

Cumulative Advantage/Disadvantage and the Life Course: Cross-Fertilizing Age and Social Science Theory

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Age and cumulative advantage/disadvantage theory have obvious logical, theoretical, and empirical connections, because both are inherently and irreducibly related to the passage of time. Over the past 15 years, these connections have resulted in the elaboration and application of the cumulative advantage-disadvantage perspective in social gerontology, especially in relation to issues of heterogeneity and inequality. However, its theoretical origins, connections, and implications are not widely understood. This article reviews the genesis of the cumulative advantage/disadvantage perspective in studies of science, its initial articulation with structural-functionalism, and its expanding importance for gerontology. It discusses its intellectual relevance for several other established theoretical paradigms in sociology, psychology, and economics. On the basis of issues deriving from these perspectives and from the accumulating body of work on cumulative advantage and disadvantage, I identify several promising directions for further research in gerontology.

BECAUSE cumulation and age are both inherently temporal phenomena, it may seem remarkable that it was not until two decades after Derek Price's (1965) first essay on cumulative advantage and Robert Merton's (1968) classic essay, "The Matthew Effect in Science," that this concept was explicitly linked to processes of individual and cohort aging. However, theoretical advance must rely on an adequate conceptual foundation, and in gerontology that foundation itself was being laid contemporaneously with Price's and Merton's writings. The same year as Price's paper appeared, Ryder (1965) and Schaie (1965) published pioneering articles on cohort analysis; the same year as Merton's essay appeared, so did the first of Riley and associates' three-volume *Aging and Society* (1968). The life course perspective (Cain, 1964; Clausen, 1972; Elder, 1974) was launched at virtually the same time. These crucial advances provided key conceptual elements for analyzing both cohort processes and age-related social-structural and institutional processes, and they laid a necessary foundation for the application of cumulative advantage to questions of individual and population aging.

Robert Merton (1988) has described cumulative advantage as dealing with "the ways in which initial comparative advantage of trained capacity, structural location, and available resources make for successive increments of advantage such that the gaps between the haves and the have-nots . . . widen" (p. 606). The relative weight accorded to capacity, location, and resources, and the interactions between them, are not specified in this description, and indeed the analysis of processes underlying such interaction is one significant problem area for the study of cumulative advantage.

More formally, cumulative advantage/disadvantage can be defined as the systemic tendency for interindividual divergence in a given characteristic (e.g., money, health, or status) with the passage of time. Two terms in this definition warrant special attention. "Systemic tendency" indicates that divergence is not

a simple extrapolation from the members' respective positions at the point of origin; it results from the interaction of a complex of forces. "Interindividual divergence" implies that cumulative advantage/disadvantage is not a property of individuals but of populations or other collectivities (such as cohorts), for which an identifiable set of members can be ranked.

The concept of cumulative advantage/disadvantage (CAD) resonates with popular folk sayings such as "success breeds success" (e.g., Huber, 1998) and "the rich get richer; the poor get poorer" (Entwisle, Alexander, & Olson, 2001), but it goes beyond them: it explicates how the tendencies often occur independent of merit (Merton, 1968, 1988) and, in some cases, with mathematical precision (Egghe & Rousseau, 1995). Although CAD is a property of *collectivities*, it is centrally relevant for those interested in *individuals*, because it is concerned with the existence and sources of age-specific individual differences and with questions of fairness in the distribution of opportunities and resources.

In the 15 years since the first publications that linked CAD with age (Dannefer, 1987, 1988a), it has come to be recognized for focusing attention on several important but neglected aspects of individual and cohort aging—looking beyond age-based generalizations to examine on the intracohort distribution of key characteristics, their trajectories over time, and the forces that produce them. CAD thus brings into focus questions concerning the extent to which observed age differences and age-related variability result from systemic processes. Does intracohort inequality vary systematically over the life course? To what extent does age-related variability reflect cohort-based resource allocation (e.g., among members of school classes, or entry-level work cohorts)? How central a role do person-environment interactions or social-system processes—processes that are potentially modifiable—play in the constitution of patterns of cohort aging? Such questions are of relevance to policy as well as to a range of research

traditions, from demography and economics to social and life-span psychology.

Evidence supporting CAD as a systemic feature of cohort aging has been provided through several independent analyses of both resource (Dannefer & Sell, 1988; O'Rand, 1996; O'Rand & Henretta, 1999) and health (Ferraro & Kelley-Moore, in press; Ross & Wu, 1996) inequality. This work has effectively demonstrated that the CAD is an obdurate, pervasive process that forms an essential feature of cohort aging. It has shown that CAD is not an artifact of measurement error or selective mortality (Crystal & Waehrer, 1996; S. M. Lynch, 2003), nor of incomprehensible random variation. Indeed, recent cross-cultural research has demonstrated how the tendencies toward CAD vary systematically between societies, reflecting differences in economic and welfare state policies (Disney & Whitehouse, 2003). Such findings compel the recognition that aging is something that happens not just to *individuals* but to *collectivities*; and as involving processes that operate not only *within* individuals but also *between* them (Dannefer, 1987). This research has opened new possibilities of cross-fertilization between age and other substantive areas of social-science inquiry such as work, education, and organizations. The CAD perspective does not deny the importance of individual action, but it demonstrates the power of structural realities within which human agency must operate (Berger & Luckman, 1967; Dannefer, 1999; Riley, 1978).

