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ABSTRACT

This study investigated variations in the relationship between age strata and career roles of faculty affiliated with eight distinctive clusters of academic disciplines in major research universities. The sample consisted of over 10,000 faculty who responded to a recent American Council on Education survey. The results demonstrated wide variation in the relationship between age and career roles of faculty in the discipline clusters, and raise serious questions regarding several commonly assumed trends in the career roles of faculty during various stages of their tenure in the academic community. (Author)

CAREER ROLES OF RESEARCH UNIVERSITY FACULTY

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This study investigated variations in the relationship between age strata and career roles of faculty affiliated with eight distinctive clusters of academic disciplines in major research universities. The sample consisted of over 10,000 faculty who responded to the recent American Council on Education survey. The results demonstrated wide variation in the rlationship between age and career roles of faculty in the eight discipline clusters and raise serious questions regarding several commonly assumed trends in the career roles of faculty during various stages of their tenure in the academic community.

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The renewed interest in research on professionals in the academic community has produced an increasingly rich literature on the dominant patterns of faculty interests, values, and activities and the salient sources of diversity in these attitudinal and behavioral patterns. Through such efforts we are beginning to acquire a better understanding of the prevailing value structure in the academic community and how this varies as a function of the academic discipline and institutional affiliations of faculty.

Until recently, however, the effects of faculty aging have received little attention in the higher education research literature. This neglect has been so pronounced that Zuckerman and Merton (1972) have claimed that "just about any methodical research on age, age cohorts, and age structure in science would qualify, through prior default, as a 'new' direction" (p. 496). The subject of faculty aging has recently begun to capture greater attention of researchers with the reversal of the enrollment growth trends of the past two decades and the resulting need to rethink existing faculty recruitment, retention, and employment practices in the current climate of "steady-state staffing." Recent literature reviews by Carlsson and Karlsson (1970) and Bess (1973) and empirical research by Bayer and Dutton (1977) reflect the emerging interest in this area of scholarly inquiry.

With the notable exception of the study by Harmon (1965), the relationship between the age and the primary career roles of faculty has not been systematically examined. Harmon (1965) reported that (a) younger faculty are more likely than their senior colleagues to devote more of their time to research activities, (b) senior faculty are far more likely to specialize in administrative roles, and (c) age differences concerning the teaching roles of faculty are less pronounced than those related to either research or administrative roles. The

possibility of variations in these prevailing relationships for faculty in different academic disciplines was not examined by Harmon (1965).

This study represents a reexamination of the general findings reported by Harmon (1965) and further seeks to examine the validity of these general findings for faculty affiliated with distinctly different clusters of academic disciplines. The study is conducted within the conceptual framework advanced by Zuckerman and Merton (1972) in their notable review of the literature on age differentiation in science. The three basic components of the framework are age differentiation, scientific roles, and the codification of subject matter areas. The former pertains to age differences in the entry, retention, and exit patterns of scientists, as well as their educational attainment and professional role performance. Scientific roles concern the distribution of scientists' efforts among the fourfold responsibilities of research, teaching, administration, and gatekeeping. The concept of subject matter area codification refers to variations in the extent to which empirical knowledge is consolidated into succinct and interdependent theoretical formulations in various sciences and their respective specialties (i.e., disciplines and sub-disciplines). This study focuses upon the interrelationships of these three primary components of the conceptual framework advanced by Zuckerman and Merton (1972); that is to say, the extent to which the relationship between age and scientific roles of faculty varies as a function of the level of codification of various academic disciplines.

DATA SOURCE AND METHOD

Data for this study were obtained from the American Council on Education (ACE) survey of college and university faculty members (Bayer, 1973). From this sample of 53,029 faculty members, those selected for analysis were men and women affiliated with large research universities (Research Universities I and

II of the Carnegie Commission typology of postsecondary institutions) whose highest earned degree was a doctorate and whose highest earned degree field and department of teaching appointment was included in the three-dimensional model of academic disciplines developed by Biglan (1973b). Only faculty from large research universities were selected since these institutions normally expect (and provide opportunities for) their faculties to be engaged in all the major career roles (i.e., research, teaching, administration) within the academic profession.

