

# Use of Q-Technique to Examine Attitudes of Entering Pharmacy Students Toward Their Profession

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The purpose of this study was to qualify pharmacy students' subjective motivations for seeking a professional degree. Essays composed and submitted by student applicants to the UIC College of Pharmacy were used as a concourse from which a naturalistic representative sample of statements (Q-set) was selected regarding perceptions of pharmacy as a profession. Students identified by data obtained from the Dean of Student Affairs Office as belonging to "high academic performance" and "low academic performance" groups after one and two semesters of pharmacy education were selected for the person sample (P-set). Factored Q-sorts produced six distinct sets of attitudes operationally defined as exhibiting clinical, family, science, undecided, traditional community, and altruistic orientations. Characteristics of the factors are described and compared with regard to issues of importance and unimportance to the students as well as the extent to which these attitude representations can be used to capture the larger picture of an important credentialed health profession undergoing rapid changes in the past two decades.

*There is no necessary relationship between the objective and the subjective any more than there is an a priori reason for expecting that just because a person scores low on mathematical ability he will necessarily dislike arithmetic, although the possibility of such a relationship is not precluded. Here, however, is where the greatest divergence appears to occur, for simply because the one behavior is subjective (whereas the other is objective) does not mean it does not operate in a lawful fashion, for one individual's appreciation of art may be correlated, in some broad way with that of another individual, and this can be demonstrated and held steady for inspection in inquiry without reference to objective trait relationships and sample norms(1).*

## INTRODUCTION

Pharmacists' roles and functions have recently been subjected to changes due to rapid developments in technology and science, constantly increasing cost containment pressures, and the public's growing awareness of the complexities of the health care delivery system. Pondering the possible impact of change on the professional self concept of pharmacy school applicants and students raises many questions: What kind of professional image do pharmacy appli-

cants and beginning students carry in their minds? Do they realize that pharmacy practice is supposed to have left most of the traditional production and mechanical dispensing aspects behind, and that many newly graduated pharmacists understand themselves now as drug information and drug monitoring experts? What appears to them to be the most important aspects of their chosen profession? How and where do they see themselves practicing upon graduation?

Much of the sociological research in pharmacy has been focused on the study of characteristics and -traits *across* students, thereby relegating the role of subjectivity in career selection and attitude development to the error term. This "empirical" approach<sup>1</sup> usually serves to provide the researcher with quantitative, "value-free," and objective data designed to allow for prediction, explanation and control of group characteristics. The study of people as whole persons, however, focusing on their qualitative, subjective, interrelated, and thus holistic make-ups, requires a different set of investigational approaches. Q-technique is one avenue for pursuing this goal.

Since the emergence of clinical pharmacy in the 1960s as an identifiable alternative to traditional practice several studies(2-8) were designed to assess changes in values, attitudes, and personality traits over the course of pharmacy education. All studies were based on the assumption that

the whole cohort of entering students would show homogeneity of personality characteristics, and furthermore that students would uniformly change in the same direction as a result of professional socialization. The assumption of homogeneity among subjects is both integral to the science and statistics of group predictions and precludes the opportunity to explore differences in students' individual subjective perceptions and attitudes. Moreover, an assumption of univariate change across all students also excludes the opportunity to study potentially occurring multidimensional changes in individuals or groups as possible outcomes of the educational process.

Successfully matching the profession's goals and mission statements with the students' attitudes is vital to the survival of any profession as well as to the provision of high quality professional services to the public. The inclusion of a quantifiable, subjective component as a component of admission criteria might help to improve the potential for matching prospective students' academic and attitudinal characteristics with the functional and role requirements posed by pharmacy education and practice. A "mismatch" of these qualities (particularly if these are unalterable in the professional educational and socialization process) may lead to role conflict, practice dissatisfaction, and/or occupational anomie.

Role orientations of pharmacy students have been measured in terms of degrees of professional and/or business orientations(9-11) wherein "business" is portrayed as offering maximum opportunities to those who value financial reward. "Professionals" are supposed to focus on altruism, expressed as service to others. In general, these two values systems were defined as competitive and mutually exclusive concepts: one either had a business or a professional orientation. Kronus(10) as well as Chappell and Barns(12) however found that pharmacists were similarly motivated by professional and business values, thus not confirming the hypothesis of alleged mutual exclusivity of business and professional role aspects. Kronus(10) suggested that the stability of incomes resulting from organizational employment as staff pharmacists rather than self employment as pharmacy proprietors, had tended to dilute the connection between business role orientations and profit making motivations. In a slightly different study design, Hornosty(13) took the subjective factor within role orientation, conflict and satisfaction into account. Subjective role orientations were measured with a newly constructed instrument (based on data from student interviews and participant observations). Results showed a three-rather than two-dimensional typology, operationally defined as "clinical/counseling," "traditional" and "managerial" types.

