
SCIENCE CAREERS

JOSEPH C. HERMANOWICZ

Varieties of scientific careers exist in academia in the context of three prototypes of institutions: elite (research oriented), communitarian (teaching oriented), and pluralist (teaching and research oriented). In each type, scientists confront obstacles to achieving their original aspirations, cultivated formally in their graduate and postdoctoral training and early professional years, and more diffusely in their collegiate, early educational, and cultural experiences. These challenges impel scientists to alter attitudes toward work and to reconstruct professional goals successively over the course of a career in academic science. Scientists and scientific careers are made by sequences of opportunities and experiences structured by organizations. Thus, variation in the types of organizations in which scientists train and work evinces a differentiation and stratification of careers in science. This chapter draws on well-established traditions in the sociology of occupations and professions, the life course, and sociology of science to situate the study of scientific careers. This chapter is illuminated by longitudinal research on how careers in science are experienced by practitioners over time.

Occupational Perspective

The sociological study of people and their work owes much of its origin to Everett C. Hughes (1958, 1971), who is considered a father of the sociology of occupations. From 1938 to 1961 at the University of Chicago, Hughes developed an approach to the study of work, closely connected to the Chicago School of Sociology, which located people and occupation ecologically in their socially situated environments. This meant that to study people and their work, one went into the field, which in this period usually was the city of Chicago, the great laboratory of the Chicago School in which to observe and study social process.

Hughes's theoretic orientation to the study of work can be understood as interactionist. Occupation and individual, structure and self, institution and identity are created by the reciprocal interplay between macro and micro forces. This theoretic orientation specified an empirical method: anthropological-like field study involving heavy use of the interview and participant observation among the institutions and individuals who mutually create one another. The result tended to be a *biographical* form of data and analysis wherein the lives of individual workers came to life in the context of the institutional worlds in which they were enmeshed.

In this perspective, the *career* exists as a core concept because it, among all concepts pertaining to work, best captures the element of time and, hence, the process by which individuals and institutions are reciprocally constituted by interaction. In one of Hughes's most notable formulations, careers are observed and studied for their two sides. One side is the *objective career*, which consists of the sequence of statuses a person holds over time. The statuses may be indicated by positions, offices, or titles: freshmen, sophomores, juniors, and seniors composing an educational career; second lieutenant, first lieutenant, captain, major, lieutenant colonel, colonel, and general composing a military career; assistant, associate, and full professor composing an academic career.

The second side, existing in tandem, is the *subjective career*, which consists of the shifting personal perspectives individuals develop about themselves and their work as the objective career unfolds. A subjective career encompasses, for example, how undergraduates experience and understand each status that marks a passage in an educational career.

Hughes marshaled the idea of *turning points* as a social mechanism that explains when and how change occurs in the subjective career as it engages in dialogue with the

objective side. As lives and careers transpire, people undergo a series of changes not only in their objective status but also in the patterned subjective views they hold about themselves in light of this change. The young assistant professor comes to view himself or herself in a substantially new and different light from that understood as a student undergoing intense training and socialization for the professorial role, just as the emeritus professor—at the other end of a long sequence in professional status change—comes to view himself or herself differently than viewed through the lens of a once regular member of a senior faculty.

This occupational perspective offers a way in which to understand and explain identity, or more specifically, *professional self-identity*, that is, how people know and understand themselves in light of their experience of work. Moreover, because the perspective is fundamentally temporal, adding the element of process to see how individuals are *made* by organizations, one can additionally observe how professional self-identities evolve as individuals experience turning points throughout the course of their careers.

Life Course Perspective

The life course consists of the patterned progression of individual experience through time. The impetus for a sociology of the life course arose in large measure from prior, psychologically oriented attempts that conceived of development predominantly in terms of preprogrammed maturation, often promulgated in the form of stage theories of aging. Notable among the theories are Erik Erikson's (1950) "eight stages of man," Daniel J. Levinson's (1978, 1996) "seasons of a man's and of a woman's life," and Gail Sheehy's (1976) "passages." In their various formulations, developmental stages were asserted to be universal, inherent to human aging among men and women, from one society to another. Predecessors to these theories, again psychologically rooted, confined development to childhood: adulthood was merely an expression of the developmental scripting that had occurred or not occurred by the end of adolescence.