The concept of codification advanced by Zuckerman and Merton (1972) bears a close resemblance to the concept of paradigm developed by Kuhn (1970). The concept of paradigm is a major feature in Biglan's (1973)b) three-dimensional model of academic disciplines (shown in Figure 1), and subsequent research by Biglan (1973a), Lodahl and Gordon (1972), and Smart and Elton (1975) has demonstrated its value in studying the structure of academic disciplines and the activities and values of their members. Thus, Biglan's model was used to identify distinctive clusters of academic disciplines for subsequent analyses.

(Insert Figure 1 about here)

Data relating to the age and career roles of faculty were obtained from responses to the following items in the ACE survey: age was reported in one of ten five-year interval categories (with the exception of the beginning and ending age categories) and subsequently reduced to three major age categories (40 or less, 41 to 50, 51 and older) and primary career role to which faculty responded that the principal activity of their current position was either administration, teaching, research, or other (the 'other' category was not retained for analyses). Chi-square analyses were performed to examine dif-

roles and goals of an institution and by specific objectives of the educational experience as they are viewed by the institution. Educators must respond to the pressures of governmental agencies to provide outcomes data related to employment and income, but they must also insure that the noneconomic values of education are an integral part of evaluations of educational benefits.

The increasing importance of information provided by surveys of graduates, as measures of educational outcomes, motivates institutions of higher education to engage in this type of research and to share the results. The cumulative information can help higher education assume leadership in demonstrating the benefits of the educational experience that include intellectual, personal, and social development as well as occupational outcomes.

Surveys of Degree Recipients

A survey of 3,315 baccalaureate and advanced degree recipients of the University of Colorado at Denver, 1970-1975, was conducted in April, 1976. This number represents all graduates for whom addresses were available. The total number of completed returns was 1,389 or 42 percent. The responses were representative of the distributions across the schools and colleges and across the five years.

The respondents identified the major or subject field of their degree. Consequently, the outcomes information can be related to each degree program. The survey includes the recipients' income, the relationship of their jobs to the degree, the amount of intergenerational or socioeconomic mobility that occurred, estimates of intellectual and personal development experienced, and evaluations of instruction, academic advising, and career counseling. For the purposes of this report, the degree-related data is aggregated by the school or college in which the degree work was completed.

This research was preceded in 1974-75 by a survey of all four campuses

ferences between age and primary career role distributions of faculty in each of the eight academic discipline groups included in Biglan's model (see Figure 1).

RESULTS

Tables 1 through 8 present the expected and actual distributions from the chi-square analyses for the age category and primary career role variables for faculty in each of the eight academic discipline clusters included in Biglan's model. For ease of interpretation, Table 9 presents summary information on the differences between the expected and actual distributions for the three age categories (40 or less, 41 to 50, 51 or more) in each primary career role for faculty in the eight academic discipline clusters. For example, Table 9 shows that there are 25 per cent fewer young faculty (40 or less) than expected in the administrative role in HPL disciplines (biological sciences), 8 per cent more middle-age faculty (41 to 50) than expected, and 16 per cent more senior faculty (51 or more) than expected. These three percentages do not always seem to zero because of rounding error.

Insert Tables 1 through 9 about here

The following is a summary of the results presented in TAble 9 for the distribution of the three age groups in each of the three primary career roles.

Administrative Role. The information in Table 9 clearly demonstrates that the administrative role is not the province of younger faculty; for in all eight discipline clusters there are fewer young faculty than expected who indicated that their principal role was administration. However, the magnitude of this disproportionately lower representation of younger faculty in the administrative role varied dramatically from 2 per cent in SAL disciplines (Education) to 27 per cent in HPL disciplines (physical sciences and mathe-

matics). Younger faculty clearly have a better opportunity of engaging primarily in administrative responsibilities in Education (SAL) disciplines than in any other discipline cluster.