## METHODOLOGY

### Introduction to Q-Technique

In contrast to summarizing character traits across groups of study subjects, the goals supported by Q-methodology are to focus on discovery and understanding of individuals as complex, holistic beings. This mode of inquiry grew out of a background of quantitative and qualitative research and was first advocated in the 1930s by William Stephenson(14). With doctorates in both physics and psychology and as a former student and assistant of the statistical theorist Charles Spearman, Stephenson saw an "excess of reductionism" within psychological and social science research. His methodological developments were fueled by a desire to under-

stand what made the individual person unique rather than what characteristics could be found across large populations of individuals. Q-methodology is based on beliefs about holism and multiple constructed realities, focusing on the study of subjectivity (including perceptions and experiences) as it is manifested in attitudes and behaviors. It has a unique method of data collection and uses techniques of statistical analysis that have traditional roots.

Q-methodology is based on the belief that subjectivity can and will be expressed by the subject's own behavior. The rank order in which a subject sorts a given set of statements is interpreted as an expression of that particular subject's viewpoint or perception of the situation at hand. Each subject's personal understanding of the situation is thus operationalized as data by the concrete behavior of rank ordering the statements in response to some condition of instruction such as: "Sort these cards containing reasons why students enter pharmacy, forming groups ranging from statements most like your own reasons for coming to pharmacy school to those which are least like your own."

Data collection in Q-technique follows several stages: *first*, a Q-set of statements to be sorted is developed; *second*, the subjects sort the Q-set cards according to a condition of instruction; and *third*, the data are analyzed and interpreted. The Q-set is usually developed by the researcher determining a concourse of objects—subjective statements, pictures, words—that pertain to the issue about which the subjects will be asked to respond. The statements may come from interviews, editorials, publications, essays, or any sources that provide information and opinions germane to the study.

In Q, questions of content and construct validity take on different meanings when compared to questionnaire design. Whereas in scaling theory emphasis on content validity serves to minimize the potential introduction of researcher bias, the meaning and content validity of single statements used in Q-technique are derived from their rank order placement and vicinity to other statements as determined by the subject. This procedure even allows for the attribution of different meanings to one and the same statement when placed in different contexts—thus turning questions of item-reliabilities into nonessential issues for this type of study design(15). Content validity of the whole Q-set is usually established through expert advice(16). The number of items in a Q-set can be "determined by convenience and statistical demand"(17) and usually ranges from 40 to 100 items(18-20). Once the items are selected, each is printed separately on a card for sorting purposes. These items (not the persons doing the sorting) become the sample elements of "n" for the study.

Each subject is given a condition of instruction and is then asked to choose a predetermined number of cards from the Q-set to be placed in a specific number of columns or piles. Piles are labeled in deviation form (from +5 "most like" or "most important" to -5 "most unlike" or "most unimportant"). An example distribution is provided in Figure 1. Such an arrangement allows the subjects' negative reactions to be as equally strongly expressed as the positive ones, while also providing—by means of the "zero" pile in the center of the sorting distribution—for those reactions about which the subjects feel neutral. Although both the shape and the range of the distribution may be varied, for Q-samples with 40-50 items quasi-normal flattened distribution curves with ranges of +5 to -5 are most common(18).

Once the Q-sorts are made, each subject's relative rank

Most Unimportant				Neutral				Most Important			
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	
(2)	(3)	(4)	(5)	(5)	(7)	(5)	(5)	(4)	(3)	(2)	
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	
X	X	X	X	X	X	X	X	X	X	X	
X	X	X	X	X	X	X	X	X	X	X	
	X	X	X	X	X	X	X	X	X	X	
		X	X	X	X	X	X	X	X		
			X	X	X	X	X				
				X	X	X	X				
				X	X	X	X				

( ) indicate number of statement cards to be placed in each pile  
 [] numerical values assigned to each statement item pile (used in factor analysis)  
 x represents one Q-sample statement

Fig. 1. Q-Sort distribution (N = 45)

ordering of statements may be examined for its own or in relation to other evidence, depending on the study's goals. The Q-sorts from all the subjects are intercorrelated and factor analysis is used to identify individuals who have performed similarly, *i.e.*, groups of correlated Q-sorts are separated into clusters of individuals who sorted the statements more or less in similar ways. Factor arrays are constructed for each of the emerging factors. The subjective attitudes of groups of sorters, now related to separate factors, are given meaning through the interpretation of their "synthetic" Q-sorts which each represent one factor or viewpoint(14-21). The statistical process of factor analysis is the same one used to analyze test item performances in the construction of scales, except in the case of Q-technique the column and row headings of the correlation table are in reversed order. With Q, whole persons and not their isolated traits form the column headings, meaning that Q-sorts made by persons and neither single statement items in the Q-set nor personality traits are being factor analyzed. Q-methodology thus uses a combination of qualitative and quantitative techniques, and in this way offers a unique approach for gaining knowledge about its particular domain, subjectivity.

#### INSTRUMENT DESIGN FOR THE Q-SORT

##### Q-Set

The sampling universe (Q-concourse) appropriate for this study consisted of many one or two sentence statements extracted from pharmacy school applicants' personal essays submitted as part of the college application materials. Students were asked to represent themselves three ways in a one-page essay: as a person, as a student, and as a future pharmacist. The essays written by the second year students at the University of Illinois College of Pharmacy were used as source material for the statements. The resulting Q-concourse contained 127 different statements.