For gerontologists, a review of the connections between CAD and other theoretical paradigms may be useful in the formulation of research questions and strategies. Moreover, linking CAD processes with age may hold the promise of contributing fresh and distinctive insights *from* gerontology, back to the other substantive areas from which CAD has drawn concepts and insights. With these considerations in mind, I have three main objectives in this paper. First, I review some important gerontological questions and issues, for which CAD theory has been able to open up fresh strategies of explanation, and to which it remains uniquely well suited. Second, I review the history of the CAD concept and its connection to major theoretical perspectives. Considering the implications of these theoretical perspectives for CAD suggests several lines of inquiry that have thus far received little attention from CAD researchers; therefore, I conclude by considering some research implications and by identifying some potential linkages between CAD and those working in intellectually resonant areas.

THE PROBLEMS: DIVERSITY AND INEQUALITY AMONG OLDER PERSONS

In the 1970s and 1980s, two important and distinct themes emerged within the enterprise of gerontology to which the CAD perspective was uniquely positioned to contribute. The first of these was the idea of the *heterogeneity* or *diversity* of older persons; second was the theme of *poverty* and *inequality* among the aged. These two problems have sometimes been seen as distinct (e.g., Blau, 1977), yet they are in at least some respects related. For example, heterogeneity in some key domains (e.g., lifestyle, health) reflects differences in material inequality (e.g., Kawachi, Kennedy, Lochner, & Prothrow-Stitt, 1999; J. W. Lynch & Kaplan, 1999; Marmot, 2000). Despite such

connections, these two ideas—heterogeneity and inequality—developed as largely separate topics within gerontological discourse, and I review them separately here.

The Diversity of Older Persons

The notion of the diversity of the older persons has long been a popular idea in social gerontology (Bass, Kutza, & Torres-Gil, 1990; Bornstein & Smircana, 1982; Maddox, 1987). It has been used by geriatricians (e.g., Rowe & Kahn, 1987; Williams, 1993), psychologists (e.g., Baltes, 1983), economists (e.g., David & Menchik, 1984; Greenwood & Wolff, 1988), and sociologists (Maddox & Douglass, 1974; Neugarten, 1982; Riley, 1983) to oppose and counter stereotypes of old age. Sometimes, it has been used in a celebratory way, to emphasize the irreducible uniqueness of each individual person and the integrity of individual personality (Butler, 1974; Friedan, 1993; Hickey, 1980).

Before the emergence of the CAD perspective in gerontology, this considerable “heterogeneity discourse” remained largely at the level of casual observation and, perhaps, popular inspiration. It provoked almost no intellectual curiosity and fostered little empirical research (Bornstein & Smircana, 1982; Dannefer, 1988b; Nelson & Dannefer, 1992). What actual evidence existed concerning the relationship of variability and age? Did diversity increase with age, or did the diversity of older persons simply reflect the diversity of the population as a whole? To the extent that the assumption of the heterogeneity of older persons relied on cross-sectional comparisons of individuals of different ages in the present, it was vulnerable to risk of a “life-course fallacy” (Riley et al., 1972)—an artifact of cross-sectional impressions about lifelong processes of individual and cohort aging. This could occur, for example, if an increasing life-course institutionalization and social conformity that disproportionately affected younger cohorts made them seem less different from one another than age peers who had grown up when educational processes and early adulthood sequencing were less uniformly experienced throughout the population (Hogan, 1981; Kohli & Meyer, 1986). If trajectories of increasing diversity could be found in longitudinal data (in the collective life course of cohorts), to what causal factors could such a pattern be attributed? Such questions received almost no serious attention.

An important exception to this general situation was the early longitudinal study by Maddox and Douglass (1974), which demonstrated that variability increased with age on a number of characteristics. This was a theme to which Maddox returned in his 1986 Kleemeier Award address at the GSA. With coeditor Powell Lawton, Maddox made “Varieties of Aging” the theme of Volume 8 of the *Annual Review of Gerontology* (Maddox & Lawton, 1988). With the near-simultaneous publication of that volume and other articles (Dannefer & Sell, 1988; Rowe & Kahn, 1987), the literature devoted to the age-heterogeneity relation began to cumulate, and existing evidence was marshaled to address the question, providing considerable evidence for increasing inequality and variability with increasing age.

As a result of these and related observations, a recognition of the limitations of the standard practice of interage comparisons based on an “age-normative” logic that relied heavily on measures of central tendencies began to develop. If it is the case

that age peers become more and more dissimilar from each other as they age, and if this process is observed in multiple cohorts, then it is misleading to treat aging as a general, normative process within a population (Dannefer, 1987, p. 213).

