation, though usually increasing inequalities, may also diminish them in some circumstances, as in the example previously given of the mitigation of race relations through the mutual interaction of white tolerance and the advancement of black living standards (1944:76). This would exemplify a virtuous circle, though Myrdal does not seem to use the term.

4. Circular causation is at the heart of popular theories touting the benefits of positive thinking. In a sophisticated version of the popular creed, Kanter (2004) examines the psychology and sociology of winning and losing streaks in sports and business. She argues that confidence enhances performance and that enhanced performance leads to victory, creating a "cycle of success." In sports, social supports, such as an enthusiastic fan base and positive media attention, further contribute to success. The dynamics of losing are the dynamics of winning in reverse, creating "doom loops" and "death spirals." "The system has momentum," Kanter contends, creating both crests of victory and undertows of defeat (2004:94–95). For Kanter, athletic competition is a metaphor for corporate competition, where similar cycles of success and failure are commonly observed.
5. For a more detailed discussion of the measurement of inequality, and the general direction of national and world trends in the distribution of resources, see the Appendix's trends in economic inequality.

4. MATTHEW EFFECTS IN POLITICS AND PUBLIC POLICY

1. Economic advantage may be analytically distinct from political and status advantage, but these factors tend to be empirically linked and mutually reinforcing. Max Weber's (1946 [1922]) essay on class, status, and party is the classic frame for this discussion.

5. MATTHEW EFFECTS IN EDUCATION AND CULTURE

1. Howley (2001) appears in an electronic journal (see references); the quotation appears in the acknowledgments at the top of the article.
2. Different authors use the term *social capital* in somewhat different ways (see, e.g., Coleman 1990; Fukuyama 1995; Putnam 2000). In Bourdieu's usage, the term refers essentially to the networks and support systems upon which social actors rely to maintain and improve their social positions. The mathematics of networks seems to predispose these to produce Matthew effects: The larger a network's size—measured by its number of nodes and links—the more nodes are available to link to future nodes. Thus, other things equal, larger networks can add nodes more rapidly than smaller networks. By analogy, if a small and a large snowball are rolling down the same hill at the same speed, the large snowball accumulates more snow in the same interval of time.

6. IMPLICATIONS AND CONCLUSIONS

1. We find the term *Matthew effect* invoked, metaphorically if not literally, even in the distant field of astronomy. Jones (2007:66) explains that planets form when dust grains collide and coagulate to form planetesimals, or little planets. Smaller planetesimals are drawn by gravitational force to larger planetesimals, which eventually forms new planets as the large become larger. Jones describes this as a Matthew effect.
2. Public policy in a democracy, at least in theory, reflects our core values. Elsewhere we have argued that American ideology is severely conflicted at the level of core values, and that we have not one, but three competing national ideologies (Rigney 2001:94–100). First, traditional conservatism, with its roots in antiquity, upholds above all the values of social order, hierarchical authority, and tradition. Religious and military conservatives, with their emphases on law and order, patriarchy, and patriotism, are representative of this value system. Second, libertarianism—also known as classical or nineteenth-century liberalism, not to be confused with contemporary liberalism—is a strong strand in American ideological discourse, upholding the more modern values of individual liberty and individual responsibility. Libertarianism is associated historically with the rise of capitalism, and entails a defense of free markets relatively unhindered by governmen-

tal interference. Finally, social democracy—or contemporary liberalism—is the third primary color in the American ideological palette. Its core value is the achievement of greater political and economic equality in society. Its roots lie in organized labor movements; in liberal religious movements, such as those that have advocated the abolition of slavery and the expansion of civil rights; and in democratic political movements seeking to empower the less powerful. While social democrats do not seek absolute equality, which is unattainable in any event, they believe that the extreme degrees of inequality that we observe in the United States and the world are morally intolerable.