To determine the representativeness of this sampling universe, a random sample (20 percent) of the first year students' essays was also analyzed for congruity of statements. Because these came directly from the students involved in this study, the Q-concourse was found to be a reliable representation of the diversity of opinions expressed in the essays of both the first-and second-year classes.

The concourse of statements was arranged in issue

clusters. The most representative statements from each cluster were chosen to comprise the Q-sample of 45 statements. A listing of these statements is provided in Appendix A. Rather than reflecting the differing viewpoints proportionally, this Q-sample was designed to cover the entire breadth of opinions found in the concourse. The relative importance of all these different perspectives was allowed to take shape in the students' Q-sorts. The Q-sample could thus be considered naturalistic and unstructured: naturalistic because the students' own words and phrases were used; and unstructured because the Q-sample was not structured to accommodate or test any set of prior theories or hypotheses.

**P-Set.** The person sample was comprised of first-and second-year pharmacy students at the UIC College of Pharmacy (graduating classes of 1995, 1994) identified by the Dean of Student Affairs as belonging to "high academic performance"<sup>2</sup> and "low academic performance"<sup>3</sup> groups after one and two semesters of pharmacy education.

**Q-Sort.** Students comprising the P-set were asked to express their current attitudes toward pharmacy by sorting the Q-sample statements into a "forced-free" distribution<sup>4</sup> along a continuum ranging from "very unimportant" (-5) to "very important" (+5). (Condition of instructions and directions for performing the Q-sort are provided in Appendix B.) Figure 1 shows the Q-sort continuum, the number of items to be placed in each pile, and the values assigned to each pile (for factor analysis). The Q-sorting instructions were accompanied by a questionnaire that requested information about experience with pharmacy practice prior to entry into pharmacy school; and perceived degree of difficulty in performing the Q-sort.<sup>5</sup>

**Pilot Study.** The validity of a Q-methodological study can be threatened if the subjects do not have a clear understanding of what they are expected to do, or if they feel that they cannot comfortably represent their own opinions with a given set of statements and sorting instructions. To test for these potential problems a pilot study was conducted. Results showed that there were no statements about which all of the subjects felt the same, thus indicating that a broad range of pharmacy related issues was being covered. In addition, none of the pilot study subjects indicated having had any problems with the content and sorting procedures of the Q-sample statements.

#### RESULTS AND FACTOR INTERPRETATIONS

Twenty-one first-and second-year pharmacy students volunteered to take part in this study. This number of individuals might seem relatively small when judged from a R-methodological, survey questionnaire point of view where

<sup>1</sup>Also termed R-methodology based on Spearman's correlational R.

<sup>2</sup>GPA at or above 4.00 (out of 5.00).

<sup>3</sup>GPA below 3.00 (out of 5.00).

<sup>4</sup>"Forced-free" implies that the number of items to be sorted into each pile is specified a priori (forced), whereas the relative location for each item allows the individual to express his/her opinion freely(21).

<sup>5</sup>Students were asked to indicate Q-sort task difficulty on a continuum ranging from 1 "hard to do" to 10 "easy to do." Assuming that students who previously had not given much thought to expressing and understanding their own attitudes toward pharmacy might find the task of Q-sorting difficult to perform, data obtained from this variable was assumed to be of use in assessing the students' firmness of perspectives.

**Table I. Distribution of P-set**

	High	Low	Totals
P-1	8	6	14
P-2	4	3	7
<b>Totals</b>	12	9	21

P-1 First-year pharmacy students.

P-2 Second-year pharmacy students.

High Students with first-year pharmacy GPA at or above 4.0.

Low Students with first-year pharmacy GPA below 3.0.

large, homogenous, and representative samples are of prime concern in order to comply with the statistical assumptions in order to generalize study results to the larger population. In Q however, being rooted in the qualitative domain, the assumptions are different. Here the goals are not to generalize but rather to explore, to elicit hypotheses, and to illuminate viewpoints. This means that P-sets become more interesting if they are not homogenous but show some diversity. In qualitative research designs, the number of subjects is not critical for establishing scientific validity. The emphasis in Q is on modeling viewpoints, whether they belong to one, two, or more people. Generalizations about people from sample to population are not intended.

Four students were male (19 percent)<sup>6</sup>; all of them were first-year pharmacy students, with three coming from the academically "high achieving"<sup>7</sup> group and one from the "low achieving."<sup>8</sup> This sample comprised 14 first-year and

<sup>6</sup>Descriptive admissions statistics show that: 40.1 percent males admitted in 1991 (P-1's in this study); 25.7 percent males admitted in 1990 (P-2's in this study).

<sup>7</sup>GPA at or above 4.00 (out of 5.00).

<sup>8</sup>GPA below 3.0 (out of 5.00).