For sociologists, however, aging is studied in contexts, which serve not merely as a *setting* for but as a *constituent force* of development. In this important theoretic sense, different contexts entail systematically distinct consequences for socialization and development throughout the entire life span. In the work arena, one can observe how behavior and beliefs understood as *developmental aging effects* may be, instead, a product of the organization in which one works.

Cohort analysis has typically been used by sociologists and others to understand how individuals pass through time in socially patterned, yet distinct, ways. Cohort analysis seeks to avoid an *ontogenetic fallacy* of postulating universality in human development by investigating how

groups of individuals age variously. Glen H. Elder's (1974, 1975) work on the life course, for instance, locates individuals in historical times and socioeconomic contexts to determine how development has transpired differently for cohorts proceeding through time under different environmental conditions. His studies of cohorts coming of age during and outside of the Great Depression illustrate the differential force of history and socioeconomic context on development in childhood and in subsequent adult phases.

Cohorts may also be used to investigate meanings of age, in particular differential meanings of work and career as socialization and development occur. This approach, developed substantially through the work of Bernice L. Neugarten (1968, 1996; Neugarten, Moore, and Lowe 1965), emphasizes the normative underpinnings of age, those underpinnings forming an enduring component of culture. What work means to the senior academic scientist may be altogether different from the junior scientist or the scientist at midcareer not only because these individuals occupy distinct age-graded statuses but also because they have likely experienced careers that have developed under substantially different institutional and sociohistorical conditions. What is more, if one takes seriously the idea that contexts shape development, then scientists may see their careers, and their professional self-identities, develop in fundamentally different ways depending on their institutional location.

An age-graded life course is not tantamount to monolithic stages, proposed by most stage theories of aging discussed previously, in which all individuals proceed through a largely invariant sequence of crises, challenges, or turning points. Rather, an age-graded life course presents the idea of a general conception and socially desired unfolding of lives through loosely defined periods of life. Some such periods characterize some individuals and not others. Individuals who enter and leave these periods do so at different rates. Some periods characteristic of a subset of people may be skipped altogether by another subset in light of differing sequences of events and turning points that socially situate their life passages. In short, the idea of a normative, age-graded life course more fully allows for the possibility of variation in the living of lives than do most stage theories of aging.

The *life course fallacy* is a reminder that cohorts do not age alike: one cannot assume that what is typical for one cohort applies to other cohorts as they in turn age. This is so because conditions of the contexts in which people age are changing throughout time. In the current concerns, the contexts are organizational. Following the fallacy, one would commit a theoretic error if one were to postulate that patterns of self and career displayed, say, by senior scientists 10 years ago would be those adopted by scientists now advancing into the same age-graded statuses and roles. The same would be true of the youngest scientists now advancing to middle phases of their careers, indeed to everyone passing into points of careers once occupied and experienced by a preceding cohort. To understand

genuinely how careers take shape—and to explain age differences across cohorts—one must follow the subjects under study to build a stock of knowledge about the experience of aging in one's work.

This life course perspective underscores the importance of cohort and context in situating the meanings of careers: It is here where meanings originate and acquire their social significance. These meanings may indeed be variegated given the developmental force that times and places can exert on the experience of unfolding careers.

Sociology of Science Perspective

If one attends to the forces that contexts can differentially exert on development in a career, then one must turn to the social-institutional arena that constitutes those contexts. In doing so, an important theoretic perspective is gained on how careers are specifically structured. In turning, therefore, to the sociology of science, we attend to a line of research concerned with work contexts, or strata, and their effects on scientific careers.

The heart of research on stratification in science is the *reward system* and its operation across the contexts of work in which science is done. In science, as in all social institutions, there is inequality. In their various forms and magnitudes, rewards constitute recognition. Recognition in turn is centrally situated in the occupation of science as well as the lives and minds of perhaps all scientists, albeit in varying degrees. The centrality of recognition to the operation of science and scientists has been examined extensively, beginning with Robert K. Merton (1968b, 1973), whose celebrated work laid the foundation not only for this specific subject but also for the entire sociology of science.

Merton explained that recognition is important to science—and scientists embark on quests for it—because recognition from those competent to judge a contribution is the prime indicator that a scientist has fulfilled the goals of science, to extend certified knowledge. Recognition is thus institutionalized: it is both essential to progress and therefore expected in trained individuals, if as socialized members of this profession they seek to satisfy the goals of science.

