



The Internet Journal of Allied Health Sciences and Practice

<http://ijahsp.nova.edu>

A Peer Reviewed Publication of the College of Allied Health & Nursing at Nova Southeastern University

Dedicated to allied health professional practice and education

<http://ijahsp.nova.edu> Vol. 1 No. 1 ISSN 1540-580X

A Comparison of Learning Styles among Seven Health Professions: Implications for Optometric Education

Patrick C. Hardigan, PhD
Associate Dean & Professor

Stanley R. Cohen, EdD
Department of Educational Development

Nova Southeastern University - Health Professions Division
United States

CITATION: Hardigan PC, Cohen SR: A Comparison of Learning Styles Among Seven Health Professions: Implication for Optometric Education. The Internet Journal of Allied Health Sciences and Practice. 2003. Volume 1 Number 1.

ABSTRACT

Educational research and development efforts are most often directed at the improvement of teaching while neglecting students' learning styles. Besides being marginally effective, an exclusive focus on improving teaching methods may lead to reinforcement of inappropriate and nontransferable learning strategies. As such, this study is being undertaken to determine if differences in personality style exist among health profession students. This retrospective-descriptive study tested the null hypothesis "there is no difference in personality traits between osteopathic medicine, pharmacy, physical therapy, physician assistant, dental medicine, optometry and occupational therapy students." Differences as well as similarities were discovered across all seven professions. Implications for instruction, student retention and practice are provided.

INTRODUCTION

Educational research and development efforts are most often directed at the improvement of teaching while neglecting students' learning styles¹ Besides being marginally effective, an exclusive focus on improving teaching methods may lead to reinforcement of inappropriate and nontransferable learning strategies. This has important considerations in dental education given the importance of transferring classroom knowledge and skills to job situations.

Learning style is best understood as the composite characteristic cognitive, affective and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment. Learning style is a structure of neural organization and personality which both molds and is molded by human development and the learning experiences of home, school and society.²

Studies have demonstrated a relationship between academic performance and students who were taught in their preferred learning style.³ For example, Nelson et al., found that college students who were assessed on their learning styles, received an interpretation of their strengths and weaknesses, and were provided instructional sessions on applying these strengths and weaknesses achieved significantly higher grade-point averages and higher retention rates than those students: (a) who were assessed on their learning styles and only received an interpretation of their strengths and weaknesses, and (b) those who received no learning style intervention.⁴

Research has also demonstrated that students with specific personality styles, a basic structure of learning style, tend to choose particular professions.^{5,6} Mathews found that mathematics and humanities students were more independent and applied while education majors preferred social and conceptual situations.⁶ Even within a discipline, differences in personality traits are evident. Stewart discovered a significant difference in personality between undergraduate marketing students pursuing degrees in sales or advertising and undergraduate marketing students pursuing degrees in marketing management.⁵

The health professions are no different. Research indicates a dominant personality style among students enrolled in medicine, nursing, pharmacy, physical therapy and dentistry programs.⁷⁻¹¹ In addition, research demonstrates that personality styles among health profession students tend to remain constant over time.¹²

With differences in personality styles reported in other professions the question arises, "are there differences in personality styles between the health professions?" For example, is there a dominant personality style among optometry students that differs from that of pharmacy students? A review of the literature would indicate that differences in personality styles exist; however, different instruments with varying psychometric qualities were used making strong comparisons difficult. As such, this study is being undertaken to determine if differences in personality style exist between optometry and other health profession students. Such information would be valuable to educators and counselors who guide students, and to instructors who should adapt teaching methods to fit students' learning styles.

METHODOLOGY

This retrospective-descriptive study was designed to assess the personality traits of health profession students. The null hypothesis tested was, "there is no difference in personality traits between osteopathic medicine, pharmacy, physical therapy, physician assistant, dental medicine, optometry and occupational therapy students."