<sup>9</sup>SYSTAT, Version 5.03 (statistical software for personal computers) - Components are computed via a Householder tridiagonalization and implicit QL iterations; rotations are computed with a variant of Kaiser's iterative algorithm(25).

**Table II. Factor loadings<sup>a</sup>**

Subjects	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
P1L6	0.759					
P1H2	0.754					
P2H4	0.659					
P1L2	0.606					
P2L1	0.606					
P2H2	0.561			0.546		
P1L4		0.851				
P1H8		0.800				
P1H7		0.739				
P1H3		0.594				
P1H4		-0.587	0.536			
P2L2			0.864			
P1H1			0.623			
P1L3				0.807		
P1H5				0.640		
P1H6				0.513		
P2L3					0.885	
P2H1					0.673	
P2H3						0.709
P1L1						0.701
P1L5 <sup>b</sup>						

<sup>a</sup>Factor loadings after principal components analysis and varimax rotation (only loadings greater than |0.500| are shown).

<sup>b</sup>This student's loadings are close to equally distributed on all factors (loadings range from 0.279 to 0.439).

seven second-year pharmacy students, with 12 students representing the academically "high achieving" group and nine representing the "low achieving" group (see Table I).

Students' ages ranged from 21 to 30 years (mean = 23.7, standard deviation = 2.5). Seven students had experience with pharmacy practice in community settings, one in a hospital, two in both types of settings, and eleven students had no practical experience with pharmacy. The mean perceived degree of difficulty in performing the Q-sorting task was 6.3 with minimum and maximum values 2 and 10 (on a continuum ranging from 1 "hard to do" to 10 "easy to do").

## FACTOR ANALYSIS RESULTS

Factor analysis by the principal components method plus subsequent varimax rotation<sup>9</sup> were used to identify the number of statistically meaningful person clusters (factors), the subjects loading on these extracted factors, and the degree to which any individual loaded on each factor. This statistical approach resulted in six eigenvalues greater than one. Two of the factors were only defined by two subjects each. It was decided to keep them in the analysis, but to take into consideration that these factors and their meanings needed to be treated with caution.

Adequacy of rotation was confirmed by analyzing the plotted factor loadings two at a time with a different pair of factors as axes for each plot. Factor loadings after varimax rotation are shown in Table II. Individual Q-sorts with factor loadings greater than |0.50| are reproduced in this table.

Two students (P1H2 and P1H4) were considered "complex" in factor-analytical terms because they each loaded on two factors. The attitude of the last student in the table (P1L5) was also complex because her loadings were equally distributed across all factors. This "outlying" student commented on the questionnaire which accompanied the study: "My feelings were equal for most of the cards." She also indicated no practical experience with pharmacy.

**Table III. Q-Sample statements defining study factors**

Q-sort ranking	+5 Very important		+4 Important		-4 Unimportant			-5 Very unimportant		
	Factor 1 (Clinical)	21	44 <sup>a</sup>	03	22	38	27	33	45	26
Factor 2 (Family)	40	41	28	39	42	14	30	31	15	29
Factor 3 (Science)	13	18	09	15	40	27	37	42	25	45
Factor 4 (Undecided)	11	33	13	19	45	06	10	28	34	44
Factor 5 (Trad. Comm.)	24	25	04	16	37	17	27	41	44	45
Factor 6 (Altruistic)	10	37	01	08	36	20	27	29	16	39

<sup>a</sup>Statement numbers. See Appendix A for complete list of all items.

Factor scores for the 45 Q-sort statements were calculated using the regression approach. To emphasize the analogy between factor arrays and the underlying structure of the Q-sorts, factor z-scores for each statement were paired with the corresponding whole number ranking assigned to each Q-sort item. The two items of a particular factor with the highest positive factor z-scores were assigned +5, the next three +4, the next four +3, etc. thus producing six “synthetic” Q-sorts each one representing a different factor.

In order to explore and determine the intrinsic meaning of these factors, the ten Q-sample statements which received whole number factor scores at the two opposing ends of the distributions (+5, +4 and -4, -5) were then investigated for each factor separately. Statement identification numbers defining factors are summarized in Table III. From this table, it can be seen that four statements appeared repeatedly among the different factors. In four out of the six factors, statement [27] can be found in the UNIMPOR-TANT (-4) column. This statement read: “I want to be a chain pharmacist and work my way into upper management.”

Three other statements can be found on the opposite ends of the distributions:

- “Pharmacy is a perfect mix between business and medicine.” [28]  
Rated by Factor 1 as very unimportant, by Factor 2 as important, and by Factor 4 as unimportant.
- “Education has always been a top priority in my family, and I feel obligated to fulfill my parents dream to the best of my abilities.” [44]  
Rated by Factor 1 as very important, by Factor 4 as very unimportant, and by Factor 5 as very unimportant.
- “The constant action and hustle of a pharmacy appeals to me.” [45]  
Rated by Factor 1 as unimportant, by Factor 3 as very unimportant, and by Factor 5 as very unimportant.