Cumulative advantage and *cumulative disadvantage* is a theory developed by Merton and elaborated by others to explain inequality in science. At root, the theory explains how increasing disparities come to characterize the *haves* and *have nots* over the course of a career in science (and conceivably in other institutional domains).

In short, the theory holds the rich get richer at a rate that makes the relatively poor become even poorer. The Matthew Effect elaborated by Merton (1968a) is a special case of cumulative advantage. Named after the Gospel of St. Matthew, it holds that already recognized scientists receive disproportionate recognition for subsequent contributions.

According to the broader theory, early access to resources is key. *Early* is a necessarily unspecified point in time, because resources available to some sooner than others—in graduate training, college, or even precollegiate experiences and conditions—can be used to begin the spiral of advantage on the one hand or, conversely, disadvantage on the other. The point is that advantages in early career, and in early life phases, position individuals for future achievement, which in turn brings its own rewards and resources that can be put to use for still more achievement, thereby establishing a process that over time significantly differentiates careers, their development, and conceivably the professional self-identities of those experiencing these careers. Thus, recalling Hughes, different careers are produced, and presumably, different people are produced as well. This sociology of science perspective provides a framework for asking and inquiring about *what life is like* across strata, or contexts, of science, and what work comes to mean to people whose careers are situated in these strata over many decades of professional events and experiences.

Longitudinal Study of Science Careers

Joseph C. Hermanowicz (1998, 2009) undertook a sociological study of contemporary academic careers situated in varieties of the modern American university as revealed in the lives of 55 university professors. The study was based on face-to-face longitudinal interviews with academics who were first interviewed in 1994–1995 and again in 2004–2005. The professors were initially sampled across a range of career stages, from early, middle, and late career. The longitudinal study examined the career paths of these academics as they advanced from these points, including into the stage of retirement and exit from the career. Age and institutional location provide the structure to analyze individual, subjective careers through diachronic change. Longitudinal data add spatial and temporal dimensions to synchronic study, and we are consequently in a position to answer the following questions about scientific careers:

- How do scientists account for the unfolding of their careers in light of the goals and aspirations that socially situate their profession?
- What continuities and changes—in aspiration, satisfaction, motivation, commitment, and identification with work—mark the careers of scientists?
- What knowledge do scientists acquire over time about themselves, their institutions, and the academic profession?
- How does this knowledge vary by individual age and type of university?

When first interviewed in 1994–1995, the subjects were sampled according to early, middle, and late career stages and by one of three types of university in which they were

employed. The universities, which form a representative continuum, consist of those stressing research in the presence of teaching and other roles, termed *elite*. Examples include Harvard, Cal Tech, and the University of California, Berkeley. Institutions that stress research and teaching as well as other roles are termed *pluralist*. Examples include the University of Kansas, the University of Missouri, and Purdue University. Institutions that stress teaching in the presence of research and other roles are termed *communitarian*. Examples include the University of Tulsa, the University of Louisville, and the University of Toledo.

The same scientists were again interviewed in 2004–2005, creating a longitudinal design from which to study how academics, working in a variety of institutions, age in relation to their work. The sequel thus allows one to observe how academics' perceptions of work evolve with felt costs and rewards, from early to middle career, from middle to late career, and from late to post career.

Scientists from one academic field—physics—composed the study, but the results are not limited to them. Physicists were selected because in the wider culture, they are perceived to embody the scientific discipline *par excellence*. They possess a recognizable genealogy of immortals, such as Johannes Kepler, Isaac Newton, and Albert Einstein, who promote a heroism and define a paradigmatic career for those who follow. Thus, if one is interested in observing how academic aspirations develop and evolve and how careers play out over time, particularly against the backdrop of such exalted company, the field of physics makes an ideal setting. A discussion will follow about how the research findings may be generalized to other fields.

Academic Paths and Perceptions

Specific generalizations can be drawn about careers that represent the major distinctions across cohorts of scientists in the three main organizational contexts of academic science. Twenty dimensions of science careers ground these comparisons: (1) career focus, (2) professional aspirations, (3) recognition sought, (4) orientation to work, (5) work/family focus, (6) attribution of academic workplace, (7) overall satisfaction, (8) career progress, (9) work intensity, (10) object of satisfaction, (11) peak satisfaction, (12) attitude toward reward system, (13) definition of success, (14) work attitude, (15) prominent concerns, (16) academic career again? (17) do differently in academic career? (18) desire to leave university, (19) desire to retire now, and (20) overall modal career pattern.