3. Some forms of intergenerational transfer redistribute resources not from older to younger generations, as inheritance typically does, but rather from younger to older. Social Security and Medicare payments to retirees in the enormous baby boom generation will represent a massive transfer of resources running opposite the usual direction of inheritance (Chisolm 2006).
4. Samuelson (2002a) contends that the economic recovery of 2002 was sustained in considerable part by trickle-up consumption on the part of moderate-income households.

APPENDIX: TRENDS IN ECONOMIC INEQUALITY

1. Sen (1997 [1973]: 24–46) offers a systematic overview of the relative merits of alternative methods of measuring inequality, including the Gini and Theil measures. For further discussions of the measurement of inequality, see Wolff 1995/2002:75–88; Ryscavage 1999:24–44; and Firebaugh 2003:70–84.
2. Keister's (2005) analysis seems to challenge the view that the United States is becoming increasingly caste-like. She notes that, contrary to our national mythology, rates of mobility in the distribution of wealth in the United States were relatively low prior to 1900 (2005:245), and that the late twentieth century spawned a range of new opportunities for the acquisition of wealth, particularly in advanced technology.
3. Cauchon's (2007) analysis of Federal Reserve data leads him to conclude that the "growing divide between the rich and poor in America is more generation gap than class conflict. . . . Overwhelmingly, the rich are older folks." He notes that "nearly all additional wealth created in the USA since 1989 has gone to people 55 and older." This conclu-

sion is potentially misleading, however. Cauchon's analysis glaringly omits to mention that while older Americans as a whole have never been more prosperous, this general prosperity masks widening economic inequalities within the fifty-and-over population since 1980 (Dannefer 1987; Gist, Figueiredo, and Ng-Baumhackl. 2001). A relatively small number of wealthy and super-wealthy elders can drive up the average wealth of the age group as a whole, creating the illusion of broadly distributed wealth and concealing extreme class differences among the elderly themselves. When a billionaire walks into a room full of thousandaires, mathematically, the average person in the room suddenly becomes a multimillionaire.

4. For a critical view of dependency theory, see Velasco (2002).
5. A useful resource for educating oneself on the issue of global inequalities is the University of California Atlas of Global Inequality (2008). Here we find references and links to research studies on several different sides of the debate, giving a more rounded picture than one is likely to find in ideological sources that represent only staunch pro-globalization or antiglobalization perspectives.
6. Some are skeptical of the quality and validity of these data. See Aslund (2001), Firebaugh (2003:186–87), and Postrel (2002).
7. Firebaugh observes that in agrarian times, prior to the industrial revolution, inequalities within societies around the world were far more pronounced than inequalities among societies. Firebaugh terms this pattern the "inequality transition." In phase one of the transition, from the early nineteenth to the mid-twentieth century, inequalities among nations increased as the industrializing Western nations pulled away from the rest of the world. By the late twentieth century, developing nations, particularly in Asia, entered a period of intense industrialization, ushering in phase two of the inequality transition. In phase two, industrializing nations, such as India and China, have begun to catch up to developed Western economies, reducing between-nation inequalities. But what about within-nation inequalities? In phase one, these tended to widen due to the gap between lower-paid agricultural labor and higher-paid industrial labor (Kuznets 1955; Firebaugh 2003:30, 93–95). In phase two, developed nations have experienced growing internal inequalities as well, but for a different reason. These nations have shrinking industrial sectors but growing service sectors. Because the service sector is extremely diverse, subsuming occupa-

tions as diverse as banker and burger flipper, occupational inequalities in the service sector lead to growing inequalities within the economies of the richest countries. Firebaugh (2003:196–201) acknowledges that no single factor explains these trends. Factors contributing to the current pattern of diminishing between-nation inequality (as measured by Gini coefficients) and growing within-nation inequality include the growth of the industrial sector in developing countries and of the service sector in developed countries, the convergence of progrowth governmental policies (e.g., in trade and education) around the world, and the emergence of space-independent information technology, helping to integrate developing countries into the world economy. With the decline of communism and the promise of a demographic windfall as poor countries bring their population problems under control, Firebaugh is generally optimistic that the globalization of the world economy will benefit most of the world's people.