Consensus Within Five Academic Subdisciplines of Pharmacy: Progress Toward Establishing Their Scientific Paradigms

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ABSTRACT. The purpose of this study was to measure the perceived consensus among faculty within pharmacy's academic subdisciplines of medicinal chemistry, pharmacology, pharmaceutics, pharmacy practice, and social and administrative pharmaceutical sciences as an initial step in determining their progress toward achieving their scientific paradigms. Surveys were mailed to a stratified random sample of faculty at 80 colleges and schools of pharmacy. Respondents indicated the level of agreement they perceive within their respective departments on issues comprising two consensus constructs: consensus basic and consensus

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Journal of Pharmacy Teaching, Vol. 9(2) 2002
http://www.haworthpressinc.com/store/product.asp?sku=J060

graduate. Respondents from all five subdisciplines perceived at least modest agreement on each issue and exhibited similar levels of consensus. Respondents from institutions whose mission is primarily teaching perceived a lesser accord than did those of other institutions. Female respondents responded less positively on issues relating to departmental decision making and organizational reward systems. In conclusion, it would appear that pharmacy's subdisciplines are on track toward achieving scholarly consensus and that differences in perceptions are mostly at the personal level.

KEYWORDS. Intradisciplinary, interdisciplinary, scientific paradigm, consensus

INTRODUCTION

Contemporary colleges and universities offer instruction in scores of fields and encourage their faculties to become adept at research as well as teaching, thus fostering disciplinary differentiation and specialization (1). This trend of specialization began in the early twentieth century but has accelerated over the past two decades. Nowhere is this better typified than within the health sciences, as advances in medical technology, concomitant with the dynamic environment of health policy, necessitate the need for academic institutions to train students in newly emerging professions while continuously updating and revising curricula of existing programs. Pharmacy has not been an exception, as its academic subdisciplines of pharmacology, therapeutics, and the social and administrative pharmaceutical sciences only developed and became critical components of pharmacy teaching and research after the 1950s (2).

Intradisciplinary Consensus and Development of A Scientific Paradigm

The issue of scholarly development or progress toward consensus on teaching concepts and research priorities and methodologies began to be addressed by philosophers during the 1950s. Their initial effort was an attempt to explain why some fields or disciplines seem to advance

more quickly than others. These theoreticians produced several single-dimension, dichotomous conceptualizations of fields: theoretical versus empirical, restricted versus unrestricted, and mature versus immature (3-5). Kuhn further defined fields as preparadigmatic versus paradigmatic to more specifically address the issue of progress in specific fields (6). Kuhn described scientific paradigm as including not only the accepted theory and findings of a field, but also its structure, by suggesting which problems require investigation, what methods are appropriate to their study, and even which findings are considered "proven." Following from this, the essence of the paradigm concept is the ". . . degree of consensus or sharing of beliefs within a scientific field about theory, methodology, techniques, and problems" (7). Kuhn added that the social sciences may be in a preparadigmatic stage, while the physical sciences have relatively well-developed paradigms (6).

Kuhn's work has been widely regarded as the seminal work for research on intradisciplinary consensus. Despite its persuasive and logical arguments, it suffered from a lack of empiricism in its foundation. In 1973, Anthony Biglan published his landmark work employing a multidimensional scaling technique to analyze the results of judgments (of disciplinary similarity) made by faculty representing 36 distinct areas of study (8). Biglan identified three dimensions which best serve to characterize a specific field. The first was a "hard-soft" dimension. At one end of this continuum were "hard" areas such as the physical sciences and engineering, while at the other end lay the "softer" humanities and education areas. The identification of this dimension corroborated previous speculation by Kuhn. The second dimension was one of "pure" versus "applied." Areas aligning as pure were those such as philosophy, languages, mathematics, and the social and physical sciences, while areas such as accountancy, finance, and engineering aligned on the opposing end and thus are concerned with the practical application of their subject matter. The third dimension addressed whether the area was concerned with living or organic objects of study, with agriculture, biology, sociology, and education aligning on one end of the dimension and areas such as mechanical engineering, mathematics, computer science, and physics on the other.