A focus may be placed on four of these dimensions: overall modal career patterns, overall satisfaction, work attitudes, and whether scientists would again pursue an academic career. These dimensions may be viewed as the most overarching and thus provide a general accounting of career patterns.

Overall Modal Career Patterns

In passing from early to middle career, elites stabilized and rededicated themselves to academe—to fulfilling the institutional goals of higher education by continuing in their research productivity. A scientist put it in the following representative terms:

The dream is to discover some fantastic new effect that knocks the socks off my friends and colleagues, that knocks the socks off the community, so that when I walk down the corridor, the young students know me and say, "There goes [Silverman], he invented the [Silverman] effect." That's what I want; I want my effect. I want to be the first person to predict such and such an event. (Hermanowicz 2009:86–89)

By contrast, pluralists experienced a reversal. They questioned their interest and commitment to the profession. They grew disillusioned with academic research, as illustrated by the following scientist:

My attitudes about the job, about me, and about the university have undergone tremendous changes in the past ten years. . . . I'm not sure I want to even submit things to published journals anymore. . . . I'm disgusted by the whole thing. . . . I got tired of getting referee reports . . . that spend a page talking about the bibliography; they were entirely concerned with whether I cited their work or their friends' work, and they hadn't read the paper. . . . I'm in a setting where the last thing people want is honesty. . . . You guys play your game; it's fine. There are more important things in life than getting grants from the National Science Foundation, getting Nobel Prizes even or any of that stuff. That's all just a game. (Hermanowicz 2009:105)

By mid-career, most communitarians ceased research. For communitarians, cumulative disadvantages accrued to the point of shutting down interest and motivation to continue in scientific research. Their career pattern may best be described as succumbing to a stasis—there was no forward progress. A scientist, just at mid-career, said:

I certainly have had a lot of distractions around here, and I think I could have been much more successful. . . . I think there's a lack of support, actually obstacles. I think there's been an orchestration of people not wanting people to succeed, not wanting to succeed in the department because there are things they can't do. I see it happen to other people. (Hermanowicz 2009:119)

In their middle-to-late career transitions, elites remained consistent in their identification with science and in their scientific productivity. Their publication productivity continued to accelerate. Pluralists either attempted to regenerate themselves after earlier fallow periods or continued in the research that they had been doing. Communitarians entered into a demise; they decreasingly identified with research. In ways consistent with the previous passage, they became increasingly disaffected with their departments

and universities, which they viewed as having crippled their research aspirations.

In moving from late to post career phases, elites for the first time lessened their intensity and embrace of research. Pluralists characteristically withdrew from work. Communitarians separated themselves completely from it, usually severing all ties with work and their employing organizations. The overall modal career patterns of scientists by institutional type and career stage are as follows:

Elites

Early to Middle: Stabilization and Rededication

Middle to Late: Continuation

Late to Post: Attenuation

Pluralists

Early to Middle: Reversal

Middle to Late: Regeneration or Continuation

Late to Post: Withdrawal

Communitarians

Early to Middle: Stasis

Middle to Late: Demise

Late to Post: Separation

Overall Satisfaction

Patterns in modal careers are in turn associated with patterns in satisfaction and in attitudes about work. Among elites, satisfaction begins high and rises through the career. It then drops at the end. Among pluralists, satisfaction starts out on a high, drops, and levels off. Finally, it rises at the end, coinciding with a time at which they withdraw from work. Among communitarians, there is a low in satisfaction throughout their careers, until the end. At the end of their careers, for the first time, communitarians experience the greatest high. Coincidentally, it is a time at which they are separating themselves altogether from work. Patterns in overall satisfaction of academic scientists by institutional type and career stage are:

Elites

Early: Medium

Middle to Late: High

Post: Medium-Low

Pluralists

Early: High

Middle: Low; Medium

Late: Medium

Post: High

Communitarians

Early to Late: Low

Post: Medium-High

Work Attitudes

Elites possessed positive attitudes toward their work throughout most of their careers. Only in the end do their attitudes turn ambivalent—about what they have done, how much they have achieved, and where they stand professionally. Unlike any previous period in their careers, there is a sense of regret and resignation about their efforts and what they have achieved. One academic put it in the following terms:

