

Assessing Pharmacy Students' Learning Styles and Personality Types: A Ten-Year Analysis

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A ten-year analysis of 1,313 Myers-Briggs Type Indicator (MBTI) is presented to address learning styles in pharmacy students. Objectives were to present a ten-year view of pharmacy students' learning styles, identify differences in pharmacy students versus the general college student population, and compare personality types of students choosing to track into the PharmD Program with those in the BS Pharmacy program. Compared to the general college population, the distribution of pharmacy students differed in several personality types measured by the Myers-Briggs Type Indicator. Generally, Drake pharmacy students' modal type remained Introvert, Sensing, Thinking, Judging (ISTJ) to Introvert, Sensing, Feeling, Judging (ISFJ) for the ten years of data. Female pharmacy students were 72 percent more likely to have feeling as a dominant function. Females were also more likely to have a judging preference. When compared to BS Pharmacy students, PharmD students were more than three times more likely to be Extraverted, Intuitive, Feeling, Judging (ENFJ). This analysis provided learning and teaching style information for both students and faculty. It is timely as colleges attempt to change students to independent learners. The key to successfully implementing ability-based outcomes and active learning may lie with the use of a variety of strategies that help students with different preferences.

INTRODUCTION:

A ten-year observational analysis of Myers-Briggs Type Indicator (MBTI)TM profiles of Drake University Pharmacy students offers a unique assessment opportunity. From 1987 through 1996, 1,313 pharmacy student profiles were collected. A review of pharmacy literature reveals no other MBTI results of a pharmacy student sample of this

size. Such information is timely to implement educational plans that will change pharmacy students from dependent to independent learners. This may be accomplished by developing assignments and class meetings that encompass a variety of learning styles, which engage students to work independently or with peers both in and out of the traditional classroom. Thus, faculties must not concentrate only on what they teach, but how they teach and how students

learn(1). Barr and Tagg speak of such a shift in higher education from the 50-minute lecture to producing learning in every student by whatever means works best(2). Consequently, specific objectives of this analysis include: (i) to present a ten-year view of pharmacy students' learning styles; (ii) to identify differences in pharmacy student learning styles versus the general college student population and between male and female pharmacy students; and (iii) to compare personality types of students electing to track into the Doctor of Pharmacy Program (PharmD) with those in the BS Pharmacy Program.

The Drake University mission statement emphasizes its goal to provide a student-centered learning environment. The College of Pharmacy is proactive in creating this environment and has just completed its second year of a two-year faculty development commitment called Enhancing Student Learning (ESL). The focus is on facilitating active and student-centered learning. That is, involving students in their own learning process. Our MBTI analysis has provided learning and teaching style information for both students and faculty.

MYERS-BRIGGS TYPE INDICATOR (MBTI)

The Myers-Briggs Type Indicator was designed by the mother-daughter team of Isabelle Myers and Katharine Briggs to make it possible to test Carl J. Jung's (1921-1971) theory of psychological types and to make it useful in people's lives. The theory is based on the premise that the random variation we see in behavior is quite orderly and consistent based on the way people prefer to use their perception and judgment functions. Jung believed that we use four basic mental functions or processes. There are two kinds of perception that involve becoming aware and gathering information using sensing (S) or intuition (N) functions. The sensing function establishes what is occurring at the immediate moment and practicality. At the opposite pole, intuition refers to possibilities and relationships. There also are two kinds of Judgment that includes the ways that we come to conclusions about that which we have perceived and aids our decision making. The thinking (T) function links ideas together by making logical connections using cause and effect and may seem impersonal. At the opposite pole, the feeling (F) function weighs the merits of issues based on values and may be more subjective. Jung conceptualized the attitudes of introversion (I) and extraversion (E), which are inward and outward orientations to life and how we derive our energy. Introverts are most interested in the inner world of concepts and ideas and enjoy solitude and privacy. Extraverts draw energy from the environment and people around them for a more action-oriented way of life. Myers and Briggs added the judging (J) and perception (P) attitudes from the implied writings of Jung. These two preferences indicate behaviors to the outside world (Lifestyle) and also help to identify dominant and auxiliary functions(3). The MBTI is a measurement tool that yields a four-letter type that gives valuable insight into ourselves and helps us to better understand and appreciate human differences. Once the student's type is identified, teachers can make predictions about how he/she learns best, which may suggest alternative methods of study. By compiling type tables of MBTI results, 16 different ways of learning can be examined. To further clarify this concept, a sample student type profile