Life-Course Inequality and Poverty in Old Age

The relation between age and poverty has been a concern of some scholars since the early days of gerontology (Gordon, 1960; Tibbitts, 1960). After the social movements of the 1960s, it emerged as a major theme in a number of important works such as Butler's prize-winning *Why Survive* (1974), and in the work of policy analysts (e.g., Binstock, 1983a, 1983b; Crystal, 1982; Quadagno, 1984) in the United States and elsewhere (Myles, 1989; Phillipson, 1982). The emphasis in much of this literature tended to focus on poverty as a condition triggered by retirement, widowhood, or other adverse economic developments in later life. "The old grow poor," as Butler argued (1974, p. 24); others observed that this was especially true for women (Hagestad, 1985). At the same time, other researchers documented "status maintenance," that is, life-course continuities in social status, between work and retirement (e.g., Henretta & Campbell, 1976). The implicit "social class" emphasis of such research was consistent with other research linking life-course socioeconomic inequality and poverty in old age (e.g., Estes, 1979; Walker, 1983).

Taken together, the ideas of heterogeneity and inequality comprised a set of intriguing intellectual problems for gerontology. If variability in either form increases with age, why is this the case? Could it reflect some form of selection bias? To the extent that it is a genuine empirical phenomenon, what is its source? What individual or social mechanisms account for it? What is the relation of observed trajectories of variability to social and demographic change?

To such questions, the CAD perspective has offered a needed response. Understanding complex, multicausal phenomena nearly always requires more than a single theoretical approach. The CAD perspective has drawn insights from several paradigmatically distinct traditions of theory, representing multiple disciplines and multiple levels of analysis. In turn, attention to the interplay of age and CAD may provide a fresh lens through which other substantive areas, especially those from which the CAD perspective has borrowed (e.g., education and work), can examine their own assumptions and hypotheses. The next section reviews the development of CAD and its relation to several major traditions in the social and behavioral sciences.

CAD: HISTORY AND THEORY

The concept of CAD has its roots in a specific set of substantive questions quite far removed from aging and the life course—questions arising in the history and sociology of science. Notwithstanding these rather specialized and esoteric origins, CAD has clear affinities with numerous substantive fields, including age. In this section, I review the origins of the concept and its initial social-science formulation within the functionalist tradition, and then I discuss its logical connections to other pertinent strands of sociological, psychological, and economic theory, which offer a range of hypotheses concerning

the source of the "systemic tendencies" that are a defining feature of CAD processes.

Origins of the Concept: The History of Science and Structural-Functionalism

The phenomenon of cumulative advantage was first articulated by the historian of science, Derek Price (1965), in his efforts to develop "bibliometrics," a system for predicting scientific citation rates. This research revealed the importance of factors unrelated to the actual merit of the work, such as reputation of author or prestige of journal. Drawing on Price's research and also on Harriet Zuckerman's (1965, 1977) study of Nobel laureates, Merton gave the notion its first sociological treatment in "The Matthew Effect in Science" (1968). This article focused on what can be called inequality-generating processes within the social system of science. (Merton associated his observations of CAD with Jesus' statement, recorded in the gospel according to St. Matthew: "To him that hath, more shall be given, but to him that hath not shall be taken away, even that he hath"; see chap. 13, verse 12. Although some consider this choice of term to be unfortunate, it nevertheless has become widely adopted in discussions of CAD.)

Because Merton is widely recognized as a leading exemplar of structural-functionalism, this focus on inequality-generating processes was more than a little ironic. His analysis of the Matthew effect clearly showed CAD to be a process that treats individuals unfairly and partially, that creates interindividual inequality and invidious sentiments, and thus, at least implicitly, raises questions of social legitimacy of established social practices. This is unfamiliar terrain for structural-functionalism, which is, after all, the source of consensus theory—famous in the perennial theory debates of 20th century sociology for emphasizing the role of shared norms and values in maintaining and legitimating social order. Functionalism has, of course, been extensively criticized for assuming a harmonious interdependence between individual and social interests and for assuming fairness and legitimacy in the prevailing social order. Numerous critics (e.g., Buckley, 1967; Gouldner, 1970) correctly argued that these emphases prevented many strands of functionalism from recognizing the empirical realities of conflict, inequality, and other problematic aspects of society, and the degree to which social processes themselves generated individual problems and social contradictions. Indeed, these normative emphases of functionalism had encouraged an acceptance of disengagement theory and other organismic approaches to aging (Parsons, 1960), and they discouraged systematic examination of diversity and inequality, whether cultural, gender based, or socioeconomic (Dannefer, 1988b).

Despite these paradigmatic tendencies of functionalism, Merton's interest in empirical processes and real-world conundra compelled his attention to the social dynamics underlying the nonrational, non-merit-based outcomes described by Price and Zuckerman. In his analysis, CAD is presented as an empirically identifiable set of processes grounded in generic psychosocial and interactional dynamics. He explicitly recognized the role of both "selection" and "socialization" elements in this process.