Maybe there is some self-delusion in feeling that you're being a significant contributor to science. It's just [pause] you have been trained, you know this field, when you're an expert in something, you tend to take pride in it, and you tend to continue doing it. But I don't think it's always very significant in the grand scheme of things. . . . I could have worked harder to become a better professional physicist. . . . At some stages of my career, I could have easily done better. It would have made a difference. It might well have been a significant difference. . . . If I had worked harder, it would have given me a little more status. I would have accomplished more in the field. (Hermanowicz 2009:192-93)

Pluralists are, by turn, positive. Asked about a particular period in their careers thought to be the most positive, the following illustration was given:

Now. This is it. Yes, absolutely. There's no question about it. . . . I'm a little older, and I've had the opportunity to look back and see how great it has been over the years, to see the whole career collectively and appreciate how lucky I've been to do all the things I have done. That's a good feeling, and it's like, wow, this has been great. (Hermanowicz 2009:200)

Communitarians feel detached from work and institution. Their attitudes are far from the negative ones that were most common among them at earlier points in their careers.

There really wasn't much else to look forward to. [Right now, I'm] not working as hard. I'm not doing research anymore. I had two or three pretty good ideas during the course of my career, and I haven't had any since. I really don't keep up with the literature. . . . I think early on, even though I did some fairly decent work, both as a graduate student and in the beginning of my career, I never was satisfied. I always thought that I could have done better or sooner or more. In more recent years [near and in retirement], I have become content, not only with what I was doing, but also how much. I think this is a reflection of my coming to like myself more. (Hermanowicz 2009:207)

Work attitudes of academic scientists show this pattern by institutional type and career stage:

Elites

Early to Middle: Positive

Middle to Late: Positive

Late to Post: Ambivalent

Pluralists

Early to Middle: Preponderantly Negative

Middle to Late: Ambivalent; Positive

Late to Post: Positive

Communitarians

Early to Middle: Preponderantly Negative

Middle to Late: Neutralized

Late to Post: Detached

Would Scientists Pursue an Academic Career Again?

Many would not. The notable trend is not that many would, as is also the case. One might anticipate that long training and preparation for a profession would coincide with commitment and satisfaction, indicated by a strong desire to pursue the same profession were people given the chance to start over. By contrast, what is noteworthy is the large fraction of faculty members who say they would pursue another line of work, an indication of a profession's lack of vitality, conditioned by the circumstances that faculty members confront in their organizational environments. Patterns in scientists' attitudes vary by institutional type and career stage:

Elites

Early to Middle: Definitely

Middle to Late: Definitely

Late to Post: Yes

Pluralists

Early to Middle: No; Maybe; Yes

Middle to Late: Maybe; Yes

Late to Post: Maybe; Yes

Communitarians

Early to Middle: No

Middle to Late: No; Maybe

Late to Post: No

Elites are most adamant in desiring an academic career again despite the leveling in satisfaction they derive from their careers in late and post phases, as indicated previously.

Their sentiments evolve only slightly, and then only in late to post career phases, when positive adamancy turns into a milder yes.

Pluralists indicate a greater variation in attitudes. They are most variable in the transition from early to mid-career but remain ambivalent throughout the duration of their careers.

Communitarians are the most in agreement about not again pursuing an academic career. Also notable is the pattern of this attitude emerging strongly in early stages of their careers. The pattern is slightly variable as communitarians pass from middle to late career stages, perhaps because of greater career stability. Their attitudes about academic careers turn wholly negative in late to post stages. The overall negative attitude that communitarians develop toward the prospect of pursuing an academic career again may be best explained by the cumulative disadvantages that they experience in their work, particularly in their research roles. They perceive their institutions as blocking an ability to realize professional goals.

Diachronic change across the three prototypical academic organizations evinces *reversals*: reversals of career orientation, outlook, and attitude. Elites may be most dedicated throughout their careers, but most devastated at the end. Communitarians may be less dedicated throughout their careers, but most satisfied and positive in their outlooks at the end. Pluralists exemplify the greatest variability in their careers, but in the end find a satisfaction that overcomes previous ambivalence.