for an introverted (I) -sensing (S) -thinking (T) -judging (J) preference follows. As a source of energy, this student prefers introversion (I) and may be more quiet and less active in the classroom than an extravert. Teachers need to respect this and give advance time to think before sharing ideas. To gather information, this student prefers sensing (S) and learns best in a concrete step-by-step progression. Practical knowledge is valued and there is a tendency to excel at memorization of facts and events. To make decisions, this type prefers thinking (T) and is motivated when given a logical reason for a project. The thought pattern is syllogistic and analytic. When coming to closure, this student prefers judging (J) and gauges learning by the completion of tasks. A structured environment that establishes goals to be met is often chosen by this type of student(4).

HYPOTHESES

Our hypotheses were: (i) There is no difference in MBTI type preference between Drake pharmacy students and the general college population; (ii) There is no difference in MBTI type preference between Drake male and female pharmacy students; and (iii) There is no difference in MBTI type preference between Drake BS Pharmacy students and those choosing the PharmD degree.

REVIEW OF LITERATURE

A number of articles about psychological type and pharmacy have appeared in this Journal for more than 20 years; however, this Journal is not included in the *MBTI Applications: A Decade of Research on the Myers-Briggs Type Indicator*(5). The writing and sharing of this article can alert professional type research bodies to MBTI research in pharmacy education that has been conducted and published. These research articles, for the most part, have studied pharmacy student personality types as related to careers and learning styles. Rezler, et al. conducted a study to assess the personality type of pharmacy students with implications for chosen career paths. Results of 614 pharmacy students showed strong propensity for sensing and judging preferences. Extraverts and Introverts were more evenly distributed and there was slightly more thinking than feeling types. Among females, as might be expected, two-thirds preferred feeling and one-third preferred thinking(6).

McCaulley reported similar findings in a study done for the U. S. Department of Health, Education and Welfare. She found that the practical and matter of fact STs are drawn to health care fields that require high technical skills including pharmacy. The sympathetic and friendly SF types are drawn to physical care(7). Draugalis and Bootman studied whether or not the options of clinical, management and research pharmacy would appeal to three different groups of students. The Keirsev Temperament Sorter, which also yields Jungian polarities, was used along with a questionnaire. They, too, found sensing and judging students over-represented. Introverts slightly outnumbered extraverts and 37 percent of the females preferred thinking, while 63 percent preferred feeling(8).

Lowenthal published a number of articles in pharmacy literature that studied issues using the MBTI as a research instrument. In 1988, he published an article on the use of the MBTI in pharmacy education. He looked at

Table I. Drake University pharmacy students' MBTI modal type, by year

Year	Sample Size	Percent female	Modal type ^a
1987	71	59	E/I S T J
1988	88	61	E/I S F J
1989	91	56	E/I S T J
1990	96	60	I S T J
1991	166	65	I S T J
1992	206	62	E/I S T J
1993	128	66	E S F J
1994	165	65	I S F J
1995	171	70	I S T J
1996	131	70	I S F J
Total	1313		I S T J