Merton contended that CAD processes are simultaneously *unfair* and *functional*, depending on the level of analysis upon which one focuses. At the individual level, he emphasized the *injustice* of CAD from the vantage point of individual

scientists—benefiting some individuals well beyond the value of their contributions while ignoring or minimizing the equally meritorious contributions of others. However, he argued that this process had a different significance at the social-system level of scientific enterprise taken as a whole. At that level, Merton argued, the same CAD process is *functional*, because it reflects an efficacious process and a positive result for the collective enterprise of scientific productivity. It has the overall effect of organizing communications to maximize the distribution of ideas among key intellects (without regard for who is actually contributing the ideas), aligning junior talent with the proper nodes in the communication system of science according to their potential, and enabling all scientists working in a given area to recognize which ideas are most promising. Thus, Merton's overall analysis brought the argument home for functionalism after all, legitimating the Matthew effect as a systemically valuable set of processes, despite its unavoidable costs for some individuals.

Revisiting the Matthew effect two decades later, Merton (1988, p. 609) reiterated the points in his original argument and enumerated the domains beyond science to which it had been applied, including social gerontology. He did not discuss whether these extrapolations to other substantive areas included an endorsement of his view of the positive functionality of the Matthew effect. In the case of aging and gerontology, it clearly did not (Dannefer, 1987).

CAD AND SOCIOLOGICAL THEORY: SOCIAL REPRODUCTION AND THE STRUCTURING OF OPPORTUNITY

The CAD perspective has a strong intellectual resonance with several other traditions of sociological theorizing that interpret differential individual outcomes as resulting, in substantial part, from the operation of social processes. Two such traditions are social reproduction theory (Bourdieu, 1990) and allocation-based theories (Reskin, 2003; Riley et al., 1972) that focus on the structuring of opportunity. I discuss each of them briefly here.

Social Reproduction Theory

Social reproduction theory has drawn on the work of European social theorists such as Habermas and Bourdieu, working in what can broadly be considered the traditions of critical theory. Critical theory sought not only to analyze the workings of modern societies but also to explicate their human and social costs and their internal contradictions. Bourdieu, in particular, emphasized the perpetuation of stratification hierarchies as part of an enduring and systemic complex of "social reproduction" processes (1990, p. 139). Especially in the United States, such an idea ran strongly counter to the educational ideals of equal opportunity and merit-based rewards that were regarded sympathetically by some leading voices of the functionalist tradition (Parsons, 1951; Parsons & Platt, 1973; Turner, 1960). Reproduction theory sought to describe a set of stratification mechanisms, many of which in modernity operate through schooling and other institutions and that produce strong intergenerational continuities in class location (e.g., Eckert, 1989; Willis, 1977). From the vantage point of CAD theory, it can be said that reproduction theory depicts advantage and disadvantage as beginning to cumulate during childhood and schooling, based on stratified educational and socialization opportunities. Some scholars, such

as Bowles and Gintis (1976, 2002) have explicitly connected schooling and work as integrated elements in such a system of stratified social reproduction.

Reproduction theorists have paid scant attention to how age interfaces with the processes through which a stratified social order is reproduced; nor has the terminology of cumulative advantage been part of their lexicon. Their focus has been mainly on structural processes and the manner in which human action reproduces institutional forms, rather than on individual life-course patterns or cohort processes. Even when studying youth, schooling, and processes of intergenerational transmission of values and status, reproduction theorists have paid little attention to student careers or other manifestations of individual trajectories over time in favor of an analysis of the consequences for individuals of institutional forces at a given point in time. However, their depiction of social sorting processes, differential opportunity structures, and class-specific socialization experiences clearly imply a view of life chances and life-course trajectories that resonate with CAD theory.

Reproduction theory has been the subject of critique from a number of directions. From the vantage point of those studying status attainment and intergenerational mobility (e.g., Featherman & Hauser, 1978) and the achievement motivation of working-class youth (Cohen, 1981), reproduction theory painted an unfairly negative picture. From the opposite side of the theoretical spectrum, some critical sociologists of education attacked reproduction theory as a new breed of functionalism (e.g., Wexler, 1995), because it described a functioning and stable social order and even specified mechanisms of intergenerational transmission that serve to sustain that social order. Like functionalism, it focused less on social change than on the description of a social system robust in its abilities at self-perpetuation. It differed from functionalism in that, instead of denying stratification as a central social problem, it regarded differential socialization and the reproduction of inequalities through schooling as a well-developed process that fit the overall mobility and opportunity regimes of a highly stratified society, and therefore that was strongly entrenched and difficult to change. It was, in a sense, functionalism in "a minor key"—without the Parsonian optimism. Although reproduction theory presented this social apparatus as humanly destructive, with opportunity costs for society as well as individuals, it did not offer any positive vision of change. Nevertheless, few disputed its contribution in providing a cogent framework for approaching the relations of stratification, education, and the labor force.