Implications Across Academic Fields

We may consider the extent to which the observed patterns pertain to practitioners in other academic fields. To do so, it is important to consider both the universalities and particularities of physics.

With regard to universalities, one may take note of the fact that these physicists are *academic* physicists whose careers have been studied within the contexts that structurally and culturally situate the system of U.S. higher education institutions. Their careers are substantially structured and acquire significant meaning by way of reward systems of universities. Reward systems of universities apply as much to physicists as to classicists, sociologists, biologists, and philosophers.

Because these identities are organizationally based, and because they convey general sets of institutional conditions for careers, one may deduce that, *in general*, careers in varieties of fields will transpire in *roughly* equivalent fashion as those found here. The major point: In all fields, academic careers are typically begun with high expectations. High expectations are compatible with fulfilling institutional goals of science, which are parallel to the institutional goals of any academic field in higher education—to extend socially certified knowledge.

To assess the particularity physics, we turn to the phenomenon of *codification*, examined by sociologists of science and higher education researchers. Codification refers to the organization of knowledge into clear theoretical formulations: a mass of seemingly disparate parts reduced to a coherent and explainable whole. Academic fields and specialties within them vary in their extent of codification. Generally, highly mature fields are said to be highly codified, less mature fields, less codified. Comparatively, fields such as physics and chemistry are recognized as highly codified. Fields such as sociology and history are recognized as weakly codified. Fields such as psychology and biology may be recognized as possessing an intermediate degree of codification.

An important aspect of codification is *consensus*, the extent to which practitioners of a field agree. Agreement may be understood to have many referents: problem choice, methods for research, theory selection to explain phenomena, and the like. One can surmise that another referent of agreement consists of a collective definition of career success. That is, the extent to which members of a field agree on what constitutes a successful career and on which members of the field are successful, given the qualitative and quantitative characteristics of their achievements. Following this logic, one would expect physics, as a high-consensus field, to possess members with relatively clear and delimited definitions of success in the field. Correspondingly, one would expect low-consensus fields, such as sociology and history, to possess members with relatively ambiguous and varied definitions of success in their respective fields.

One would expect members of high-consensus fields, such as physics, to offer among the severest judgments about their careers. One would expect members of low-consensus fields to find the greatest latitude in the judgments they could render on their careers. Put differently, members of low-consensus fields have more chances to define themselves as successful because they can more easily find a sanctioned reference group against whom they favorably measure up. Members of high-consensus fields have the chips stacked high; career success hinges on an ability and opportunity to satisfy relatively rigid collective understandings of achievement.

One might also therefore predict that low-consensus fields offer the greatest opportunity for professional satisfaction; practitioners can do almost anything and find an outlet to be recognized for it. Professional satisfaction in high-consensus fields is a scarcer commodity, because it is traded for scarcer talent.

The *resource dependence* of physics is another means by which it achieves particularity. To do their physics, physicists need money. Money is necessary for numerous components that comprise research in physics: laboratories, equipment, supplies, staffs of postdoctoral and predoctoral researchers, professional travel, release time from teaching, and so on.

Not all academic fields, of course, are resource dependent in the same ways or degrees. Other fields in the hard

sciences, such as chemistry and biology, will approximate conditions of physics. Fields in the humanities are significantly less resource dependent or relatively resource independent. Fields in the social sciences compose a mix of resource dependence and independence. For example, anthropological work that relies on data obtained in distant field sites carries greater resource demands than sociological work that relies on observational data obtained on inner-city street corners. There are also variations by specialty area within fields, some more resource dependent than others. Experimental social psychology, for instance, imposes greater resource demands than most research in the sociological study of social movements. Moreover, theorists in all fields are less resource dependent than experimentalists or other types of primary empirical researchers.

In addition, academic fields differ in their *mutability*, that is, the capacity of a researcher to change direction or research area entirely to a less resource-dependent project should a more resource-dependent line of research fail. Relatively speaking, sociology, for example, is highly mutable. In the absence of funding, most sociologists can turn to other projects that are less resource contingent and often may be able to do so with few or no career costs. By contrast, physics is relatively immutable. Virtually all physics research, save a fraction of purely theoretical work, is resource dependent. Doing physics of almost any kind requires a significant financial infrastructure.