**FACTOR INTERPRETATIONS**

Table IV summarizes the factor characteristics. Students comprising Factor 1 displayed the lay person’s perception of the “clinically oriented” pharmacist.<sup>10</sup> Factor 1 appeared to be defined by students who would like to help patients on an individual basis as well as to work closely with physicians. These students were looking for a stable profession that

<sup>10</sup> Provision of information, counseling, and decision-making in direct contact with individual physicians and patients are the cornerstones of the clinical pharmacist’s role and functions.

**Table IV. Factor Characteristics**

Factor Identifier	Statements rated as Important (+5 +4)	Statements rated as Unimportant (-5 -4)
Clinical (Factor 1)	hospital setting work with physicians work with patients stable profession	community pharmacy mix: business/medicine chain pharmacist/ management
Family (Factor 2)	many career opportunities flexibility/family mix: business/medicine mix: medicine/family	natural sciences research & development research in industry
Science (Factor 3)	natural sciences pharmacology patient education many career opportunities	small town/family community pharmacy mix: medicine/family chain pharmacist/ management
Undecided (Factor 4)	chemistry/biology pharmacognosy pharmacology hospital pharmacy	clinical pharmacy drug research mix: business/medicine serving others
Traditional Community (Factor 5)	own community pharmacy small town/family mix: science/community humanitarian profession	drug research chain pharmacist/ management flexible hours/good pay
Altruistic (Factor 6)	natural sciences helping people patient education self fulfillment	hospital/laboratories research & development chain pharmacist/ management

involves science and gives them the opportunity to help people through the provision of drug information and counseling. They placed the chain and retail pharmacy environments on the unimportant side. The idea of pharmacy being the perfect mix between business and medicine was very unimportant to them. This group of students seemed to be convinced that the performance of clinical functions would only be possible in hospital/institutional settings. They resisted any involvement in community practice. Students loading on this factor had either no practical experience with pharmacy or had worked in retail settings.

Factor 2 was operationally defined as emphasizing a “family oriented” element. Factor 2 students showed a strong preference for flexibility in career opportunities as well as in work hours. To these students the possibilities of combining a health profession with family, as well as medicine with business, were rather appealing. The two unimpor-

tant categories in the Factor 2 array were exclusively filled with statements describing research oriented activities. As with Factor 1, students defining Factor 2 had either no practical experience with pharmacy or had worked only in retail settings. Factor 1 students however disliked the retail setting, whereas Factor 2 did not express any strong feelings for either hospital or community setting.

Factor 3 appeared to represent nearly an exact opposite viewpoint when compared to Factor 2. Students loading on this factor were very much interested in sciences in general. Studying the body's functions, knowing how medicine works, etc. were very important aspects to them. On the unimportant side were found exactly the statements that were preferred by Factor 2 subjects. Toward the negative end of the Q-sorting continuum Factor 3 students placed statements referring to the possible combination of family and career, community pharmacy in a small town, and helping people to enrich one's soul. Factor 3 could thus be seen as exhibiting a "science orientation."

Factor 4 was operationally defined as an expression of students with an "undecided attitude." Factor 4 students displayed a rather inconsistent picture. They expressed strong interests in biology, chemistry, pharmacognosy, drug action, as well as being attracted to pharmacy's "action and hustle" and hospital pharmacy. For them the unimportant end of the continuum was comprised of a mix of statements referring to research as well as retail oriented activities. Students loading on all of the other factors indicated having had little difficulty when performing the actual Q-sorting task, Factor 4 students distinguished themselves by finding the Q-sorting rather "hard to do." The combination of inconclusive Q-sorts and expressions of difficulty when making the Q-sort task was interpreted as a sign that these students might not have given much previous thought to defining and expressing their personal image of pharmacy as a profession.

Factor 5 exemplified the "traditional community oriented" pharmacist who thrives on helping people through scientific drug information and counseling (the scientist on the corner) and thereby fulfilling an important personal desire to provide service for his/her community. Students loading on this factor had no previous experience with pharmacy. They would like to open a pharmacy of their own, preferably in a small town where there is a sense of community and family. Helping people, humanitarian ideals, and the possible combination of science with community orientation, were also important aspects of their viewpoint. In contrast, this group of students placed statements referring to drug research, chain pharmacy and management positions, as well as flexible hours and good pay, on the negative side of the Q-sorting continuum.

Factor 6 was operationally defined as an "altruistic orientation." Students loading on Factor 6 enjoyed hypothesizing and studying chemical reactions as well as helping people through the provision of drug information. Emphasis was placed on enriching oneself by helping people. Feelings of satisfaction, self fulfillment, and pride came from interactions with patients. However, these students did not seem to have decided in what type of setting they would want to practice their helping skills. Statements referring to drug research, hospital, chain, and community pharmacy were placed on the negative side of the continuum, possibly indicating a separation of setting and service in the minds of these students.

Subjects defining the factors were analyzed regarding their academic performance, years of professional pharmacy education, ethnic origin, gender, previous experience with pharmacy practice, and difficulty experienced in ranking items of the Q-sorting task. However, with the exception of Factor 4, the "undecided attitude," no associations between these variables and the clustering of students on factors were found. The lack of statistically significant associations may, however, be attributable simply to the relatively small size of the person sample for this type of analytical approach.