Conceptual formulations that resonate with reproduction theory have also been used by those who begin from other perspectives, such as feminism, social psychology, and organizational analysis. In her now-classic ethnography of late 20th century corporate life, for example, Kanter (1977) demonstrated how the subtle interplay of norms, impression management, and social interaction led to the "homosocial reproduction" of White male managers, and how similar dynamics led to the stigmatizing of employees—by coworkers as well as superiors—if they were perceived to be falling behind the implicit but normatively potent sense of promotion timetables. Age and time-in-job thus were highly sensitive matters, as has also been shown in Lawrence's work on age norms in organizations (1984, 1996). Through such mundane processes of everyday social discourse within the

formal and informal culture of modern corporations, a distribution of success and failure was constructed out of small or artificial differences, leading to an array of outcomes for those who had entered together—from “water-walkers” to “dead-wood.” In the context of social gerontology, Kuypers and Bengtson (1984) and Gubrium and associates (e.g., Gubrium, 1976; Gubrium, Holstein, & Buckholdt, 1994) have identified similar “labeling” processes linked to differential age-related outcomes among age peers in disparate institutional settings, from schools to nursing homes.

Although the social reproduction perspective has been little concerned with trajectories of human development and aging, the potential link is obvious. If, for example, education is a resilient mechanism through which class-based or other regimes of inequality are reproduced, then the diverging interindividual trajectories that lead to increasing intracohort inequality have their origins in education-based stratification in early childhood, and, it can be hypothesized, continue to be amplified through the life course. Thus, CAD theory offers a systematic life-course component to the general understanding of education and work as comprising institutionalized systems through which class and gender inequalities are systematically and relentlessly reproduced, and through which success and failure are created (e.g., Willis, 1977).

At the same time, the aging of every cohort entails the reproduction of health inequities, involving differential health practices and stratified access to health as its members move through the life course. The well-established connections of economic resources (as indexed by socioeconomic status) and health (Carr, 2003; Marmot, 2000) strongly suggest the importance of attending to CAD processes in the study of health and aging. Resource-based health effects begin early in life and interact continuously with external circumstances. For example, epidemiological studies have found a strong relationship between social class and childhood nutrition and risk factors such as cigarette smoking (Blanc, 1999) and low birth weight (Drever & Whitehead, 1997).

The Structuring of Opportunity and Mechanisms of Allocation

Reproduction theory, as implied by its name, focuses heavily on the relation between individuals and social forces, and the processes that guide their interaction—intergenerational, interactional, and ideological. It thus deals with the constitution of self and society and their interplay, through what can be called “social reality-reproducing processes” (Dannefer & Perlmutter, 1990; see also Berger & Luckmann, 1967). Such interactional processes identified in the reproductionist framework can be distinguished from the structural dimensions of social reality captured by the term “social allocation.” Allocation is not primarily concerned with how social factors influence internal individual characteristics, such as health, cognitive functioning, or values. Rather, it is concerned with external characteristic such as roles or statuses, and especially with the problem of person–role matching or assignment (Dannefer, 1988a; Marshall, 1996; O’Rand, 2003; Reskin, 2003.) Issues of allocation are made especially visible when “disordered cohort flow”—baby booms or busts, or similar events—produce large-scale “person–role incongruities” (Easterlin, 1980; Uhlenberg &

Riley, 1996; Waring, 1976). However, as an analytical frame, social allocation is based on the existence of relatively stable, institutionalized social entities that contain a fairly inelastic number of positions or roles to which individuals are allocated. Transitional movement through these systems over time is also institutionalized, and with that movement, unavoidably, aging occurs (George, 1993; Sorensen, 1986).

Examples of such systems abound. Educational, military, and corporate systems all have a finite number of positions into which individuals are inducted, and through which they are continuously processed. Such processes are also at play beyond the level of discrete organizations—for example, in the segmentation of the labor market. Cumulative advantage can be hypothesized to operate through mechanisms at each of these levels.

Organizational processing of individuals.—Schools, work organizations, and correctional and military institutions are examples of organizations for which “people-processing” (whether as students, employees, inductees, or wards) is a central function. Organizational mechanisms of people-processing have a clear conceptual affinity with CAD theory (Dannefer, 1987). Such processes are driven by the scarcity of desirable positions—whether the limited number of slots in the most lucrative and interesting specializations in medical residency programs or the small number of occupational positions at the narrow peak of the traditional corporate hierarchy. Consider the contradiction between the ladder and the pyramid—the *individual’s* sense of career ladder and the organizationally defined “need” for upward mobility, versus the *organization’s* standard pyramidal structure. This familiar situation constitutes, *ceteris parabus*, a prescription for increasing inequality in occupational status among the members of each entering cohort, because comparable movement “up the ladder” is not equally possible for all employees, as tenure with the organization progresses. In a set of analyses that has prompted considerable subsequent research, Rosenbaum proposed that these processes generate predictable patterns of sequencing and temporal movement, both in schools (1978) and in work organizations (1984), that he characterized as “tournament mobility.” The fundamental idea of tournament mobility is that falling behind (e.g., by not receiving timely promotion at work, or by being shifted to a lower track at school) leads to serious disadvantage or disqualification for some while other age peers continue to advance—in effect, a CAD process among members of the entering cohort. Although some further support for the tournament model has been found, its generality either in the workplace or schools is unclear (Kerckhoff & Glennie, 1999). For example, Lucas and Good (2001) find that school tracking operates differently for different ethnic groups; Spilerman and Petersen (1999) distinguish “merit” versus “vacancy-driven” job mobility regimes, and they contend that allocation issues figure much more prominently in the latter.