^aLegend: E= Extraversion I= Introversion
 S= Sensing N= Intuitive
 T= Thinking F= Feeling
 J= Judging P= Perception

learning styles of 98 students and 41 faculty using the MBTI, the Kolb Learning Style Inventory and the Learning Preference Inventory. The purpose was to investigate if this understanding could be helpful in curriculum development. Lowenthal found more sensing-feeling-perceptive (SFP) type students than in the faculty sample. No significant difference was found on the extraversion-introversion (EL) dimension. On the sensing-intuition (SN) dimension, faculty preferred intuition at a significant level. This suggests that faculty must make sure that lectures include practical examples as well as conceptual ideas. There were significant differences on the thinking-feeling (TF) and judging-perception (JP) dimensions with faculty showing stronger thinking-judging (TJ) preferences. According to the theory, the higher number of female students probably resulted in the feeling (F) preference, which weighs the human aspect before the logical principles. This is important for faculty when looking at methods of problem solving. The fact that more students preferred perception (P) than faculty suggests that time for processing information is important. Faculty may use their judging (J) preference to come to conclusions too quickly. In this study Lowenthal showed that personality differences do exist between faculty and students. This could be important information for faculty in designing curricula and examinations and making sure that all learning types are taken into consideration(9-11).

Lowenthal and Meth used the same sample of pharmacy students to look at MBTI preferences and academic performance. They investigated whether or not there were relationships between MBTI preferences, GPA and numerical scores on the SAT, PCAT and NABPLEX examinations(11). Their findings were similar to those in the MBTI literature by Myers and McCaulley. Students preferring introversion and intuition did best on written tests, time limited tests and concept and theory. Sensing students did better on objective tests offering choices and performed well in a lab setting. Students preferring perceiving did well on essays and those with a thinking preference performed well on science, mathematics and analysis of facts(12).

Lowenthal also examined MBTI type preferences of pharmacy students and pharmacy practitioners. This study

was a cross-sectional sample of four different schools of pharmacy in the U.S. (N= 832) and a sample of 170 practicing pharmacists. He found them statistically similar on the EI and SN dimensions. Six years of pharmacy classes at Virginia Commonwealth University pharmacy reported the modal type as ISTJ with about two thirds preferring SJ. A significant difference at $P<0.01$ was found on the TF dimension with more females preferring feeling(10).

Thus, the available literature does present some information on pharmacy students, but does not address the relationship between their types and learning styles in view of the recent changes taking place in pharmacy education. Likewise, past literature does not provide longitudinal data on pharmacy students. In addition, past data have not allowed an analysis of students who, for their own reasons, chose training considered to be entry-level for future practice in pharmacy.

METHODOLOGY

The Myers-Briggs Type Indicator (MBTI) was administered to a total of 1,313 Drake University pharmacy students over a ten-year time span from 1987-1996. Students were given the MBTI one time in either their second or fourth year in the 0-5/6 year pharmacy program. The MBTI was administered and interpreted to all students in a required Communication Skills for Pharmaceutical Care course by a single faculty member who was trained and qualified in using the MBTI. Students were instructed on the use and purpose of the MBTI. In subsequent course evaluations, students rated the use of the MBTI very highly. Each year, students were asked to rate the statement, "The Myers-Briggs instrument was helpful to identify your preferred communication style, and to better understand others," using a Likert-scale of 1 (Strongly Disagree) to 5 (Strongly Agree). Results of these student evaluations consistently yielded an average score of 4 and above.

Three separate analyses addressed the research hypotheses. For testing the hypothesis that there is no difference in MBTI type between BS and PharmD students, the pharmacy students were categorized based on two variables; first, by their MBTI preference, and secondly on whether they chose to enter the College's PharmD or BS Pharmacy program. The former program comprises both an additional year of didactic coursework and an additional 18 weeks of experiential training in their last year. Sixty-nine students were categorized as tracking into the PharmD program. These students chose to track into the PharmD program before it became the entry-level program. Thus, we believed they chose the PharmD program rather than having to enter it by default.

Students also were categorized on gender. Comparisons between male and female pharmacy students were made on MBTI type. Thirdly, comparisons between pharmacy students and the general college populations were made. The comparison group was the most recent general college MBTI type table data (1971-1982) published in the CAPT-MBTI Atlas of Type Tables and comprised 39,429 individuals. These subjects were between 18 and 25 years of age and had a gender distribution of 56 percent females and 44 percent males. (13).