The implications of a discipline's structure, and thus its development of a scientific paradigm through consensus of its members, are extensive. In continuing his work in the area, Biglan examined the output (productivity) of the 36 disciplines originally classified in his previous work (9). The initial categorization of these disciplines into the three aforementioned dimensions was highly predictive in determining facul-

ties' social connectedness; commitment to teaching, research, and service; their number and types of publications; and the number of dissertations that they sponsored. Similarly, Lodahl and Gordon developed a series of hypotheses in which relatively high paradigm development in a discipline was predicted to facilitate research and teaching through an improved process of communication and greater access to published information (7). They found that physicists and chemists exhibited more agreement over field content and were more willing to spend time with graduate students than were sociologists and political scientists. Additionally, chemists were found to collaborate with larger numbers of fellow scholars than were scientists in other fields. In a subsequent paper, Lodahl and Gordon uncovered a significant correlation between a discipline's paradigm development and its procurement of both university and extramural funds (10).

Recent evidence suggests that the categorization of disciplines into a hard and soft dichotomy is still valid. For example, observations of speech disfluency in lecture (use of "uh," "er," or "um") was demonstrated to be more prevalent among faculty in the humanities and social sciences than among faculty in the natural sciences (11). As a control, faculty in the former disciplines exhibited no greater extent of speech disfluency in personal interviews. The difference is speech disfluency in lectures was attributed to the natural sciences being formal, structured, and factual. In seeking to provide "disciplinary ethnographies" from in-depth interviews of faculty, Becher argued that the primary subject-matter dimensions by which disciplines vary are the same hard-soft and pure-applied dimensions delineated by the Biglan model (12). Most recently, in a large research endeavor titled the "New Faculty Project," it was found that newly hired faculty in high-consensus disciplines (operationally defined primarily as basic and natural sciences) adjusted to their research roles better than newly hired faculty in low-consensus disciplines in settings emphasizing research and adjusted to their teaching roles better than low-consensus discipline faculty in settings emphasizing teaching (13).

The basic methodologies of teaching and research differ among scholars in low-and high-consensus disciplines. For instance, dissertations in high-consensus fields are substantially shorter than those in low-consensus fields, presumably due to greater precision in communication made possible by such accord (14). Similarly, articles in refereed journals in low-consensus fields dedicate more space to "establishing the literature," wherein authors review and interpret wide ranges of literature (15). It has also been documented that authors in low-consensus

fields cite older literature and are much more likely to cite "classic" works by disciplinary founders (16). Griffith and Small argued further that research in low-consensus fields is not integrated around recent research developments, but around a small set of "charismatic documents" (17). Scholars in low-consensus fields are also more likely to report research results at conferences prior to publication and publish their research results in book form (12,18).

The preceding evidence suggests that scholars in low- and high-consensus disciplines will encounter differences in the types of obstacles they must overcome, differences in mechanisms by which they develop effective strategies for coping with the complexities of their jobs, and differences in the way that they should be evaluated and rewarded by their superiors. For instance, those making decisions on organizational reward and promotion and tenure should consider that rejection rates of refereed journals in low-consensus disciplines exceed those of journals in high-consensus disciplines (19). Discipline-specific rewards, including citations of published work, prestige of current academic affiliation, and scholarly visibility, are also unequally distributed among disciplines (20). It has also been demonstrated that faculty in high-consensus fields have higher academic salaries than those in low-consensus fields and that this situation needs to be addressed by universities for reasons transcending equity and also for improvement of organizational effectiveness (21). As recently as 1997, discrepancy in pay among disciplines still existed, with the lowest pay group comprised mostly of faculty from the humanities and social sciences (22). Smart and Elton found that chairpersons in high-consensus fields were more likely to emphasize research productivity and professional development of the faculty, while low-consensus field chairs were more likely to emphasize creating a congenial atmosphere and making sound managerial decisions (23). Logically, it was later observed that commitment among scholars in high-consensus fields is a function of their perception of equitably distributed rewards, whereas having a supportive chairperson and feeling that one's work is significant fosters commitment among scholars in low-consensus fields (24). Finally, another important distinction among scholars in low-and high-consensus disciplines is affinity and preference for time commitments to research (high-consensus) versus teaching (low-consensus) (25).