Yet to say that younger faculty are consistently 'underrepresented' in the administrative role does not necessarily mean that senior faculty are consistently 'overrepresented', as suggested by Harmon (1965). We find, for example, in all four 'soft' discipline clusters that the 'underrepresentation' of younger faculty is offset by approximately equal 'overrepresentation' of both middle-age and senior faculty. This suggests that opportunities to engage primarily is administrative tasks becomes available to faculty in 'soft' disciplines somewhere around the age of forty. On the other hand, the administrative role is primarily the province of senior faculty in three of the four 'hard' disciplines (HPL, HPN, HAL). The only exception is in HAN disciplines (engineering sciences) where middle-age faculty are far more dominant than their senior colleagues.

Teaching Role There is clearly less variation in the expected and actual frequencies in the teaching role than in either the administrative or research role. The largest discrepancy between the expected and actual frequencies (4 per cent) is in HAL disciplines (agricultural sciences), and the direction of this difference is somewhat unique; that is, there is a slightly greater percentage of senior faculty whose primary activity is teaching than normally would be anticipated. The differences, in all eight discipline clusters, however, is negligible.

Research Role. If the administrative role is decidedly not the province of younger faculty, the reverse is true in terms of the research role, for in all eight discipline clusters there are more young faculty who are principally engaged in research activities than expected. Again, however, the

magnitude of this 'overrepresentation' of younger faculty in the research role varies substantially among the eight discipline clusters, from 3 per cent in SPL (social sciences) and SPN (humanities) disciplines to 14 per cent in HAN disciplines (engineering sciences). Furthermore, it is not always the senior faculty who are disproportionately 'underrepresented' in the research role. The 'underrepresentation' of senior faculty in the research role is evident in only four of the eight discipline clusters (HPL, HAL, SPL, SAN). In fact, senior faculty are substantially 'overrepresented' in the research role in SAL disciplines (Education) and not as 'underrepresented' as their middle-age colleagues in the three remaining discipline clusters (HPN, HAN, SPN).

CONCLUSIONS

The failure of researchers to investigate the possibility of academic-discipline variability can often lead to the formulation of universal conclusions regarding the prevailing interests, values, and activities of members of the academic profession. While such conclusions, on the whole, may be true, their applicability to faculty in specific academic disciplines may be unwarranted. This, in essence, describes the relationship of the finding of this study and those reported by Harmon (1965). Harmon's findings are essentially substantiated by the results of this study if one ignores the academic discipline affiliation of faculty members. That is to say, more senior faculty tend to specialize in administrative roles, younger faculty tend to specialize in research roles, and age differences in the teaching role are less pronounced than those related to either research or administrative roles. Yet such universal conclusions are too simplistic and tend to mask wide variations among distinctively different academic discipline clusters, and it is this variability, rather than the similarity, that is most descriptive of the academic community.

Zuckerman and Merton (1972) note that "what is role-sequence from the standpoint of the individual moving along the phases of his life course is role-allocation from the standpoint of the social system of science" (p. 523). And it is this distinctive role-allocation process in each of the eight academic discipline clusters included in Biglan's model that deserves further attention on the part of researchers interested in the sociology of careers in the scientific community. Based on the underlying dimensions of Biglan's model, the results of this study suggest that the level of subject matter area codification, advanced by Zuckerman and Merton (1972), and similar to the concept of paradigm developed by Kuhn (1970), is closely related to the allocation of administrative roles in the scientific community. The findings discussed above suggest that the allocation of administrative responsibilities in subject areas that have a higher degree of codification ('hard' disciplines) are reserved for senior faculty, while 'soft' disciplines, which have a lower level of codification and paradigm development, provide opportunities to engage principally in administrative roles to faculty of middle-age (or mid-career). The underlying reasons for this variability in the relationshiop between age differentiation and subject matter area codification clearly warrant further study. One might also want to examine why the engineering sciences (HAN) are different from the other 'hard' disciplines in this respect.

Similarly, the third dimension of Biglan's model (life-system vs.nonlife-system disciplines) appears to be related to the allocation of the research role opportunities in the scientific community. The prevailing tendency is that senior faculty are especially 'underrepresented' in the research role of 'life-system' disciplines (particularly in the biological sciences, HPL; agricultural sciences, HAL; and social sciences, SPL), while this is not as

pronounced in most 'nonlife-system' disciplines (particularly in the physical sciences and mathematics, HPN; engineering sciences, HAN; and humanities, SPN).