All comparisons were based on chi-square analysis and utilized the Selection Ratio Type Table (SRTT) for the Macintosh[®] (14). The Fisher's Exact Probability was used

Table II. MBTI comparison of Drake pharmacy students to General College population

				N	%	Index	
				E	616	46.92	0.67***
				I	97	53.08	1.74***
				S	942	71.74	1.74***
ISTJ	ISFJ	INFJ	INTJ	N	371	28.26	0.48***
N = 222	N = 201	N = 39	N = 34				
% = 16.91	% = 15.31	% = 2.97	% = 2.59	T	655	49.89	0.79***
Index = 2.59***	Index = 2.57***	Index = 1.32	Index = 1.02	F	658	50.11	1.36***
				J	897	68.32	1.79***
				P	416	31.68	0.51***
				IJ	496	37.78	2.19***
				IP	201	15.31	1.16*
				EP	215	16.37	0.34***
ISTP	ISTP	INFP	INTP	EJ	401	30.54	1.46***
N = 61	N = 49	N = 47	N = 44				
% = 4.65	% = 3.73	% = 3.58	% = 3.35	ST	487	37.09	1.85***
Index = 1.51**	Index = 1.09	Index = 0.94	Index = 1.16	SF	455	34.65	1.64***
				NF	203	15.46	0.99
				NT	168	12.80	0.30***
				SJ	732	55.75	2.06***
				SP	210	15.99	1.13
				NP	206	15.69	0.33***
ESTP	ESFP	ENFP	ENTP	NJ	165	12.57	1.13
N = 39	N = 61	N = 69	N = 46				
% = 2.97	% = 4.65	% = 5.26	% = 3.50	TJ	465	35.42	1.83***
Index = 0.93	Index = 1.04	Index = 0.83	Index = 0.10***	TP	190	14.47	0.33***
				FP	226	17.21	0.95
				FJ	432	32.90	1.75***
				IN	164	12.49	1.09
				EN	207	15.77	0.33***
				IS	533	40.59	2.14***
ESTJ	ESFJ	ENFJ	ENTJ	ES	409	31.15	1.40***
N = 165	N = 144	N = 48	N = 44				
% = 12.57	% = 10.97	% = 3.66	% = 3.35	Sdom	523	39.83	1.98***
Index = 1.72***	Index = 1.50***	Index = 1.10	Index = 1.10	Ndom	188	14.32	0.31***
				Tdom	314	23.91	1.47***
				Fdom	288	21.93	1.23***

Table values are for the 1313 pharmacy students

E= Extraversion I= Introversion
 S= Sensing N= Intuitive
 T= Thinking F= Feeling
 J= Judging P= Perception

* < .05, ** < .01, *** < .001

Base total N = 27,156; Pharmacy Group N=1313. Groups are independent

for all instances where the cell frequency was five or less. For comparisons where the sample group was a subset of the base population, the SRTT calculated the chi-square based on a dependent sample. All comparisons used an a priori alpha level of 0.05.

Index scores and their associated P-values were calculated for each of the 16 MBTI types plus 32 associated groupings. The index score provides a measure of the frequency of each type found in the sample versus the expected frequency calculated on the base population. Thus, significant index scores greater than 1.00 indicate there are more people in that cell than would have been expected from their numbers in the base population. If the index is less than 1.00, there are fewer in that cell than would be expected.

RESULTS

A total of 1,313 pharmacy students completed the MBTI during the ten years of data gathering (Table I). The modal

type for these students was ISTJ, although there was fluctuation between Introversion-Extraversion preferences and Thinking-Feeling preferences. For each of the ten years, the sensing and judging preferences predominated.