Intradisciplinary Consensus and Pharmacy

Following Biglan's efforts to categorize 36 fields along the "hard-soft," "pure-applied," and "life-non-life" dimensions, other researchers

have simply inferred and thus operationally defined in their studies that areas such as the physical sciences, mathematics, and engineering are high-consensus disciplines, whereas such disciplines as the social sciences and the humanities are low-consensus disciplines (8). A literature review failed to yield evidence of attempts to build upon Biglan's initial work and categorize a more comprehensive set of disciplines. Particularly, there has yet to be published any well-conceived effort to assess consensus within subdisciplines of professional areas of study such as law, medicine, nursing, or pharmacy. The nursing literature has documented a lack of consensus overall on core knowledge for practicing nurses (26). Hargens attributed a lack of consensus on research priorities among scientists to a wide variation in the peer-review systems of medical journals (27). The need to develop a consensus on a vision of teaching, research, and practice in pharmacy has been acknowledged for over a decade (28). There is no evidence, however, to suggest that the degree of accord among pharmacy scholars has ever been measured.

Pharmacy is a comprehensive and complex discipline and practice, encompassing knowledge in chemistry, pharmacology, pharmaceutics, therapeutics, and administrative sciences. By its nature, pharmacy's academic subdisciplines (henceforth, "subdisciplines") are newer and tend to borrow from older, more established disciplines. They may not have fully established their own scientific paradigms, thus failing to have developed a consensus within their own ranks on key issues such as the most appropriate course content for entry-level students, the most important topics to research, and the best methods by which to research them.

The purpose of this study was to measure perceptions of consensus existing within five academic subdisciplines of pharmacy designated by the American Association of Colleges of Pharmacy (AACP) on issues dealing with teaching entry-level degree program students, scholarship, organizational structure and reward systems, and implementation of a graduate program. Other objectives were to identify correlates associated with these perceptions from factors such as scholars' rank, years of experience, type of institution where employed, and certain demographic characteristics.

METHODS

As previously mentioned, Biglan's work to categorize an initial 36 fields was based upon judgments of similar groupings by academicians

(8). There has since been no attempt to develop valid instrumentation that seeks to measure consensus or perceptions of consensus. Perhaps Lodahl and Gordon came closest to actually measuring perceptions of consensus (7). They queried academic scholars in the fields of physics, chemistry, sociology, and political science for perceptions of agreement on students' degree requirements, course content, willingness to work with graduate students, desire to hire more research assistants, and conflict over time spent teaching. While Lodahl and Gordon's work contributed indirectly to establishing some parameters for measuring consensus, they fell short of actually operationalizing the construct because their objective was simply to make comparisons of the four fields across a variety of issues.

Lacking any sort of valid instrument to measure consensus, the authors of the current article sought to develop their own. A thorough review encompassing mostly education, sociology, and psychology literature was conducted. A database search on Sociological Abstracts and PsycINFO® was conducted beginning with key terms such as consensus, paradigm, scientific progress, structure, disciplinary, and fields. The authors also sought assistance from a scholar on intra- and interdisciplinary differences. A particularly useful and thorough review and analysis of the literature was then identified (1). These processes generated a set of concepts, principles, and ideas by which fields may vary according to their stage of paradigm development. These concepts served as the framework for generating an initial list of 16 items by which perceptions of consensus within disciplines could be measured. The items were placed into two categories, the first of which is applicable to any faculty member and the second of which is applicable only to those faculty whose department offers graduate degrees. Seven colleagues were asked to review the items for face validity. Following their recommendations, one item was added and another deleted.

To measure a subject's perception of consensus within his or her discipline, subjects were asked to indicate their respective department's level of agreement on each item on a five-point, Likert-type scale from −2 equals "considerable disagreement" to +2 equals "near perfect agreement." All subjects were instructed to respond to the first 11 items only, if their department did not offer a graduate degree; others responded to all 16 items. Responses to the first 11 items by each respondent were summed to form a score henceforth referred to as "consensus basic." Similarly, responses to items 12 through 16 were summed to form "consensus graduate," while "consensus total" was operationally

defined as the sum of responses to the "consensus basic" and "consensus graduate" items.