## DISCUSSION

Results from this study showed that Q-methodology could be used to identify six different and largely exclusive attitudes about pharmacy in beginning pharmacy students. These were operationally defined as representing clinical, family, science, undecided, traditional community, and altruistic orientations. They suggested that the students had realized that pharmacy is on its way to leaving behind most of the production and mechanical dispensing aspects that once were at the heart of pharmacy practice. The study showed interests and motivations of incoming pharmacy students cover a broad range of functions not associated with drug distribution.

However, it is interesting to note that incoming students still tended to associate clinical pharmacy with the hospital setting. This point of view is most clearly exemplified in the Factor 1, "clinical orientation," statement array. While students comprising this factor appeared to favor the clinical aspects of pharmacy practice, at the same time they opposed any involvement in community pharmacy practice. However, this is where, according to the profession's mission, the provision of clinical pharmacy services has as much a place as in the hospital environment(23,23). From the profession's point of view, the concepts of clinical pharmacy and pharmaceutical care comprise the most important roles and functions for today's pharmacists, regardless of practice setting.

This study also demonstrated that entering pharmacy students do not necessarily comprise one homogenous group of individuals who all possess similar attitudes. On the contrary, six largely exclusive attitude domains were identified. When taken further, these findings can also be interpreted to cast doubt on the often employed assumption of univariate change in all students as a result of the educational and professional socialization processes. There appear to be multiple sets of attitudes among the incoming students, and it might be warranted to expect multidimensional changes in individuals over the term of the educational process. Studying professional socialization as a dynamic process might render more insightful results if it were performed on the basis of individuals and individual changes rather than through the assessment of presumably homogenous cohorts of students all moving together as a single class.

Results from this study also agree with the findings of Chappel(12) and Hornosty(13). Both authors considered the exclusivity in the distinction between "business" and "professional" orientations to be overdrawn. This present study confirmed their findings that contemporary pharmacy students' attitudes cannot be neatly grouped into just these two categories. In particular, students comprising Factors 2 and 5, operationally defined as "family" and "traditional

community” orientations, appeared to favor a mix of “professional” and “business” elements in their professional self images—a view that was supposed to not even exist under the traditional, dichotomous model.

Matters of sample size can be confusing when taken out of context. For qualitative studies, even the in depth analysis of one person (termed intensive studies) can be appropriate and result in contributions to scientific knowledge. On the other hand, most empirical studies, *i.e.*, those analyzing epidemiological and environmental hazards, require large numbers of subjects in order to control “within groups error” and thereby generate scientifically sound, reliable inferences and predictions based on differences between the averages of group data.

While the sample of students in this study would be considered relatively small when measured by the more common “empirical” standards, the resulting factor arrays are nevertheless still valid representations of the students’ opinions. The main goal of this study was not to generalize from these research results to the larger population of pharmacy students all over the United States. The purpose was rather to test and offer a method for qualifying individuals’ subjective motivations for seeking a professional degree in pharmacy. Whether or not the factors that might be isolated in different settings would turn out identical is only a secondary consideration in the context of this study; and would, of course, call for empirical and inductive methods, thus requiring the accumulation of additional cases. And even then there would be no guarantee that one would not find shadings of differences in the diverse settings, *i.e.*, that Factor 1 from this study might be a few degrees off (in terms of factor rotation) when compared to Factor 1 in another geographic setting.

Q-methodology, by itself and in combination with other inferential techniques, opens a wide range of creative and innovative design and research opportunities. Exploring and determining attitudes with Q-methodology at one time offers the opportunity to reassess these attitudes for change at other time intervals. For this reason Q-technique is ideally suited to allow for the monitoring of dynamic changes in the students’ attitude profiles over the course of professional pharmacy education. In addition, student attitudes could easily be compared with those of faculty and preceptors to assess the dynamics of role model and mentor effects in the affective domain. Making comparisons between the subjective attitudes of students and educators in a longitudinal design could prove useful for extensive studies of the process of professional socialization. Based on the stimulating findings from this study, it seems appropriate to consider further the potential contributions of Q-methodological designs whenever subjective matters are at the center of research interests.

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#### References

- (1) Brown, S.R., “A fundamental incommensurability between objectivity and subjectivity,” in *Science, Psychology, and Communications*, (eds. Brown, S.R. and Brenner, D.J.) Teachers College Press, New York NY (1972) pp. 57-94.
- (2) Hatoum, H.T. and Smith, M.C., “Orientation of pharmacy students and practitioners toward work, family, and desired professional qualities,” *Contemp. Pharm. Pract.*, **5**, 102-106(1982).
- (3) Hatoum, H.T. and Smith, M.C., “Identifying patterns of professional socialization for pharmacists during pharmacy schooling and after one year in practice,” *Am. J. Pharm. Educ.*, **51**, 7-17(1987).