When comparing the 1,313 pharmacy students to the general college population (N=27,156), the pharmacy group had a significantly greater proportion of ISTJ, ISFJ, ISTP, ESTJ, and ESFJ types (Table II). These types were from 50 to 159 percent more prevalent in the pharmacy group than the general college population (SRTT Index Scores 1.5 to 2.59, $P < 0.01$ to 0.001). Pharmacy students were significantly under-represented for the ENTP type (Index Score of 0.10, $P < 0.001$). In essence, the pharmacy students were over-represented by the ISFJ preferences. These students can be described as preferring introversion (gaining energy from within, e.g., ideas and concepts), sensing (a need for hands-on experiences and practical data), feeling (looking at the humanistic factors) and judgment (coming to closure rather quickly in an organized manner)

Table III. Drake pharmacy males vs Drake pharmacy females (1987-1996)

				N	%	Index	
				E	395	46.75	0.99
				I	450	53.25	1.01
ISTJ	ISFJ	INFJ	INTJ	S	612	72.43	1.03
N = 125	N = 168	N = 31	N = 19	N	233	27.57	0.94
% = 14.79	% = 19.88	% = 3.67	% = 2.25				
Index = 0.71**	Index = 2.82***	Index = 2.15*	Index = 0.70	T	330	39.05	0.56***
				F	515	60.95	1.99***
				J	612	72.43	1.19***
				P	233	27.57	0.71***
				IJ	343	40.59	1.24**
				IP	107	12.66	0.63***
				EP	126	14.91	0.78
ISTP	ISFP	INFP	INTP	EJ	269	31.83	1.13
N = 24	N = 31	N = 32	N = 20				
% = 2.84	% = 3.67	% = 3.79	% = 2.37	ST	252	29.82	0.59***
Index = 0.36***	Index = 0.95	Index = 1.18	Index = 0.46**	SF	360	42.60	2.10***
				NF	155	18.34	1.79***
				NT	78	9.23	0.48***
				SJ	501	59.29	1.20***
				SP	111	13.14	0.62***
				NP	122	14.44	0.80
ESTP	ESFP	ENFP	ENTP	NJ	111	13.14	1.14
N = 12	N = 44	N = 54	N = 16				
% = 1.42	% = 5.21	% = 6.39	% = 1.89	TJ	258	30.53	0.69***
Index = 0.25***	Index = 1.43	Index = 1.99*	Index = 0.30***	TP	72	8.52	0.34***
				FP	161	19.05	1.37*
				FJ	354	41.89	2.51***
				IN	102	12.07	0.91
				EN	131	15.50	0.95
				IS	348	41.18	1.04
ESTJ	ESFJ	ENFJ	ENTJ	ES	264	31.24	1.01
N = 91	N = 117	N = 38	N = 23				
% = 10.77	% = 13.85	% = 4.50	% = 2.72	Sdom	349	41.30	1.11
Index = 0.68**	Index = 2.40***	Index = 2.10*	Index = 0.61	Ndom	120	14.20	0.98
				Tdom	158	18.70	0.56***
				Fdom	218	25.80	2.72***

Table values are for the 845 female students.

E= Extraversion I= Introversion
 S= Sensing N= Intuitive
 T= Thinking F= Feeling
 J= Judging P= Perception

* < .05, ** < .01, *** < .001.

Male Pharmacy Base total (N = 468), Female Pharmacy Students (N = 845) Groups are Independent.

Drake pharmacy students also were compared on their MBTI type preference based on gender (Table III). In general, the female pharmacy students were 72 percent more likely to have feeling as a dominant or leading function (Index = 1.72, $P < 0.001$). Females were also more likely than the male pharmacy students to have a judging preference (Index = 1.19, $P < 0.001$). There was no statistical difference between males and females with regard to sensing-intuition or introvert-extravert types.