The project was exempted from review by the university's Institutional Review Board. Surveys were mailed to a random sample of faculty employed at U.S. colleges and schools of pharmacy stratified by discipline during the summer of 2000. A list of all accredited U.S. school of pharmacy faculty members was obtained from the *AACP Roster of Faculty and Professional Staff 1999-2000* (29). The roster provides the name, address, and discipline of each faculty member. The AACP roster identifies each faculty member as belonging to one of several disciplines: medicinal/pharmaceutical chemistry/pharmacognosy (henceforth referred to as "medicinal chemistry"), pharmaceutics, pharmacology, pharmacy practice, and social and administrative sciences (henceforth referred to as "SAdS"). Other categories include continuing professional education, libraries/educational resources, and biological sciences; however, this study was not concerned with these disciplines because their representation is relatively small in number, with many colleges and schools of pharmacy having no representation from these subdisciplines. After assigning a unique number to each faculty member listed by discipline, subjects were chosen with a random number-generating procedure. Given these conditions, 30% of medicinal chemistry (162), 30% of pharmaceutics (152), 30% of pharmacology (142), 12% of pharmacy practice (221), and 40% of SAdS (138) faculty were sampled. The total number of survey questionnaires mailed was 815.

The sampled population received a cover letter explaining the significance of the research and a statement of the confidentiality and anonymity of responses. Accompanying the cover letter was a three-page survey questionnaire and a postage-paid, self-addressed return envelope. On part one of the survey, participants responded to the Likert-type scales used to measure the consensus constructs. Respondents were asked on the second part of the survey to provide answers to open-ended questions about priorities for their respective discipline members to teach and research (the results of which will be discussed in a future article). On the third part of the survey, respondents were asked to provide some personal information along with data about their respective employing institutions. Although budgetary constraints precluded the type of approach recommend by Dillman to maximize the rate of return, subjects were mailed a reminder postcard nine days after the mailing of the questionnaire surveys (30).

Principal components analysis was conducted to confirm the dimensionality of the scale into the "consensus basic" and "consensus graduate" components. As the data were ordinal in nature, Cronbach's alphas were calculated as a measure of each subscale's internal consistency (31). Factors associated with consensus basic and consensus graduate were identified with the use of Student's *t* tests, one-way analyses of variance (ANOVAs), and Pearson correlation coefficients, as appropriate. Tukey's *B* tests were selected as an appropriate means of post hoc analysis of the one-way ANOVA procedures due to this test's relatively conservative nature (32). All analyses were conducted with the use of SPSS-PC 10.0 (33).

RESULTS

Of the 815 surveys mailed, 16 were returned as undeliverable. Additionally, the principal investigator received a total of six phone calls and e-mail messages from subjects or clerical staff of institutions stating that the faculty member had left, had retired, was on sabbatical, or otherwise could not return the survey. One hundred eighty-seven surveys with usable data were returned, yielding a return rate of 23.6%.

Descriptive data of the respondents are provided in Table 1. Responses were obtained from 73 of the 80 colleges and schools of pharmacy represented with faculty contacts at the time. There were an approximately equal number of respondents from each of the 5 disciplines, with the exception of 52 from pharmacy practice. Return rates by discipline ranged from 18.4% (pharmaceutics) to 27.5% (SAdS). Nearly 60% of respondents indicated their institution was balanced in teaching and research, with approximately 40% identifying their institution as either primarily teaching or primarily research in nature. Aside from only one respondent at the instructor level, the ranks of assistant, associate, and full professor were equally represented by respondents. On average, respondents were 46.87 ± 9.41 years of age, had been employed 14.49 ± 10.27 years as full-time faculty members, and had been at their current rank for 8.33 ± 7.53 years.

The authors undertook several approaches to determining potential nonresponse bias. A wave analysis of the first 20 and last 20 respondents determined that they did not differ by discipline, type of institution, rank, or gender, but did differ by the proportion of nonwhite respondents, with a significantly greater proportion of nonwhite re-

TABLE 1. Descriptive Data of Respondents and Their Employing Academic Institutions.