- (4) Knapp, D.E. and Knapp, D.A., “Disillusionment in pharmacy students,” *Soc. Sci. Med.*, **1**, 445-447(1968).
- (5) Manasse, H.R., Kabat, H.F. and Wertheimer, A.I. “Professional socialization in pharmacy I: A cross-sectional analysis of personality characteristics of agents and objects of socialization,” *Drugs Hlth. Care*, **3**, 3-18(1976).
- (6) Manasse, H.R., Kabat, H.F. and Wertheimer, A.I., “Professional socialization in pharmacy: A cross-sectional analysis of dominant value characteristics of agents and objects of socialization,” *Soc. Sci. Med.*, **11**, 653-659(1977).
- (7) Schwirian, P.M. and Facchinetti, N. J., “Professional socialization and disillusionment: The case of pharmacy,” *Am. J. Pharm. Educ.*, **39**, 18-23(1975).
- (8) Smith, M., Messer, S. and Fincham, J.E., “A longitudinal study of attitude change in pharmacy students during school and post graduation,” *ibid.*, **55**, 30-35(1991).
- (9) Denzin, N.K. and Mettlin, C.J., “Incomplete professionalization: The case of pharmacy,” *Soc. Forces*, **46**, 375-382(1968).
- (10) Kronus, C.L., “Occupational values, role orientations, and work settings: The case of pharmacy,” *Sociol. Quart.*, **16**, 171-183(1975).
- (11) Smith, H.A., Branecker, J. and Pence, B.S., “Role orientation, conflict and satisfaction among pharmacists and students,” *J. Soc. Admin. Pharm.*, **3**(1), 18-29(1985).
- (12) Chappell, N.L. and Barnes, G.E., “Professional and business role orientations among practicing pharmacists,” *Soc. Sci. Med.*, **18**, 103-110(1984).
- (13) Hornosty, R.W., “Subjective role orientation, conflict and satisfaction among pharmacy students,” *J. Admin. Soc. Pharm.*, **7**(1): 14- 25(1990).
- (14) Stephenson, W., *The Study of Behavior: Q-Technique and Its Methodology*, University of Chicago Press, Chicago IL (1953).
- (15) Brown, S.R., “The composition of microcosms,” *Policy Sciences*, **5**, 15-27(1974).
- (16) Garrard, J. and Hausman, W., “The priority sort: An empirical approach to program planning and evaluation,” *Am. J. Soc. Psych.*, **1**, 774.777(1973).
- (17) Kerlinger, F.N., *Foundations of Behavioral Research*, 3rd Ed., Holt, Rinehart and Winston, Inc., Orlando FL (1986) p. 509.
- (18) Brown, S.R., *Political Subjectivity: Application of Q-methodology in Political Science*, Yale University Press, New Haven CT (1980).
- (19) Dennis, R.N., “Q methodology: Relevance and application to nursing research,” *Adv. Nurs. Sci.*, **8**(3): 6-17(1986).
- (20) *Op. cit.*, (17).
- (21) McKeown, B.F. and Thomas, D., *Q-Methodology*. Sage Publishers, Beverly Hills CA (1988).
- (22) Hepler, CD. and Strand, L.M., “Opportunities and responsibilities in pharmaceutical care,” *Am. J. Hosp. Pharm.*, **47**, 533-543(1990).
- (23) Penna, R.P., “Pharmaceutical care: Pharmacy’s mission for the 1990s,” *ibid.*, **47**, 543-549(1990).
- (24) Cottle, C.E. and McKeown, B.F. “The forced-free distinction in Q-technique: A note on unused in the Q-sort continuum,” *Operant Subjectivity*, **3**, 58-63(1981).
- (25) Wilkinson, L., *SYSTAT: The System for Statistics*, SYSTAT, Inc., Evanston IL (1990).

#### APPENDIX A. Q-SAMPLE

1. I enjoy helping people by explaining how to take medication and which side effects there are.
2. I would like to be part of a health care team.
3. I see a great need for the promotion of knowledge concerning the broad area of medications.
4. Pharmacy is a humanitarian profession which deals with people who need help and orientation about their health and well being.
5. I want to be able to help people in my community and feel good about myself.
6. I enjoy serving my fellow human beings.
7. By administering medication, which helps people overcome disease and maintain their health, I feel I will be serving society.
8. Any contributions (research, consulting) I could make in pharmacy would make the world a possibly better place to live in.
9. I want to learn about chemistry in an attempt to add to sciences