Together, the high resource dependency and immutability of physics establish notable constraints on academic careers in that field and in fields like it. One would again expect practitioners in such fields to offer the severest judgments about their careers because, when these contingencies fail, the consequences for careers are likewise severe. But even when contingencies remain intact, the risk and anxiety about their collapse remains high because practitioners can easily anticipate the consequences of failure.

Implications for the Academic Profession

The picture that emerges is far from sanguine. The patterns of careers seem to indicate a direction of the academic profession; research on academic institutions offers a further lens on the course of academe.

Alternately called *mission creep*, *academic drift*, and *institutional upgrading*, the increasingly widespread phenomenon in which institutions of many types seek to embrace the model of the American research university has become a subject of higher education research. The research emphasizes institutional benefits derived from this status change, including enhanced status and prestige that in turn can marshal additional resources, such as attractively credentialed faculty, students, and monies from legislatures, foundations, and other funding agencies; greater program offerings and correspondingly greater

market shares of students; and increased tuition revenues and alumni giving.

By one view, these substantial changes in the organizational makeup of higher education institutions in the United States may spell greater research opportunity for individual academics than existed within the population of institutions at a prior point in time. This remains an empirical matter that merits systematic treatment. For example, although there may be a positive net change in research opportunity, this of course does not mean that there is congruency between the research expectations of individual academics and those of their employing institutions. This prompts a more general point.

Although we cannot safely conclude that mission creep brings about greater research opportunity, we can say that it does entail a change in institutional expectations for careers. And the change, unsurprisingly, involves a greater emphasis on research productivity. This evolutionary process toward a more intensified stress on research has taken place amid other changes in academe. Academics of all generations note a heightened competition for research funding. Pressures to publish are now more intense as tenure and promotion procedures have grown more formalized throughout the higher education system, and as the supply of labor replacements has increased, making it easy to substitute faculty members whose records prior to tenure may be deemed good but not good enough to satisfy present-day performance realities. These conditions, already having become or well on their way to becoming so institutionalized as to enter habits of thought and behavior, have altered what it means to lead an academic life.

Taking into account the longitudinal evidence, organizational changes in institutions, and the omnipresent scarcity of rewards, the following proposition may be advanced: *Increased emphases on research will be accompanied by increased probabilities of dissatisfaction throughout the system of higher education.* As research is more greatly stressed, by institutions as by individuals, career expectations rise, in accord with attempting to satisfy external reference groups that are consistent with fulfilling the

institutional goals of academe. As expectations rise, the likelihood of satisfying them decreases because the expectations are defined by that not yet achieved and, ultimately, by the unachievable. These conditions favor dissatisfaction and disaffection for the academic career.

Current organizational conditions of academe favor a decline in the attractiveness of the academic career. On many objective criteria, the chances of success in academia across many fields are low and, where won, are hard fought. They are also arguably more difficult to obtain across institutional types than in any other historical time in the profession: obtaining regular employment, obtaining tenure, obtaining promotion through standard ranks, publication, citation of work, competitive salary, and competitive salary growth.

At stake on the one hand are individual satisfaction and moral commitment. These are significant stakes. When compromised, the institutional goals of the profession fail to be served. On the other hand, the overall welfare and functioning of the profession are at stake. One may question what types of people, with what levels of talent, the academic profession will be able to attract.

One scenario is that the profession will attract less talented individuals. More talented individuals, observing the conditions under which science careers are experienced, may increasingly enter other professions. It is conceivable that less talented individuals would possess lower expectations for achievement, thus muting the effects of dissatisfaction and leaving them more contented with work, and the profession *more stable* at a reduced performance threshold. But at such a reduced performance threshold, the net quality of scientific work would decline. Public value assigned to the profession would erode further. This effect would also have to overcome the processes of induction, training, and socialization that are aimed at inculcating moral commitment and associated high levels of expectations, as well as organizational and professional norms that press for productivity. Short of organizational change, conditions seem to have developed to create an enduring crisis of meaning about work and satisfaction in scientific careers.