Characteristic	n[a]	%[b]
Discipline		
Medicinal chemistry	31	16.8
Pharmaceutics	28	15.1
Pharmacology	36	19.5
Social and administrative sciences	38	20.5
Pharmacy practice	52	28.1
Rank		
Instructor	1	0.5
Assistant professor	58	31.0
Associate professor	66	35.3
Professor	62	33.2
Institution[c]		
Primarily teaching	20	10.7
Primarily research	52	27.8
Equal balance of teaching and research	115	61.5
Gender		
Male	130	71.0
Female	53	29.0
Race/Ethnicity		
Caucasian	148	82.7
African-American	8	4.5
Hispanic/Latino	4	2.2
Asian/Pacific Islander	13	7.3
Native of India	4	2.2
Other[d]	2	1.1

[a]Any total under 187 is indicative of missing data.
[b]Total may not add up to 100.0 due to rounding.
[c]From self-report by subjects in response to the closed-ended question, "How would you classify your institution?"
[d]Respondents did not specify further.

spondents comprising the late responder group (34). It was also confirmed that early and late responders did not differ by their responses to the "consensus basic" and "consensus graduate" measures. The proportion of respondents by gender and race/ethnicity was also compared with the entire U.S. pharmacy faculty as reported in the *AACP Institutional Report Series 1999-2000 Profile of Pharmacy Faculty* (35). The

proportion of male respondents in this study did not differ significantly from the proportion of male pharmacy faculty in the U.S. (64.7%), nor did the proportion of Caucasian respondents in this study differ significantly from the proportion of Caucasian pharmacy faculty in the U.S. (80.3%).

Table 2 reveals the items comprising the consensus constructs and respective mean responses. Mean responses to each of the 16 items measuring the consensus constructs were all positive. A series of one-sample *t* tests confirmed each response mean to be significantly greater than zero. With possible scores on the "consensus basic" instrument ranging from −22 to +22, the mean was 6.71 ± 7.36. Responses to the "consensus graduate" items were obtained from 114 (61%) of the 187 respondents. The mean response to the "consensus graduate" instrument was 3.75 ± 3.75 from a possible range of −10 to +10.

Overall, respondents perceived the greatest accord with fellow department colleagues on entry-level degree program (ELDP) course sequencing, basic concepts to teach in the ELDP, and the roles of graduate students as research assistants. Lesser accord was observed for issues dealing with the quantity of outside work assignments given to ELDP students, departmental decision making, effective teaching strategies, and methods of recognition and reward for excellence in scholarship.

The results of the principal components analysis indicated that the "consensus basic" construct was conceptualized by respondents across two dimensions (factors). The first factor was comprised of items 6 through 11, while items 1 through 5 comprised the second factor. The decompartmentalization of the "consensus basic" construct into these two factors was considered for analysis purposes. With one exception (gender, which will be explained later), this added little toward identifying differences among respondents in their perceptions of consensus. The third factor consisted of the entire body of "consensus graduate" items, 12 through 16. The Cronbach's alphas calculated for the "consensus basic" and "consensus graduate" constructs were 0.88 and 0.81, respectively.

Tables 3 and 4 illustrate the results of the one-way ANOVA and Tukey's *B* procedures on the consensus constructs. Even though the difference did not achieve statistical significance, the mean score observed from pharmacy practice respondents was 4.33 ± 7.39, while the mean for respondents of other disciplines ranged from 7.44 ± 8.63 to 7.94 ± 5.87. The ANOVA procedures on "consensus graduate" scores did reveal significant differences by discipline ($F = 2.56$, df = 4, $p = 0.042$).

TABLE 2. Consensus Construct Items and Mean Subjects' Responses to the Consensus Scale.

Scale Items	μ ± SD[a]
Consensus Basic Items	
1. How to sequence your department's course offerings for the entry-level degree program (ELDP).	1.02 ± 0.84
2. Which basic concepts to teach in your department's course offerings for the ELDP.	0.99 ± 0.86
3. The most effective teaching methods and strategies that facilitate learning among students in the ELDP.	0.39 ± 0.93
4. The quantity of outside work assignments given to students in the ELDP by members of your department.	0.36 ± 0.97
5. The standards required for successful completion of your department's course offerings.	0.84 ± 0.93
6. Standards for excellence in scholarship in your department.	0.57 ± 1.11
7. The most reputable journals in which to publish in your discipline.	0.86 ± 0.95
8. Methods of recognition and reward for excellence in scholarship in your department.	0.39 ± 1.06
9. Requirements for tenure and promotion in your department.	0.56 ± 1.13
10. The qualities to look for in hiring a new faculty member in your department.	0.52 ± 1.03
11. Departmental decision-making as governance (how decisions are made, level of input by department faculty, etc.).	0.36 ± 1.16
Consensus basic mean total	6.71 ± 7.36
Consensus Graduate Items	
12. The requirements for successful completion of graduate degrees in your discipline.	0.83 ± 1.10
13. The roles of graduate students as teaching assistants.	0.68 ± 0.98
14. The roles of graduate students as research assistants.	0.97 ± 0.84
15. The nature of graduate student stipends (amount of stipend, limits on the length of time students may receive stipends, etc.).	0.82 ± 1.06
16. Teaching methods and strategies in graduate courses.	0.63 ± 0.98
Consensus graduate mean total	3.75 ± 3.75
Grand total	11.62 ± 9.98