Finally, Drake pharmacy students were compared on their program of study (Table IV). All Drake pharmacy students were compared to those seeking their PharmD degree. Sixty-nine of the 1,313 students had chosen to enter the PharmD program. When compared to the total, the ENFJ type was over three times as prevalent in these 69 students than in the base population of pharmacy students (Index 3.17, $P < 0.001$). This is better represented by the fact that the PharmD students were feeling-dominant when compared with the base population (Index 1.52, $P < 0.05$) and they represented a higher proportion of FJ

types than all pharmacy students (Index 1.41, $P < 0.05$)

DISCUSSION AND IMPLICATIONS

This research presents the largest amount of MBTI type data for pharmacy students yet studied. In general, the 1,313 pharmacy students prefer sensing and judging (SJ). This further confirms the findings of Lowenthal(10) and McCaulley(7). A possible trend over the last ten years, however, suggests that students have moved from thinking to feeling type preferences. The sensing (concrete, step-by-step progression) and judging (task and result-oriented) preferences seem to fit the traditional type of instruction and learning environment of colleges of pharmacy. In the traditional type, one can argue that emphasis has been placed on facts, memorization and perfecting the art of dispensing medications. In looking at learning styles, Jensen *et al*, state that sensing type students tend to focus on facts and details first and then utilize what they have learned. They may be practical, realistic and like clear directions that are direct and to the point. Sensing types like to learn

Table IV. Drake PharmDs (94-98 graduation date) compared with all Drake pharmacy students, 1987-1996

				N	%	Index	
				E	35	50.72	1.08
				I	34	49.28	0.93
ISTJ	ISFJ	INFJ	INTJ	S	49	71.01	0.99
N = 8	N = 13	N = 0	N = 3	N	20	28.99	1.03
% = 11.59	% = 18.84	% = 0.00	% = 4.35				
Index = 0.69	Index = 1.23	Index = 0.00	Index = 1.68	T	29	42.03	0.84
				F	40	57.97	1.16
				J	52	75.36	1.10
				P	17	24.64	0.78
				IJ	24	34.78	0.92
				IP	10	14.49	0.95
				EP	7	10.14	0.62
ISTP	ISFP	INFP	INTP	EJ	28	40.58	1.33
N = 2	N = 4	N = 0	N = 4				
% = 2.90	% = 5.80	% = 0.00	% = 5.80	ST	20	28.99	0.78
Index = 0.62	Index = 1.55	Index = 0.00	Index = 1.73	SF	29	42.03	1.21
				NF	11	15.94	1.03
				NT	9	13.04	1.02
				SJ	41	59.42	1.07
				SP	8	11.59	0.72
				NP	9	13.04	1.03
ESTP	ESFP	ENFP	ENTP	NJ	11	15.94	1.02
N = 1	N = 1	N = 3	N = 2				
% = 1.45	% = 1.45	% = 4.35	% = 2.90	TJ	20	28.99	0.82
Index = 0.49	Index = 0.31	Index = 0.83	Index = 0.83	TP	9	13.04	0.90
				FP	8	11.59	0.67
				FJ	32	46.38	1.41*
				IN	7	10.14	0.81
				EN	13	18.84	1.20
				IS	27	39.13	0.96
ESTJ	ESFP	ENFJ	ENTJ	ES	22	31.88	1.02
N = 9	N = 11	N = 8	N = 0				
% = 13.04	% = 15.94	% = 11.59	% = 0.00	Sdom	23	333.33	0.84
Index = 1.04	Index = 15.94	Index = 3.17***	Index = 0.00	Ndom	8	11.59	0.81
				Tdom	15	21.74	0.91
				Fdom	23	33.33	1.52*

Table values are for the 69 PharmD students.

E= Extraversion I= Introversion
 S= Sensing N= Intuitive
 T=Thinking F= Feeling
 J= Judging P= Perception

* < .05, ** < .01, *** < .001.

Base total N = 1313, PharmD Group N= 69. Groups are dependent

a skill, perfect it and then put it into practice without much variation. Students with a judging preference tend to prefer goals and deadlines in their learning and a clear plan; they may be overachievers(4).

Consequently, a change from this natural preference to a more independent discovery type of learning may be uncomfortable and some students may resist. Partridge, however, cautioned of the fallacy of only utilizing one learning style lest the student be at a serious disadvantage when another mode is required(15).