The instrument used to survey the students was the Myers-Briggs Type Indicator (MBTI). The MBTI is a forced-choice, self-report personality inventory developed to measure variables in Carl Jung's theory of psychological type. The MBTI consists of 126 questions representing four underlying bipolar constructs: (1) Extraversion-Introversion (E/I), Sensation-Intuition (S/N), Thinking-Feeling (T/F), and Judgment-Perception (J/P). The four constructs are combined into a 'profile' of which 16 possibilities exist. For example, a person can have a profile type of ESTJ. Research has established evidence of the MBTI's validity and reliability.¹³

The bipolar constructs are defined as follows: Extroverts (E) tend to focus on the outer world of people and things while introverts (I) focus on the inner world of ideas and impressions. Sensors (S) focus on the present and on concrete information gained from senses while intuitives (N) focus on the future with an emphasis on patterns and possibilities. Thinkers (T) base their decisions on logic and objective analysis while feelers (F) base decisions primarily on values and subjective evaluations of person-centered concerns. Judgers (J) prefer a planned and organized approach to life while perceivers (P) enjoy a flexible and spontaneous approach to life.

As part of a southern health science school's core curriculum, the MBTI is administered to dental medicine, optometry, physician assistant, physical therapy and occupation therapy students during the first semester of the first professional year, and to osteopathic medicine and pharmacy students during the first semester of the second professional year. The purpose of administering the MBTI is to give students insight into their specific learning and personality styles. Students are given class time to complete the MBTI. The University's Institutional Review Board approved this study.

Explanations of the MBTI as well as an opportunity to ask questions are presented to students before the MBTI is administered. Participation is voluntary and the results are confidential. After students have completed the MBTI, results are scored and returned to students with explanations; again, class time is used to present the results. For this study, 12 years of data from osteopathic medicine students (1989-2000), 9 years of data from pharmacy students (1990-2000), 4 years of data from physician assistant students (1997-2000), 3 years of data from physical therapy and occupational therapy students (1998-2000), and 2 years of data for dental medicine and optometry students (1999-2000) were used in the analysis.

RESULTS

MBTI's completed by 1,838 osteopathic medicine, 912 pharmacy, 377 physical therapy, 452 physician assistant, 207 optometry students, 139 dental, and 70 occupational therapy students were used in the analysis. To answer the hypothesis: "there is no difference in personality traits between osteopathic medicine, pharmacy, physical therapy, physician assistant, dental medicine,

optometry and occupational therapy students" chi-square analyses were conducted. The analyses were calculated on the four bipolar constructs as well as the 16 profile types. Results are presented in Tables I and II respectively. The relatively small number of occupational therapy students resulted in frequencies less than five for some of the profile types. This made statistical inference in some cases difficult.

Table I. Chi-Square Analysis for groups: MBTI personality preferences

Profile	Extrovert vs. Introvert						
	Medicine	Pharmacy	P.A.	P.T.	Optometry	Dental	O.T.
	N=1838	N=912	N=452	N=377	N=207	N=139	N=70
Extrovert	1073	466	277 ^a	238 ^a	106	83	44
Introvert	765	446	175	139	101	56	26
^a Significant at p<.01							
Profile	Medicine	Pharmacy	P.A.	P.T.	Optometry	Dental	O.T.
	N=1838	N=912	N=452	N=317	N=207	N=139	N=70
Sensing	1020	607 ^a	323	245	138	108 ^a	42
Intuition	818 ^a	305	129	132	69	31	28
^a Significant at p<.01							
Profile	Medicine	Pharmacy	P.A.	P.T.	Optometry	Dental	O.T.
	N=1838	N=912	N=452	N=317	N=207	N=139	N=70
Thinking	985	492	223	161 ^a	91	92 ^a	34
Feeling	853	420	229	216 ^a	116	47	36
^a Significant at p<.01							
Profile	Medicine	Pharmacy	P.A.	P.T.	Optometry	Dental	O.T.
	N=1838	N=912	N=452	N=317	N=207	N=139	N=70
Judging	1086	577	284	236	132	95	34
Perceiving	752	335	168	141	75	44	36 ^a
^b Significant at p<.05							
P.A. = Physician Assistant							
P.T. = Physical Therapy							
O.T. = Occupational Therapy							