[a]Response format is a five-point scale ranging from −2 = considerable disagreement to +2 = near perfect agreement.

TABLE 3. Post-Hoc Comparisons of Predictor Effects on Consensus Basic Scores.

Variable	Mean ± S.D.*	Significance
Discipline		$F = 1.96$, df = 4, $p = 0.103$
Pharmacy practice	4.33 ± 7.39^{a}	
SAdS	7.44 ± 8.63^{a}	
Pharmacology	7.61 ± 7.40^{a}	
Pharmaceutics	7.64 ± 6.40^{a}	
Medicinal chemistry	7.94 ± 5.87^{a}	
Rank		$F = 1.83$, df = 2, $p = 0.163$
Assistant professor	5.64 ± 8.43^{a}	
Associate professor	6.50 ± 7.07^{a}	
Professor	8.16 ± 6.57^{a}	
Institution		$F = 7.73$, df = 2, $p = 0.001$
Primarily teaching	3.60 ± 8.36^{a}	
Balanced	7.85 ± 6.52^{b}	
Primarily research	9.35 ± 7.27^{b}	
Race		$F = 3.63$, df = 4, $p = 0.007$
African-American	-1.38 ± 9.36^{a}	
Native of India	$3.75 \pm 2.50^{a,b}$	
Hispanic	$4.00 \pm 10.13^{a,b}$	
Caucasian	$7.05 \pm 7.22^{a,b}$	
Asian/Pacific Islander	10.31 ± 6.73^{b}	

*Like alphabetic symbols indicate similar (nonsignificant) grouping.

Post-hoc analysis indicated different groupings for pharmacy practice and pharmacology respondents. Type of institution exerted influence on "consensus basic" ($F = 7.73$, df = 2, $p = 0.001$) and "consensus graduate" scores ($F = 12.26$, df = 2, $p < 0.001$). Post-hoc tests revealed that respondents from teaching institutions differed significantly in their perceptions of the construct "consensus basic" compared to respondents from both balanced and teaching institutions. Similarly, in response to "consensus graduate," those employed by teaching institutions perceived less intradepartmental accord than those employed by balanced and research institutions.

Initially, race/ethnicity was collapsed into a dichotomous variable for analysis purposes, specifically, Caucasian and "all other," due to restrictions in sample size. Student's *t* tests revealed no significant differences in responses to either "consensus basic" or "consensus graduate" constructs using these procedures. There being no reason to believe that all non-Caucasian respondents would have had similar experiences and

TABLE 4. Post-Hoc Comparisons of Predictor Effects on Consensus Graduate Scores.

Variable	Mean ± S.D.*	Significance
Discipline		$F = 2.56$, df = 4, $p = 0.042$
Pharmacy practice	1.25 ± 3.89^{a}	
Medicinal chemistry	$3.72 \pm 3.25^{a,b}$	
SAdS	$3.92 \pm 4.04^{a,b}$	
Pharmaceutics	$3.95 \pm 4.32^{a,b}$	
Pharmacology	4.83 ± 2.95^{b}	
Rank		$F = 0.02$, df = 2, $p = 0.978$
Assistant professor	3.73 ± 4.27^{a}	
Professor	3.77 ± 3.84^{a}	
Associate professor	3.91 ± 3.27^{a}	
Institution		$F = 12.73$, df = 2, $p < 0.001$
Primarily teaching	0.42 ± 4.11^{a}	
Balanced	4.22 ± 3.22^{b}	
Primarily research	5.65 ± 3.64^{b}	

*Like alphabetic symbols indicate similar (nonsignificant) grouping.

share similar attitudes, the data were reanalyzed. One-way ANOVAs revealed significant differences by race/ethnic group on both consensus constructs. The mean "consensus basic" score from African-American respondents ($n = 8$) was -1.38, while for Asian/Pacific Islanders, the mean response was 10.31. Similar results were observed for "consensus graduate" scores; however, the sample size precluded statistical analysis.