Labor market segmentation.—Others have conceptualized the regulation of opportunity and resource flows beyond the level of the firm by analyzing features of national labor markets as predictors of career development opportunities and earnings trajectories, independent of the capabilities and the actual productivity of workers (e.g., Doeringer & Piore, 1971; Spilerman,

man, 1977). The role of normative, legal, political, and other dimensions of institutional life—dimensions that are quite independent of the characteristics of individual workers—is thus seen to have an impact on factors such as earnings, job stability, and access to health care. From the perspective of CAD theory, it can readily be hypothesized that such sectoral differences in the organization of work may be related to divergence in wages and pension accumulations as workers age (Wolff, 2003), and also to divergence in other work-related consequences, such as health, access to health care (e.g., Carr, 2003; Marmot, 1998; Ross & Wu, 1996), and on-the-job learning opportunities and psychological stimulation (Kohn & Slomeczynski, 1993).

As in the case of reproduction theory, studies of organizations and of labor market segmentation have, with few exceptions (Kaufman & Spilerman, 1982; Rosenbaum, 1984), paid relatively little attention to questions of trajectories of individual change over time.

“PERSONOLOGICAL” APPROACHES TO CAD: PSYCHOSOCIAL ACCENTUATION AND HUMAN CAPITAL

As illustrated in the foregoing discussion, much of the interest in CAD derives from a recognition of the power of social processes and forces to regulate and shape not only individual lives but the distribution of opportunities among individuals. However, the matter appears quite differently to those who begin from a position of strong premises about the stability of individual-level variables. In this section, I consider two examples of such theorizing—psychosocial accentuation and human capital theory.

Psychosocial Accentuation

It is at least a logical possibility that the general empirical phenomena of age-related increases in diversity, inequality, and divergence in individual trajectories can be explained primarily by individual differences in, for example, personality characteristics, talent, or motivation. Such an approach has long been proposed from a psychological perspective, as a form of “accentuation” (Eiser, 1996; Elder, 1969; Feldman & Weiler, 1976)—a concept that has its roots in evolutionary theory. In the work of Elder and others in the social-psychological and life-course traditions, this idea is of course linked to the unique history encountered by each succeeding cohort: Early experience differentially marks individuals in ways that shape their understanding of the world, their development of skills, and their opportunities in ways that are seen to shape later life-course outcomes.

The accentuation argument assumes that individuals possess significant and enduring differences in temperament and talent, differences that become magnified over time. The continuing popularity of accentuation as an explanatory principle is well illustrated by recent controversy around the claim that longevity is a function of intelligence, with intelligence assumed to be a fixed and largely innate characteristic with substantial inter-individual differences (Deary, 2000; Gottfredson, 2002; Holden, 2003).

Of course, few claim that accentuation processes operate in a social vacuum, without some confirmation and support in how the individual interfaces with social realities—just as no one would claim that the process of social reproduction or

labor market segmentation operates independently of interaction with the individual-level characteristics of the persons who are caught up in such processes. The difference between the “sociogenic” and the “individual accentuation” views comes down to a difference in the factors considered primary in the construction of an explanation. Is CAD best accounted for as the outworking of interindividual differences in stable individual characteristics that are simply amplified with age, or by the differentiating and stratifying effects of social forces? It is a useful heuristic, as Sorensen (1986) has noted, to consider these two alternatives in pure form.

Human Capital Theory

The labor market segmentation perspective discussed herein was forged, in part, in opposition to human capital and other economic theories of earnings (Doeringer & Piore, 1971; see also Rumberger, 1981). Yet, ironically, the human capital approach must be credited with producing some of the earliest data supporting the idea of CAD as a cohort process (Becker, 1975; Mincer, 1974). Although his analysis did not document increasing inequality as a general population process, Becker arranged cross-sectional data to describe diverging trajectories for subgroups with differing levels of education in the second edition of *Human Capital* (1975, p. 281), a pattern that others have replicated (e.g., U.S. Bureau of the Census, 1991).

A central principle of human capital theory is that investment yields increases in worker productivity, which in turn translates into higher earnings. Economists working with human capital assumptions thus have long had an early interest in documenting the divergence of earnings trajectories of individual cohort members as their work lives progressed and also in the explanatory power of education as a central factor in this divergence.

In making this argument, Becker differentiated human capital from a prevailing assumption of economics, that “labor power was given and not augmentable” (1996, p. 9). This traditional view remains alive and well in some versions of the “screening” and “credentialing” arguments—that the functions of schooling mainly have to do with identifying or credentialing those with talent. Typically, this “fixed ability” school of thought assumes the habits, talents, and other work-relevant characteristics of individuals are quite immutable, and that the value of workers is not increased by education (Grubb, 1993; Spence, 1973; Stiglitz, 1975).