Table II. Chi-Square Analyses for groups: Myers-Briggs Type Indicator Profiles

Profile	Medicine N=1838	Pharmacy. N=912	P.A. N=452	P.T. N=377	Optometry N=207	Dental N=139	O.T. N=70
ISTJ	201	141 ^b	59	40	17	19	5
ISFJ	129 ^c	100 ^c	40	30	30 ^b	9	6
INFJ	77	27	4 ^b	8	11	5	0
INTJ	68	32	9	10	7	3	3
ISTP	63	46	20	6 ^c	10	8	2
ISFP	49	32	16	21	12	7	2
INFP	95 ^c	30	12	12	6	3	4
INTP	74	34	15	12	8	2	4
ESTP	105	51	26	17	11	9	5
ESFP	81	48	26	25	9	0 ^b	7
ENFP	145	58	44	31	14	6	8
ENTP	126 ^b	40	9 ^a	17	5	9	4
ESTJ	233	101	72	41	24	40 ^a	6
ESFJ	161 ^b	93	64	65 ^a	25	16	9
ENFJ	111	37	23	24	9	1	0
ENTJ	120 ^c	42	13	18	9	2	5

^a Significant at $p < .01$

^b Significant at $p < .05$

^c Significant at $p < .10$

P.A. = Physician Assistant

P.T. = Physical Therapy

O.T. = Occupational Therapy

A significant difference was found on the E/I dimension with physician assistant and physical therapy students ($p < .01$) more likely to be extroverts. A significant difference ($p < .01$) was found on the S/N dimension. Pharmacy and dental students ($p < .01$) preferred the S dimension while osteopathic medicine students ($p < .01$) prefer to use intuition to a greater degree. A statistical significant difference was discovered on the T/F dimension. A greater proportion of physical therapy students ($p < .01$) report a preference for the feeling dimensions while dental students ($p < .01$) reported using the thinking dimensions more. A significant difference ($p < .10$) was discovered on the J/P dimensions with osteopathic medicine students showing a strong J preference.

The chi-square analysis calculated on the 16 profile types (chi-square=135.77, df=60, $p < .005$) indicated the distribution of profile types was not homogenous across disciplines. To identify specific differences the chi-square analysis was decomposed to inspect for cell-specific contributions. The decomposed chi-square analysis indicated the following: (1) osteopathic medical students are more likely to be INFP ($p < .10$), ENTJ ($p < .10$), ENTP ($p < .05$), and less likely to be ISFJ ($p < .10$), ESFJ ($p < .05$).; (2) pharmacy students are more likely to be ISTJ ($p < .05$) and ISFJ ($p < .10$); (3) physical therapy students are more likely to be ESFJ ($p < .01$) and less likely to be ISTP ($p < .10$); (4) physician assistant students are less likely to be ENTP ($p < .01$) and INFJ ($p < .05$), (5) Optometry students are more likely to be ISFJ ($p < .05$); and (6) dental students are more likely to be ESTJ ($p < .01$) and less likely to be ESFP ($p < .05$).

DISCUSSION

It is important to say clearly that there is no value judgment about any of the functions. For example, it is neither better nor worse to be a thinking or feeling type. In certain situations or contexts, however, each function possesses various advantages and

disadvantages. The key is in recognizing this fact. Students or practicing health professionals who are misplaced may find themselves suffering dissonance and/or high anxiety.

Comparing the extrovert/introvert dimension reveals that a larger percentage of dental (60%), physical therapy (63%), physician assistant (61%) and occupational therapy (63%) students prefer the extrovert dimension. According to McCaulley about 75% of the population in the United States are extroverts; so it is not surprising to find the majority of students enrolled in the health science programs to be extroverts.¹⁴ These findings are also consistent with Jones, Frank, Sandow, & Watson (1997) who discovered that most dental students are extroverts.¹⁵ Research examining the relationship between academic achievement and the introvert/extrovert dimension are mixed. Lowenthal & Meth found that introverts do not perform any better in school than extroverts.¹⁶ Rezler et al., however, reported that high achievers prefer the introvert dimension.¹⁷ Borg & Shapiro discovered that introverts possess a greater probability of achieving a higher grade than extroverts.¹⁸ Research focusing specifically on dental education also provides mixed conclusions.