A Student's t test revealed higher perceptions of accord within the department by males than females on "consensus basic" items ($t = -2.45$, df = 181, $p = 0.014$). Prior research on newly hired female faculty members spurred further inquiry into the responses (36). While the responses of male and female subjects were similar on other scale items, their responses to items pertaining to standards and rewards for scholarship and decision-making procedures by fellow colleagues were quite disparate. Correlational analysis revealed no significant associations between consensus scores and age or number of years employed as full-time faculty.

LIMITATIONS

Some caution should be exercised in interpreting the results. First, the rate of return and the cross-sectional study design prevent extrapola-

tion to the entire population of pharmacy faculty in the five subdisciplines. The low rate of return further compromised the representativeness of the respondent pool because within any one subdiscipline only approximately one-third of colleges and schools of pharmacy were represented. The rate of return of 23.6% was somewhat lower than expected but could have been the result of the additional component of the survey questionnaire soliciting responses to open-ended questions, which increased the response burden. The mailings occurred over the summer at a time when many faculty could have been away from the office; therefore, faculty with academic-year rather than calendar-year appointments may have been particularly underrepresented in the respondent pool.

Third, even though respondents in the study were asked to categorize themselves in a manner designated by the AACP, there are many faculty whose teaching and research activities may be more synonymous with a discipline other than what was represented by the AACP roster or indicated by the respondent. Moreover, the organizational structures of many colleges and schools of pharmacy now reflect the integration of departments into divisions, thus making it even more difficult for some respondents to classify themselves into one of the five disciplines accounted for in the study.

This study also relied upon respondents to self-report a classification of their institution as being more teaching- or research-oriented. The authors thought this more useful than simply classifying the response as coming from a private or public institution.

Additionally, this study measured perceptions of consensus as a proxy for measuring the consensus construct itself, and although this method has been previously validated, the tendency some respondents may have to provide socially desirable answers could have biased the results (7). Similarly, perceptions of intradisciplinary consensus were obtained by asking subjects to base their assessments of accord with other departmental faculty on the situations at their respective institutions, which says little of their perceptions of consensus by the entire discipline. Requiring subjects to estimate consensus by all discipline members would greatly jeopardize the internal validity of the study, however, and the sampling procedure utilized for this study allows for adequate comparisons to be made across the subdisciplines of pharmacy.

Finally, the analysis of the "consensus basic" construct by race/ethnicity is based upon very small numbers of respondents from non-Cau-

casian groups. One must be cautious about making generalizations from so few subjects.

DISCUSSION

Efforts toward multi-and interdisciplinary collaboration in pharmacy education have been documented (37). The AACP, representing the faculty members and deans of colleges and schools of pharmacy nationwide, has dedicated annual meetings and published documents aimed at accomplishing this (38). Although the goals of interdisciplinary collaboration are noble and well intentioned, it may be difficult to fully realize its benefits without first examining the states of the disciplines themselves. A discipline's research endeavors are also critical manifestations of its level of consensus. Scholarly productivity is essential for the faculty member to stay abreast of current developments in the field, thereby enhancing his or her teaching. Productivity is also critical to the scholar's well-being and attainment of organizational rewards and is beneficial to society by its contribution to the current body of knowledge. The American Council on Pharmaceutical Education in Guideline 25.2 of its *Accreditation Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree* states: "Faculty should have a responsibility to generate and disseminate knowledge through scholarship . . . and . . . The College or School should foster an environment which encourages contributions by the faculty to the development and transmission of new knowledge, and should contribute to the advancement of knowledge and to the intellectual growth of students through scholarship" (39).