- knowledge of how body chemistry is affected by drugs, positively and negatively.
10. I enjoy hypothesizing, studying, and synthesizing various paths of chemical reactions that would lead to a desired outcome.
  11. I found pharmacy to be the profession that best combines my interests in Chemistry and Biology.
  12. I have always been fascinated by the physiological and molecular mechanisms of medications.
  13. I am very much interested in how drugs or substances can alter and affect the body's functions.
  14. I enjoy sciences such as biology, physiology, and especially organic chemistry, and I believe that these are the integral parts of the big picture called pharmacy.
  15. I am interested most in the physical, biological, and behavioral sciences, and I feel that pharmacy as a profession is the best choice for me to challenge myself in these fields.
  16. I have always been interested in science. I am also community oriented; being a pharmacist would allow me to hold a career that combines both of these interests.
  17. I believe I will be successful in drug research due to my interest in chemistry, study of reaction synthesis, and desire to improve the quality of life.
  18. Knowing how medicine works and being able to convey the information to others, I feel that I will be able to adequately educate others on proper medication usage.
  19. I would like to work as a hospital pharmacist who prepares dosage forms, monitors drug therapy, and teaches patients about their medications.
  20. Hospital pharmacy would fulfill many of my interests, since I enjoy working in laboratories, believe I'm quite organized, and I like interacting with people.
  21. I would most like to work in a hospital setting, supervising patients' medications and conferring with doctors on just what type of drugs would work best in specific situations.
  22. In the hospital, I can help patients individually and work closely with the doctors using my knowledge to help these patients.
  23. I would like to practice pharmacy in geriatrics because this age group is the most misinformed.
  24. I have this dream of one day opening a pharmacy of my own -a place where the people of the community would come for their prescriptions, a place they would feel comfortable in, and a place where they would find a new friend.
  25. I plan to move to a small town, where there is a sense of community and family. It is in this environment that I want to practice, a place where I can get to know the people I serve and to be involved in their continuing health care.
  26. I would like to work in a retail community pharmacy because this will give me more of a chance to interact with people.
  27. I want to be a chain pharmacist and work my way into upper management.
  28. Pharmacy is a perfect mix between business and medicine.
  29. One possibility would be to work in research and development because I enjoy working in the laboratory and with others.
  30. I hope to eventually use my PharmD to develop a research oriented practice within an academic setting.
  31. I am looking forward to working in the industrial field, so I can research for the new medicine which can help more people to be healed from their illnesses.
  32. I would like to work in an area of clinical study.
  33. I am especially interested in the field of pharmacognosy.
  34. I plan to work as a clinical pharmacist for a few years and then I would like to either go back to school and receive my PhD and do drug research, or possibly work for the FDA.
  35. Pharmacy is one of the most respected health professions.
  36. Patient interaction gives me satisfaction and pride.
  37. I find that helping people is one of the most satisfying ways to enrich your mind, heart, and soul.

38. I want to enter into a stable profession that involves a use of science and provides an opportunity to help people.
39. I finally found the career that would combine my love for sciences and would not include eight long years of study only to be followed up with residencies — pharmacy was the answer.
40. The many career opportunities and flexibility pharmacy offers a person wanting a career and family keep my motivation very high.
41. Pharmacy offers flexible hours and good pay.
42. A career in the pharmacy, I feel, is a way to live out both my dreams: to have a career in a medical profession and to raise a family. I feel that in this position, once the work day is over, I will be able to return home without bringing a major part of my job home with me.
43. I decided to study pharmacy because of the vast opportunities and flexibility in the numerous fields of specialization.
44. Education has always been a top priority in my family, and I feel obligated to fulfill my parents' dream to the best of my abilities.
45. The constant action and hustle of a pharmacy appeals to me.

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## APPENDIX B. Q-SORT INSTRUCTIONS

### Directions

You are asked to sort the card items in several piles that represent IMPORTANCE and UNIMPORTANCE to you when describing your personal attitude toward pharmacy as a profession and career choice. Please follow each step below very carefully. The full sort may take as long as 1 hour to complete. Place a check mark in the space on the left hand side of each step as you complete it.

1. \_\_ Place the empty envelopes on a flat surface, in order of increasing magnitude of the numbers written on them, from left to right. Thus, they will be arranged in the following order: -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5.
  2. \_\_ Now read through the items very carefully to become familiar with them. Think about each item in terms of its relevance to you in describing your own attitude toward pharmacy.
  3. \_\_ Please, sort all the items into three piles: on the right, place those items that you think are important in describing your own attitude; on the left, those that are unimportant to you, and in the middle those about which you feel ambivalent or about which you do not feel very strongly (neither very important nor very unimportant to you).
  4. \_\_ Study the items in the right pile, select only two that you consider to be most important and place the cards on top of the +5 envelope; just like in a game of Solitaire with playing cards.
  5. \_\_ Study the items in the left pile and select only two that you consider most unimportant and place the cards on top of the -5 envelope.
  6. \_\_ Sort all the other items according to their relative importance in describing your attitude toward pharmacy such that the total number of cards below each envelope equals the number that is supposed to be placed in that envelope.
- NOTE: You are perfectly free to move any items around as much as you wish until you reach a point where you feel the order of the sorted cards truly represents your thoughts about the importance of these items relative to one another. Please, ensure that the number of cards below each envelope corresponds to the number stated on the envelope. When satisfied with the sort, please proceed to step #7.
7. \_\_ Place the cards in their corresponding envelopes. Fill in the requested information on the back of this sheet.
  8. \_\_ Please place all materials in the self addressed envelope