References and Further Readings

- Barley, Stephen R. 1989. "Careers, Identities, and Institutions: The Legacy of the Chicago School of Sociology." Pp. 41-65 in *Handbook of Career Theory*, edited by M. B. Arthur, D. T. Hall, and B. S. Lawrence. Cambridge, MA: Cambridge University Press.
- Blackburn, Robert T. and Janet H. Lawrence. 1995. *Faculty at Work: Motivation, Expectation, and Satisfaction*. Baltimore, MD: Johns Hopkins University Press.
- Braxton, John M. and Lowell L. Hargens. 1996. "Variation among Academic Disciplines: Analytical Frameworks and Research." Pp. 1-46 in *Higher Education: Handbook of Theory and Research*, Vol. 11, edited by J. C. Smart. New York: Agathon.
- Clark, Burton R. 1987. *The Academic Life: Small Worlds, Different Worlds*. Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.
- Cole, Jonathan R. and Stephen Cole. 1973. *Social Stratification in Science*. Chicago, IL: University of Chicago Press.
- Elder, Glen H., Jr. 1974. *Children of the Great Depression: Social Change in Life Experience*. Chicago, IL: University of Chicago Press.
- . 1975. "Age Differentiation and the Life Course." *Annual Review of Sociology* 1:165-190.
- Erikson, Erik H. 1950. *Childhood and Society*. New York: Norton.
- Finkelstein, Martin J., Robert K. Seal, and Jack H. Schuster. 1998. *The New Academic Generation: A Profession in*

- Transformation*. Baltimore, MD: Johns Hopkins University Press.
- Hagstrom, Warren O. 1965. *The Scientific Community*. New York: Basic Books.
- Hermanowicz, Joseph C. 1998. *The Stars Are Not Enough: Scientists—Their Passions and Professions*. Chicago, IL: University of Chicago Press.
- . 2009. *Lives in Science: How Institutions Affect Academic Careers*. Chicago, IL: University of Chicago Press.
- Hughes, Everett C. 1958. *Men and Their Work*. Glencoe, IL: Free Press.
- . 1971. *The Sociological Eye: Selected Papers*. New Brunswick, NJ: Transaction.
- Levinson, Daniel J. 1978. *The Seasons of a Man's Life*. New York: Ballantine.
- . 1996. *The Seasons of a Woman's Life*. New York: Knopf.
- Long, J. Scott and Mary Frank Fox. 1995. "Scientific Careers: Universalism and Particularism." *Annual Review of Sociology* 21:45–71.
- Merton, Robert K. 1968a. "The Matthew Effect in Science." *Science* 159:56–63.
- . 1968b. *Social Theory and Social Structure*. New York: Free Press.
- . 1973. *The Sociology of Science: Theoretical and Empirical Investigations*. Edited and with an Introduction by N. W. Storer. Chicago, IL: University of Chicago Press.
- Neugarten, Bernice L., ed. 1968. *Middle Age and Aging: A Reader in Social Psychology*. Chicago, IL: University of Chicago Press.
- . 1996. *The Meanings of Age: Selected Papers of Bernice L. Neugarten*. Edited by Dail A. Neugarten. Chicago, IL: University of Chicago Press.
- Neugarten, Bernice L., Joan W. Moore, and John C. Lowe. 1965. "Age Norms, Age Constraints, and Adult Socialization." *American Journal of Sociology* 70:710–17.
- Riley, Matilda White, Anne Foner, and Joan Waring. 1988. "Sociology of Age." Pp. 243–90 in *Handbook of Sociology*, edited by N. J. Smelser. Newbury Park, CA: Sage.
- Schuster, Jack H. and Martin J. Finkelstein. 2006. *The American Faculty: The Restructuring of Academic Work and Careers*. Baltimore, MD: Johns Hopkins University Press.
- Sheehy, Gail. 1976. *Passages: Predictable Crises of Adult Life*. New York: Bantam.
- Sonnert, Gerhard and Gerald Holton. 1995. *Gender Differences in Science Careers: The Project Access Study*. New Brunswick, NJ: Rutgers University Press.
- Zuckerman, Harriet. 1977. *Scientific Elite: Nobel Laureates in the United States*. New York: Free Press.
- . 1988. "Sociology of Science." Pp. 511–74 in *Handbook of Sociology*, edited by N. J. Smelser. Newbury Park, CA: Sage.
- Zuckerman, Harriet, Jonathan R. Cole, and John T. Bruer, eds. 1991. *The Outer Circle: Women in the Scientific Community*. New York: Norton.