To the extent that educational investments are still conceived primarily as occurring early in the life course, both the “human capital” and the opposing “screening” or “fixed talent” perspectives can be thought of as, essentially, accentuation models of CAD. For both of them, the active role of institutions and social forces in structuring opportunities either before or after the critical “education moment” is not acknowledged. Rather, the explanatory factors are individual decision making and talent, and “the labor market is merely a composite of individual activity” (Rumberger, 1981, p. 29). Responding to essentially the same issue, Farkas (2003, pp. 147–248), in his recent discussion of CAD and human capital, cautioned that “individual-level behavior and the pattern of outcomes for individuals are crucially determined by the incentive and reward structures within which these individuals operate” (also see O’Rand, 2001).

At the same time, human capital has explicitly recognized the impact of contingencies on individuals. As Becker (1996) recently stated, "the process of investing or disinvesting in human capital alters the very nature of a person" (p. 10). Thus, the role of education in shaping identity and the internalization of cultural practices as well as workplace skills is acknowledged (Antikainen et al., 1999).

In sum, an intracohort pattern of "fanning out" (Dannefer, 1998a; Ehrenberg & Smith, 1994; Hagestad, 1998) is an expectation that, at least with respect to earnings, human capital theory and CAD theory fully share. As noted earlier, several analyses have found support for CAD by documenting that intracohort income inequality appears to increase systematically with age in the United States (Crystal & Waehrer, 1996; Dannefer & Sell, 1988; O'Rand, 1996) and elsewhere (Disney & Whitehouse, 2003; O'Rand & Henretta, 1999).

CROSS-FERTILIZING THEORY, AGE, AND CAD: PROSPECTS FOR RESEARCH

In this article, I have reviewed the contributions of research from several theoretical traditions that are relevant to the CAD perspective. In many cases, these paradigms are complementary; in some cases they are oppositional. Taken together, the population-based, organization-based, and microinteractional foci of sociological theorizing form the basis of a composite, multilevel depiction of how social processes may interact to produce intracohort differentiation and stratification. Psychosocial processes such as accentuation also require attention. An explanatory role for personal agency is also integral to a full account of the processes underlying trajectories of inequality, although few would contend that the outcomes observed across these traditions of research are simply the additive result of individual differences in ability, motivation, and goals.

I conclude by discussing three areas in which research may build on the accumulated work and extend in new empirical directions: first, developing qualitative research strategies to capture more systematically the CAD tendencies of microlevel and organizational or "mesolevel" social processes; second, further systematizing the relation between health and CAD processes; and third, examining the relation between resilient intracohort processes of CAD and social change. The first two of these suggestions are intended as strategies to specify mechanisms by which the diverging trajectories so consistently reported by CAD researchers are constituted; the third is to extend understanding of CAD processes both globally and historically.

CAD and Microlevel and Mesolevel Processes

Although it is essential to have information on patterns of inequality at the population level, in such studies individuals are necessarily decontextualized from the everyday networks, routines, and the work and family contexts in which their lives are played out, and in which their life chances are constrained. This directs attention to microlevel and intermediate or meso-level social processes and to the potentials of qualitative as well as quantitative data sources at both levels.

It is instructive to recall that the first applications of the CAD perspective in sociology, by Zuckerman and Merton, were based on qualitative research—on the searching questions that individual scientists raised about their own social status, leading to

a set of inferences and hypotheses concerning the working of social processes at the microlevel, in everyday social interaction. Similarly, research in the traditions of feminist analysis, reproduction theory, interactionism, and ethnography has shown that such everyday processes as labeling and altercasting have the effect of constructing the life chances and future possibilities of individuals caught in such dynamics. Such processes derive their power in part from the lack of awareness of those involved in enacting them, and, despite some exemplary models of how they may relate to development and aging (e.g., Gubrium et al., 1994; Kuypers & Bengtson, 1984), they have not received the attention they deserve. Such overlooked processes belong squarely in the center of the CAD perspective, because they capture the irreducible realities of lived experience through which the outcomes that are combined into pictures of cohort trajectories are ultimately realized. The fact that microanalysis generally provides no long-term longitudinal or nationally representative data does not make the phenomena that it reveals less constitutive of CAD processes.

The social systems of organizations have powerful effects on the future life chances of individuals—whether students (e.g., Kerckhoff & Glennie, 1999), workers (e.g., Rosenbaum, 1984), or elders (e.g., Gubrium, 1976; Hazan, 1980). Such effects—which range from learning opportunities to high-stress experiences and destructive health effects—often involve a cohort-based stratification of organizational mobility. Systematic attention to the effects of such processes often suggests hypotheses about individual change or individual characteristics that challenge the standard developmental or trait-based approaches. For example, Kanter's (1977) classic ethnography of life in a Fortune 500 company postulated a possible reframing of "fear of success" as "fear of visibility" resulting from "token" status—being a woman or minority in an all-male management team.