Lawrence reviewed approximately 100 published reports on type and learning styles and defined them broadly as cognitive style, patterns of attitudes and interests, and a disposition to seek out a learning environment compatible with one's own style. He further suggested that sensing and intuitive types differ dramatically in their choice of tools and strategies to help them learn(16). Keeping in mind the sensing-judging (SJ) types of many pharmacy students, they may prefer structured didactic, sensory rich instruction. In pharmacy education there is a

shift from the didactic method to the active experiential approach. This may be difficult for students initially; however, active learning can provide rich and practical hands-on sensory experiences so helpful to sensing types. Meanwhile, it will be important to provide eclectic curricula that allow use of natural SJ preferences along with developing new ways of learning.

Within the pharmacy group, females were more likely to be feeling dominant (Table III). The continuing increase in the number of females entering the pharmacy profession (Drake matches the 63 percent national trend) may account for the general movement over the last four years towards the sensing-feeling (SF) function (Table I). Thus, increased enrollment of 'feeling' dominant students may suggest changes in curricular instruction. As Jensen points out, when learning, the feeling preference students tend to want to know that what they are learning has meaning and will be put to use for others. Also, they may find classroom tasks boring while their thinking counterparts are less likely to complain about dry material as long as they are told

the reasoning behind the task or information. Feeling types tend to differ in how they solve problems and communicate. They may be more likely to be expressive in their communication and concerned with how it is received. Conversely, thinking types are more concerned with the content of the message and providing reasons for their statements(4). These ideas might suggest 'feeling' dominant students would do well in curriculums emphasizing interaction with patients and peers and presented in an active learning environment that stresses application of knowledge and information.

Similar to the difference between male and female pharmacy students, the results of this study suggest that, within this sample, students choosing the PharmD had an extraverted-intuitive-feeling-judging (ENFJ) type preference with dominant feeling. Again, this would seem to be consistent with the anticipated role of the pharmacist in providing patient-centered care. The fact that students with this preference self-selected the PharmD program of study that prepares for a more patient-focused career, is congruent with the dominant feeling focus on the human aspect.

Murawski and Miederhoff suggested that the focus of the admissions process should be shifted to selecting those with scientific competency as well as concern and care for the patient, rather than just scientific excellence(17). The EN preference of these students opting for the PharmD program may add support to this idea. Students in our PharmD program are exposed more to giving presentations, initiating interaction with health care teams and solving therapeutic problems. These activities would appeal to the EN type and may be a positive attribute for students to possess. In fact, colleges of pharmacy may see more of these types of students as ACPE's new admission procedures, which include non-academic student qualities, become effective in the Fall of 2000(18).

In summary, the potential shift from students with a thinking preference to a feeling preference for decision making would seem to be beneficial as the profession attempts to move toward a more patient-centered practice. Yet, given the traditional emphasis in pharmacy curricula to focus first on facts and pieces of information, these students may become frustrated with the educational process. The shift to a more active learning and ability-based learning methods as proposed by the Commission to Implement Change in Pharmacy Education(1) may both expose students to more realistic applications of their education as well as aid those with a preference for applications of ideas. The knowledge of personality types and learning styles can be used by both faculty and students to make this transition in pharmacy education more successful. Knowing the preferences of students may help faculty members design a variety of teaching methods for a course, as well as various grading opportunities. Knowing faculty preferences may increase the understanding of their own learning and teaching styles as well as foster an appreciation of other styles. The key to successfully implementing ability-based outcomes and active learning in pharmacy curricula may lie with the use of a variety of strategies that help students with different preferences succeed in their programs.

LIMITATIONS

The SRTT statistical tool makes a total of 48 comparisons between the base population and the comparison group. Thus, the possibility exists that with a five percent a priori alpha level, chance alone may produce significant differences. The findings of several significant differences with the 48 comparisons adds support that true differences do exist between the base population and the comparison group; much like the pharmacy students versus the general college population.

Because the pharmacy data was restricted to one college, the results may not be generalizable to the broader population of pharmacy students. Yet, given similar admission requirements and curricula among pharmacy schools, it would seem reasonable to expect similar results at other pharmacy institutions.

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