Jones et al. discovered that introverts performed better on the National Dental Board examination but experienced progressively lower course grades over four years¹⁵. Westerman et al., found no correlation with the E/I dimensions and academic performance¹⁹. Myers and McCaulley demonstrated a consistent pattern of aptitude for introverts. They measured strong correlations between introversion and IQ (a traditional measure of intelligence).²⁰ However, they note that extroverts are not less intelligent, but rather, that introverts perform better on tests that measure work important to academia.²⁰ Most intelligence or aptitude tests do not measure practical or applied intelligences.

A significant difference was discovered on the sensing/intuition dimension. Pharmacy, medical and dental students were more inclined to use the sensing function than would be expected. In terms of school performance, pharmacy students who prefer the intuitive function have a tendency to score higher on timed multiple choice tests--SAT, PCAT, and the NABPLEX.¹⁶ On the other hand, medical students who prefer the sensing function have an easier time passing the NBME exams and in-service training exams. Research with dental students indicates that sensors were found to earn a higher class rank than intuitives.¹⁵

Nationally, Myers and McCaulley discovered that intuitives consistently scored higher than sensors on all aptitude tests. These disparate results may be a result of a need by sensors to grasp the concrete world.²⁰ Sensors tend to perform better on objective measures while intuitives display a greater proclivity for theoretical constructs. For example, research indicates that sensors perform better in lecture-discussion formats.²¹ Furthermore, Myers' notes that intuitives define intelligence as "quickness of understanding" while sensors define intelligence as "soundness of understanding."

Examining the five health science disciplines reveals two significant differences across the thinking/feeling dimension. More dental students are 'thinkers' and more physical therapy students are 'feelers' than would be expected. Past research demonstrates that in education, thinking preferences tend to perform better in math and science courses.²² For instance, O'Donnell discovered that in medicine feelers were less likely to pass the NBME exams and dropout at a greater rate.²³ Myers, McCaulley, Quenk, & Hammer also found in their research that thinkers outscore feelers on mean grades.²⁴ However, additional research argues that students who are in the minority (Type minority) tend to drop out.^{25,26,27} This would imply that dental students who are feelers may be at a higher risk of dropping out of the program.

All disciplines preferred the judging dimension with the sole exception of occupational therapy students. Research indicates that judgers perform better in science-based courses and exams.²⁵ Myers, McCaulley, Quenk, & Hammer demonstrated in their research that judging types possess both higher mean grades and higher mean IQ than perceivers; however, they also presented evidence that perceivers perform better on standardized tests.²⁴ They hypothesize that the open-minded curiosity of perceivers leads to the theoretical prediction of their advantage in aptitude.²⁴

CONCLUSION

This study was undertaken to see if there was a difference in personality traits between dental medicine, optometry, pharmacy, osteopathic medicine, physical therapy, physician assistant and occupational therapy students. Results indicate significant differences across all dimensions. Data also indicate a logical trend in profiles. Specifically, the study revealed the following: (1) the dominant profile for osteopathic medicine, physician assistant, and dental students was ESTJ--meaning they are practical, realistic, with a natural head for business or mechanics; (2) the dominant profile for physical and occupational therapy students was ESFJ--meaning they are warm-hearted, talkative, whose main interest is in things that affect people's lives; (3) the dominant profile for pharmacy students was ISTJ--meaning they are serious, thorough, logical and realistic; (4) the dominant profile for

optometry students was ISFJ –meaning they rely on facts to make judgments, tend to be organized and offer strong warmth and sympathy.