The results of the principal components analysis and subsequent calculation of Cronbach's alphas provided at least modest evidence of the validity of the constructs and considerable evidence of the instrument's reliability. Respondents from all five disciplines perceived at least a modest amount of consensus among their colleagues across each of the issues represented by the instrument. The fact that considerable consensus was perceived by respondents on issues such as course sequencing and basic concepts to instruct entry-level degree program students should be good news to pharmacy educators. Although there was less consensus perceived on issues such as effective teaching strategies and the number of outside work assignments, these response means were still above neutral.

Ostensibly, medicinal chemistry, pharmacology, and pharmaceutics would be "harder" sciences than pharmacy practice and the social and administrative sciences. According to the results of this study, however, perceptions of consensus with colleagues did not differ greatly from one discipline to another, with the exception that pharmacy practice faculty reported somewhat less accord on certain graduate program issues. Most SAdS faculty have been trained via Ph.D. programs with a fairly extensive focus on conducting independent research. Moreover, they have been trained primarily in colleges and schools of pharmacy concomitantly with members of the basic sciences. Coupled with the fact that many of the SAdS faculty have an undergraduate degree in pharmacy, the gap between them and scientists along the "hard-soft" dimension may not be as great as that which exists between social scientists and physical scientists not affiliated with professional degree programs. Discrepancies in the level of intradisciplinary consensus existing within pharmacy practice and other pharmacy faculty may be due in part to their training through residencies and fellowships, which place varying degrees of emphasis on research training and which may be highly specialized in one particular area of pharmacy practice. Future study is needed to determine whether agreement over teaching strategies and research priorities and methods exists not only among faculty within the same institution but also between faculty at different institutions. This may be accomplished by soliciting faculty responses to open-ended questions about teaching and research or by use of focus group or nominative group techniques.

The factor exerting the greatest influence on perceptions of consensus was institution type. Respondents indicating that their institution was primarily teaching in its mission perceived considerably less accord among department members than did other respondents. These responses *primarily* came from private universities. Perhaps the pressure of maintaining enrollment while transitioning to entry-level Pharm.D. programs sparks more contentious debate about how the degree program should be implemented, or perhaps faculty members at these institutions perceive pressure to be more productive in scholarly pursuits, despite the mission of their institutions being primarily teaching in nature. The angst or confusion caused by this phenomenon in schools/colleges other than pharmacy has been documented (40). This is only speculative, however, and the relationship between perceived consensus and type of institution warrants further investigation.

Both female and African-American respondents perceived less consensus among their colleagues on certain issues. For females, the issues were departmental decision making, standards of excellence in scholar-

ship, and organizational reward systems. Previous studies have indicated that the tenure rate for females is well below that for men and that a greater proportion of tenure-track females than male faculty members leave their institutions prior to a tenure decision (36). This may be because women faculty receive different messages regarding expectations at their respective institutions. Similarly, African-American faculty have been shown to experience marginalization by department colleagues, due at least in part to difficulty learning the political and informal norms governing organizational culture (41). While it is not possible to identify the specific causes for the responses of female and African-American faculty from this study, it may be worthwhile to investigate whether these groups of pharmacy faculty experience unique situations that prompt them to be skeptical of departmental consensus.

Rank, age, and number of years employed as a full-time faculty member were not associated with perceptions of consensus by respondents. Overall, relatively little variation in responses among subjects was accounted for, especially with regard to the "consensus basic" items. Other factors that may account for variation are the size of the department and the organizational structure of the respective college/school of pharmacy (e.g., departmental versus division structure). Future studies may attempt to identify other factors associated with perceptions of consensus by pharmacy faculty.

CONCLUSIONS

The results of this study bode fairly well for the current state of consensus among pharmacy's subdisciplines. At least modest accord was perceived across each of 16 issues. Efforts should be made to build consensus among all pharmacy faculty on issues such as teaching strategies, departmental decision making, and organizational rewards, particularly among female members. Any differences in perceptions of consensus between the disciplines were negligible, with the exception of graduate program issues among pharmacy practice faculty. Despite a significant contribution by type of institution on perceptions of consensus, much of the remaining variation in perceptions of consensus remains unexplained.

RECEIVED: 01/24/01
REVIEWED: 03/13/01
REVISED: 04/27/01
REVIEWED: 06/26/01
REVISED AND ACCEPTED: 07/13/01

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