CAD, Health, and the Life Course

The "socioeconomic gradient" emphasized as a robust predictor of health status by epidemiologists and others (e.g., Blanc, 1999; Marmot, 2000) provides ample basis for expecting that trajectories of income inequality also track health inequality. A few analyses have explicitly employed a CAD framework for addressing health differentials (Ross & Wu, 1996), specific health problems (Ferraro & Kelley-Moore, in press), and health insurance (Crystal, 2003), yet research to date has only begun the task of a systematic linking of the age-health correlation to trajectories of intracohort inequality. Recently, it has become clear that the health-inequality relationship has important dimensions beyond the individual level, thus raising new possibilities for connection with CAD processes. Comparative research in epidemiology has shown that overall societal inequality affects individual health, *even for those who are better off* (Daniels, Kennedy, & Kawachi, 2000). The middle classes and the overall populations of societies with less social inequality have better health than those societies, such as the United States, in which income inequality is great (Kawachi et al., 1999; Wilkinson, 1999; cf. Judge, 1999). To my knowledge, this rapidly growing body of work that deals, like CAD, with the impact of population-level characteristics on individual outcomes has yet to be systematically linked to

age. Clearly, CAD provides a key theoretical framework for organizing such a link.

CAD and Social Change

It is no accident that the discussion of CAD here and elsewhere has been conducted with virtually no reference to the theme—so familiar in social gerontology and studies of the life course—of social change. CAD is *not* a perspective in which social change is a primary problem. Rather, its primary analytical task is to understand the relatively stable social processes that operate faithfully on each succeeding cohort. As is the case with functionalism and reproduction theory, the central logic of CAD is a thus logic of obdurate social tendencies—“social facts” in the Durkheimian sense—that are quite resistant to change. The fact that congruent patterns of increasing inequality over the life course (at least with respect to income) have been found by multiple researchers working in multiple traditions measuring cohorts from multiple decades suggests that this is, indeed, a quite stable phenomenon, at least in late modern societies. It is a pattern that recurs, even when dramatic change occurs in the absolute amount of age-specific poverty or inequality (e.g., O’Rand & Henretta, 1999, pp. 75–78; Pampel, 1981; Vincent, 1995).

Despite the remarkable resilience of these intracohort patterns of inequality reproduction, however, the relation of CAD to social change is centrally important. The dramatic change in the dependency ratio, accelerated by the combination of graying boomers and increasing longevity, will inevitably provide something of a “natural experiment” that will test the resilience of what have been quite stable trajectories of inequality across successive cohorts (Dannefer, 2003; O’Rand, 1996). The study of such processes is of interest for policy as well as theory, although the complex intersections of policy change with economic and demographic trends guarantee that this will be a challenging, multilayered task. For example, graying boomers will mean not only a burgeoning senior population but also a population of older women who have had a distinct labor market experience.

The stability of CAD patterns may encounter additional challenges if, as some have suggested, we are entering a period of the deinstitutionalization of the life course, of new forms and levels of risk, or of postmodernity (Guillemard, 2001; Held, 1986; Kohli & Meyer, 1986; Marshall, 1996; Polivka & Longino, 2002). They are also pertinent because of the obvious human and social costs of high levels of inequality, as suggested in the preceding section. Wolff’s (2003) recent analysis of the adverse wealth (pension accumulation) effects for many workers of the shift from defined benefits to defined contributions is an example of research documenting the relevance of these trends. To the extent that deinstitutionalization occurs more broadly as a social process, it will provide a basis for testing of the stability of CAD patterns and processes. Will they change the distribution of cohort resources and the trajectories of cohort inequality and diversity over the life course, or will the kinds of patterns that have been observed continue to recur even under quite different social conditions?

The Relevance of Aging and CAD for Social Theory

Finally is the issue, noted earlier, of the relevance of age for other substantive areas of theorizing, whether reproduction

theory or organization analysis. In what has been presented herein, I have argued for the relevance to CAD of empirical and conceptual developments in a number of subareas of social science work—the sociology of education, organizations and labor markets, labeling theory—in which scant attention is paid to the role of the dynamics of age or of individual trajectories. However, the CAD perspective shows that dynamics of social reproduction, in both microprocesses and in allocation mechanisms, operate with age and life-course processes as irreducible elements in their own dynamics. Similarly, a recognition of CAD-related social processes may enhance understanding of epidemiological findings concerning social class and health. Thus, it may be useful for researchers in other areas to consider how much precision of understanding is lost, and how many weak empirical findings may be explained, by the failure to consider the role of cohort and life-course processes. Such questions suggest an unexcavated set of issues and possibilities for explanation within which the CAD perspective as developed within the study of age may yet pay dividends back to fields that have contributed to its own development.

In sum, the theoretical problems and research possibilities that are opened up by the CAD perspective are numerous, complex, and challenging—for gerontologists and others interested in age and human development. However, it appears that part of the nature of aging is the existence of systematic and regular life-course patterns in the development of intracohort inequality on health-related as well as resource characteristics. To the extent that this is the case, an integral part of understanding aging requires an understanding of those patterns and forces that underlie them.

ACKNOWLEDGMENTS

I thank Craig Barclay, Brian Brent, Elaine Dannefer, George Gonos, Lynn Nowbar, Malathi Rangan, Matilda W. Riley, Paul Stein, Fleur Thomese, Peter Uhlenberg, and the Editor and anonymous reviewers of the *Journal* for their helpful criticisms on an earlier draft of this paper.

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Received February 10, 2003

Accepted June 17, 2003

Decision Editor: Charles F. Longino, Jr., PhD