Another area that deserves greater attention is the unusual relationship between age differentiation and role allocation in Education disciplines (SAL). For example, unlike all other seven discipline clusters, the opportunity to engage in administrative role activities in Education disciplines is almost totally unrelated to the age of faculty members. Also, the relationship between faculty age and opportunities to engage primarily in research role activities of faculty in Education disciplines is atypical; that is, the research role is reserved for (i.e., allocated to) faculty in the two extreme age categories (40 or less, 51 or more). This unusual pattern warrants further study.

In summary, there are many intriguing questions regarding the relationship between age differentiation and role allocation in the academic community that deserve further attention. The results presented above clearly suggest the advisability of incorporating the academic discipline affiliations of faculty into research designs in this area of scholarly inquiry since the relationship between age differentiation and role allocation is likely to vary in different academic disciplines. It is further suggested that Biglan's model constitutes a desirable conceptual framework for the clustering of academic disciplines.

Figure 1

Clustering of Academic Task Areas in Three Dimensions

Task area	Hard		Soft	
	Nonlife system	Life system	Nonlife system	Life system
Pure	Astronomy Chemistry Geology Math Physics	Botany Entomology Microbiology Physiology Zoology	English History Philosophy Communications	Anthropology Political science Psychology Sociology
Applied	Ceramic Engineering Civil engineering Computer science Mechanical engineering	Agronomy Dairy science Horticulture Agricultural economics	Accounting Finance Economics	Educational administration & supervision Secondary & continuing education Special education Vocational and technical education

Table 1

Age Strata and Primary Career Role Distributions:
HPL Discipline Cluster (Biological Sciences)

Primary Career Role	Age Strata			TOTAL
	40 or less	41-50	51 or more	
Administration				
Actual	21	73	78	172
Expected	63	58	50	
Teaching				
Actual	275	235	214	724
Expected	266	246	212	
Research				
Actual	197	148	101	446
Expected	164	152	131	

Table 2

Age Strata and Primary Career Role Distributions:
HPN Discipline Cluster (Physical and Mathematical Sciences)

Primary Career Role	Age Strata			TOTAL
	40 or less	41-50	51 or more	
Administration				
Actual	72	123	131	326
Expected	160	92	75	
Teaching				
Actual	1123	651	497	2271
Expected	1112	638	521	
Research				
Actual	436	162	136	734
Expected	359	206	168	

Table 3

Age Strata and Primary Career Role Distributions:
HAL Discipline Cluster (Agricultural Sciences)

Primary Career Role	Age Strata			TOTAL
	40 or less	41-50	51 or more	
Administration				
Actual	12	37	62	111
Expected	37	36	38	
Teaching				
Actual	75	78	93	246
Expected	81	81	84	
Research				
Actual	176	146	118	440
Expected	145	144	151	

Table 4
Age Strata and Primary Career Role Distributions:
HAN Discipline Cluster (Engineering Sciences)

Primary Career Role	Age Strata			TOTAL
	40 or less	41-50	51 or more	
Administration				
Actual	21	29	16	66
Expected	38	18	9	
Teaching				
Actual	256	112	56	424
Expected	245	118	61	
Research				
Actual	35	9	5	49
Expected	28	14	7	

Table 5
Age Strata and Primary Career Role Distributions:
SPL Discipline Cluster (Social Sciences)

Primary Career Role	Age Strata			TOTAL
	40 or less	41-50	51 or more	
Administration				
Actual	39	73	65	177
Expected	79	51	47	
Teaching				
Actual	497	275	261	1033
Expected	460	298	275	
Research				
Actual	56	36	28	120
Expected	53	35	32	

Table 6

Age Strata and Primary Career Role Distributions:
SPN Discipline Cluster (Humanities)

Primary Career Role	Age Strata			TOTAL
	40 or less	41-50	51 or more	
Administration				
Actual	41	80	89	210
Expected	94	55	62	
Teaching				
Actual	754	388	434	1576
Expected	702	412	462	
Research				
Actual	20	10	13	43
Expected	19	11	13	

tion advanced degree recipients the lowest at 32 percent and Engineering advanced degree recipients highest at 100 percent.