Optometric educators to help guide prospective students or counsel students who are having a difficult time completing the curriculum can use this information. In addition, this information can help enlighten all health profession students about the differences in personality and how these differences may manifest themselves in the workplace. While our data identifies dominant learning styles in respective programs, it also appears that there is a mixture of learning styles in every class. The challenge for teachers is to find effective ways to share technical information so that all students regardless of style can understand and apply that information.

Unfortunately, teacher skills that can create a sense of excitement out of complex scientific subject matter are really foreign to many health professional instructors. Such skills are not part of their own learning experiences. The notion that the teaching art is simply the transference of knowledge dictated by the discipline is erroneous. Much of what is taught is not needed for the students' future real world use. So the initial steps are to re-examine content, identify what needs to be included in each program, determine what not to teach, and simplify complex concepts. Simplification is especially important for strong Sensing learners so they can focus on essential information. Given the exponential expansion of scientific knowledge it is simply not possible for one human being to be familiar with all there is to know in a particular field.

We need to create a learning environment where many styles of learning can be employed. Teaching methodologies other than the standard sixty-minute lecture with slide show presentation need to be considered. Putting students into a teaching mode enhances their own learning. This can be accomplished by having students act as tutors for other students; having students teach certain areas to the class; having bag lunch open inquiry/discovery groups; and creating small research groups charged with the responsibility of reading, interpreting and presenting results of research that will grab other students' interest. Well presented current research findings can inspire the learners to get out of their mental boxes and discover new pathways. Other possibilities for different modalities include: dividing large classes at times into workable small groups with facilitators; grouping students using similar learning styles; computer assisted programs that are tailored to specific learning styles; problem based case studies with practical applications (especially helpful for strong Sensors); and simulated program instruction.

Ultimately, restricting teaching presentations to one modality, no matter how good it might be, will not be successful for all students with their many different learning styles. Many get bored, lose focus, and become passive learners. Frequent changes of modality can help to avoid this outcome. The faculty are the only ones that can effect a significant change in the learning environment. Change can be risky and threatening to us all, but the positive possible outcomes make it worthwhile. What better outcome could there be than improvement of student learning?

Nevertheless, results also bring with them some difficult questions. The MBTI is based on the hypothesis that personality type is inborn. With research demonstrating a relationship between certain personality types, aptitude, performance, IQ and attrition, the natural question is "are people pre-destined to fail certain programs?" Myers, McCaulley, Quenk, & Hammer argue that even if the MBTI measures innate ability, biology is not destiny.²⁴ All types can and do perform in varying ways, depending upon the situation, the opportunity and motivation to do so.²⁴

This study was conducted in a large, urban, southern setting. Differences may exist in other locales. Nevertheless, the findings are notable and supported by past research. Future research in health-profession education and practice should concentrate on the effect personality has on each profession. Such questions as which MBTI profile defines the most satisfied practicing optometrists, and does the admission process filter-out excellent candidates or are they self-selecting, need to be answered. Insightful and reasoned analysis will help make the profession stronger.

REFERENCES

1. Dansereau, D, "The development of a learning strategies curriculum," in Learning Strategies, (edit. Schmeck, R.) Plenum Press, New York (1988) p1.
2. Keefe, J.W., Monk, J.S., Learning Style Profile Examiner's Manual, 2nd ed., National Association of Secondary School Principals, Reston, VA (1990), p1.
3. Wratcher, M.A., "Helping freshmen to maximize their learning potential," Journal of College Student Development, 32, 380-381 (1991).