Nearly one-half of the total sample indicated that they did not receive career or occupational counseling from the mentioned sources and nearly one-fourth identified friends and acquaintances as the source. These proportions were the general pattern for both baccalaureates and advanced degree recipients. Faculty members provided nearly one-fifth of the career-occupational counseling for the total sample, with a range across the schools-colleges of nine percent (Business baccalaureates) to 29 percent (Engineering baccalaureates and advanced degrees).

Sixty-eight percent of the total sample believe a placement service on the Denver campus is important, only 14 percent consider it not important or are neutral, and 18 percent had no opinion. This was the general pattern of the responses across the schools-colleges.

Degree Recipients Who Remained in the State

Seventy-five percent of all degree recipients, 1970-75, now live in Denver and an additional eight percent live in Colorado. Nearly three-fourths plan to remain in Colorado in the future (56 percent in Denver and 17 percent in other state locations).

The Uses of the Survey Results

The outcome studies have been used for reports to the State Planning and Budgeting Office, they have supported proposals for new degree programs, and they are being used by the School for Educational Studies in its self study for the accreditation review by the National Council for Accreditation of Teacher Education (NCATE).

The income and employment-related data have supplied the information re-

quired by the Guaranteed Student Loan Program, and it will be useful for counseling students about potential outcomes related to specific degree programs.

Comments and Conclusions

Accountability. One aspect of accountability is to demonstrate the benefits that accrue to graduates of an institution that result from completing a degree program. The results of the survey show that 84 percent are in employment related to their academic field, with a range of 92 percent to 100 percent of advanced degree recipients across the schools and colleges in degree-related jobs. Thirty-two percent more graduates, compared to their fathers, are in officer-manager, professional or technical occupations. There were significant increases in median income from the first position held after receiving a degree to the present position. Compared with national statistics for comparable age groups, the 3.7 percent unemployment is extremely low. Eighty-three percent of the graduates have remained in the state that provided most of the financial support for their education and are contributing to its economy and to society. Ninety-one percent found their degree helpful in providing intellectual development (nonoccupational knowledge) and nearly 80 percent were helped in the development of values.

These results reveal a considerable benefit from the educational experience for graduates.

Academic Planning. Though the evaluations of instruction were good, they are no cause for complacency. On the other hand, academic advising and career counseling were not evaluated highly. One-third of the respondents believe academic advising is below average or poor and nearly 60 percent gave these ratings for career or occupational counseling. Thirty-eight percent believe classes are too large. Sixty-eight percent believe more placement services should be provided. These respondents indicate that academic planning and student services need to improve these conditions and services.

Resource Allocations. Resource allocations require perspective and the weighing of many factors in making decisions. Surveys of graduates provide employment related information about degree recipients and their estimates of other benefits derived such as personal and intellectual development. For example, the median annual income for Education degree recipients was the lowest among the school and colleges while those with baccalaureate degrees completed in the College of Liberal Arts and Sciences had the lowest number of graduates with jobs that were related to their academic field. However, arts and sciences degree recipients had the highest number who stated that general education was their purpose in obtaining the degree, and they had the next highest number who indicated that knowledge in a specific field was their purpose. Consequently, when data from surveys is used in relationship to resource allocations, perspective is necessary and it must be related to the purposes, roles and goals, and objectives of the educational experience in an institution.

Moreover, in order to obtain perspective, data from surveys of graduates should be viewed beside other information such as the number of degrees awarded and the number of student credit hours (SCH) generated. For example, in the academic year (1975-76) in which the University of Colorado at Denver survey occurred, the College of Liberal Arts and Sciences (CLAS) produced 39 percent of all degree recipients and had 62 percent of all full time equivalent faculty (FTE). However, that college generated 64 percent of the student credit hours with one-third of these from students with declared majors in degree programs of the other schools or colleges.

The obvious conclusion that results from the consideration of survey data and other available data is that no single factor can be used exclusively, but perspective for decision-making may be developed by weighing all items of information.

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