4. Nelson, B., Dunn, R., Griggs, S.A., Primavera, L., Fitzpatrick, M., Baciliou, Z., et al., "Effects of learning style intervention on college students' retention and achievement," *Journal of College Student Development*, 34, 364-369 (1993).
5. Stewart, K.L., Felicetti, L.A., "Learning styles of marketing majors," *Educational Research Quarterly*, 15(2), 15-23, (1992).
6. Mathews, D.B., "Learning styles of education majors: Are they similar to those of other students?" *SRATE Journal*, 1(1), 28-32, (1992).
7. Coombs, R.H., Fawzy, F.I., Daniels, M.L., "Surgeons' personalities: The influence of medical school," *Medical Education*, 27, 337-343, (1993).
8. Bradham, C.U., Dalme, F.C., Thompson, P.J., "Personality traits valued by practicing nurses and measured in nursing students," *Journal of Nursing Education*, 29(5), 225-232, (1990).
9. Garvey, M., Bootman, J.L., McGhan, W.F., Meredith, K., "An assessment of learning styles among pharmacy students," *American Journal of Pharmaceutical Education*, 48, 134-140, (1984).
10. Rovezzi-Carroll, S., Leavitt, R., "Personality characteristics and expressed career choice of graduating physical therapy students," *Physical Therapy*, 64(10), 1549-1552, (1984).
11. Schwartz, R.H., Shenoy, S., "Personality factors related to career satisfaction among general practitioners," *Journal of Dental Education*, 58(3), 225-227, (1994).
12. Silberman, S.L., Freeman, I., Lester, G.R., "A longitudinal study of dental students' personality type preferences," *Journal of Dental Education*, 56(6), 384-388, (1992).
13. Harvey, R.J. Murray, W.D., Stamoulis, D.T., "Unresolved issues in the dimensionality of the Myers-Briggs Type Indicator," *Educational and Psychological Measurement*, 55(4), 535-544, (1995).
14. McCaulley, M.H., Macdaid, G.P., Kainz, R.I., "Estimated frequencies of the MBTI types," *Journal of Psychological Type*, 9, 3-9, (1985).
15. Jones, A.C., Courts, F.J., Sandow, P.L., & Watson, R.E. "Myers-Briggs Type Indicator and dental school performance," *Journal of Dental Education*, 61,928-933, (1997).
16. Lowenthal, W., Meth, H., "Myers-Briggs Type Inventory personality preferences and academic performance," *American Journal of Pharmaceutical Education*, 53, 226-228, (1989).
17. Rezler, A.G., Mrtek, R.G., Guttman, C.M., "Personality correlates of persistent high and low achievers," *American Journal of Pharmaceutical Education*, 39, 236-238, (1975).
18. Borg, M.O., Shapiro, S.L. "Personality type and student performance in principles of economics," *Journal of Economic Education*, 3-25, (Winter-1996).
19. Westerma, G.H., Grandy, T.G., Erskine, C.G., & Turner, C.H. "Personality variables as predictors of performance for first-year dental students," *Journal of Dental Education*, 53, 233-237, 1989.
20. Myers I.B., & McCaulley, M.H. *Manual: A guide to the development and use of the Myers-Briggs Type Indicator*:Palo Alto, CA:Consulting Psychologists Press, (1985).
21. Lacorte, MA & Risucci, D.A. "Personality, clinical performance and knowledge in pediatric residents," *Medical Education*, 27(2), 165-169, (1993).
22. Tharp, G.D., "Relationships between personality type and achievement in an undergraduate physiology course," *American Journal of Physiology*, 6, (June, 1992).
23. O'Donnell, M.J., "NBME Part I examination: Possible explanations for performance based on personality type," *Journal of Medical Education*, 57, 868-870, (1982).
24. Myers, I.B., McCaulley, M.H., Quenk, N.L., & Hammer, A.L. *Manual: A guide to the development and use of the Myers-Briggs Type Indicator*:Palo Alto, CA:Consulting Psychologists Press, (1998).
25. McCaulley, M.H., "Research on college science teaching," *Journal of Psychological Type*, 2, 114-120, (1977).
26. Roush, P.L. "MBTI type and voluntary attrition at the United States Naval Academy." *Journal of Psychological Type*, 18, 72-79, 1989.
27. McCaulley, M.H. "The MBTI and individual pathways in engineering design." *Engineering Education*, 80, 537-542, 1990.
28. Kalsbeek, D. "Campus retention: The MBTI in institutional self-studies." In J.A. Provost & S. Anchors (Eds.), *Applications of the Myers-Briggs Type Indicator in higher education*. Palo Alto, CA: Davies-Black, 1987.