

# Use of the Gordon Personal Profile-Inventory of Pharmacists and Pharmacy Students<sup>1</sup>

George H. Cocolas, Betsy Sleath and E. Christine Hanson-Divers

*School of Pharmacy, University of North Carolina, Chapel Hill, NC 27599-7360*

Practicing pharmacists were surveyed for eight personality traits; ascendancy, responsibility, emotional stability, sociability, cautiousness, original thinking, personal relations and vigor using the Gordon Personal Profile-Inventory (GPP-I), an instrument requiring subjects to self-score themselves by selecting statements in a forced-choice tetrad format. Students in a school of pharmacy in the same state were also surveyed. Pharmacists self-scored themselves higher than did students in all the traits except sociability. Based on multivariate analysis, pharmacists who were active in their profession through service as preceptors in the School's experiential program, having applied to the external PharmD program of the School, or having been elected officers in pharmacy organizations scored themselves significantly higher in the trait of original thinking as measured by the GPP-I and had advanced degrees. The data suggest that the GPP-I could be used as a tool to support the subjective measurements from interviews, written essays and letters of recommendation on applicant characteristics used in the pharmacy admissions process.

## INTRODUCTION

The major focus in the selection of applicants to pharmacy school has traditionally been academic achievement. The literature is replete with attempts to correlate information on standardized tests, *e.g.*, SAT, PCAT, in whole or in part on success in the pharmacy curriculum by the applicant (1-9). Although not conclusive, the data suggest that good grades in coursework prior to entry into the study of pharmacy and/or above average scores on standardized tests (SAT, PCAT) improve the probability of academic success in the pharmacy curriculum. Academic success, however, does not predict success beyond the classroom.

For many years the number of qualified applications for the pharmacy degree has exceeded the number of spaces in the pharmacy class. The 1994-95 Application Pool Survey reported 4.1 applications for every one entering student enrolled in a school of pharmacy (10). Competition for admission has increased the quality of acceptable candidates so much that admissions committees have far more qualified applicants than spaces available for the entering pharmacy class. In today's climate of health care change the traditional use of academic records to select the best student to study pharmacy may need to be supplemented by information about other attributes of the applicant.

Admission requirements listed by most of the schools and colleges of pharmacy in the 1996-97 edition of Pharmacy School Admission Requirements (11) make little or no mention of criteria that include nonacademic characteristics as part of the selection process. Many requirements identify interviews as part of the selection process but criteria used to screen applicants appear to be subjective. Admission decisions on the interview may require an interviewer's evaluation of applicant characteristics such as communication skills, motivation, maturity and other factors considered important for future pharmacy professionals all subject to an interpretation by the interviewer. Myers-Briggs tests have been used to predict academic success but not professional success(12). Sauter and Bulgin(13) raised the ques-

tion about qualities that are needed in students to become professional leaders but they do not provide definitive answers as to how to determine these qualities.

The objective of this study is to develop quantitative measures of perceived desirable characteristics for selection of applicants into entry-level programs that prepare graduates to practice pharmacy. The basis for the development of quantitative measures is the administration of an instrument, the Gordon Personal Profile-Inventory, to practicing pharmacists from which percentile norm tables could be prepared.

## THE GORDON PERSONAL PROFILE -INVENTORY

The Gordon Personal Profile-Inventory (GPP-I) provides reliable measures of eight well-established personality traits. It is a combination of two instruments, the Gordon Personal Profile (GPP) and the Gordon Personal Inventory (GPI). The Profile (GPP) measures four aspects of personality: (i) ascendancy; (ii) responsibility; (iii) emotional stability; and (iv) sociability. The Inventory (GPI) measures four additional traits: (i) cautiousness; (ii) original thinking; (iii) personal relations; and (iv) vigor. The design of the test requires individuals to self-score themselves on items presented in a forced-choice tetrad format. The respondent reviews four items and endorses one as being most like themselves and one as being least like themselves. The format reduces distortion by individuals who are motivated to make a good impression. Correlations with other personality measures support the construct validity of the eight scales which bear on the relevance of the scales to forecast success in a variety of occupational endeavors (14). Earlier studies have developed norms for high school students, college students, adults, managers at a public utility, sales representatives, and executives in a large manufacturing company(14). Percentile norms on the eight GPP-I traits

<sup>1</sup>Supported by a grant from the North Carolina Special Opportunities Fund and the Pharmacy Foundation of North Carolina.

have not been reported for pharmacists or pharmacy students. The eight personality traits are described below.

### **Gordon Personal Profile (GPP)**

**Ascendancy (A).** High scores characterize individuals who take an active role in group discussions, tend to make independent decisions and have a self-assurance relationship with others. Individuals who score low in this scale play a passive role in a group, let others take the lead and tend to be overly dependent on others for advice.

**Responsibility (R).** Individuals who are persevering and determined score high on this section of the test. Those who are unable to stick to tasks that do not interest them score low.

**Emotional Stability (E).** Individuals who are emotionally stable and free from worries, anxiety and nervous tension have high scores on this scale. Low scores are associated with excessive anxiety, hypersensitivity, nervousness and low frustration tolerance. Low scores reflect poor emotional adjustment of that individual.

**Sociability (S).** One who scores high in this scale likes to be with and work with people. This individual is gregarious and sociable. Low scorers tend to restrict social contacts.

### **Gordon Personal Inventory (GPI)**

**Cautiousness (C).** High scorers are individuals who consider matters very carefully before making decisions. They do not take chances or run risks. Those who are impulsive, act on the spur of the moment, make hurried or snap decisions, enjoy taking chances, and normally seek excitement, normally score low.

**Original Thinking (O).** Individuals who like to work on difficult problems, are intellectually curious, enjoy thought-provoking questions and discussions, and like to think about new ideas score high in this scale. Low scorers are just the opposite.

**Personal Relations (P).** High scorers typically have faith and trust in people. They are tolerant, patient and understanding. Those who score low reflect a lack of trust or confidence in people and tend to be critical of others.

**Vigor (V).** The individuals who score high are characterized as being energetic, rapid workers and able to accomplish more than the average individual. Low scorers are associated with low vitality, a preference for setting a slow pace and have a tendency to tire easily.

## **METHODS**

This study reports the development of percentile norms of well-established traits of a population of licensed pharmacists (Appendix A) in one state as measured by the Gordon Personal Profile-Inventory. Included in this group of pharmacists surveyed are practicing pharmacists who can be identified as leaders in pharmacy. These are individuals who have demonstrated leadership by: (i) being practitioner-instructors serving in the School's experiential program *i.e.*, preceptors; (ii) having applied to the School's first external pharmacy class; and (iii) being elected officers, past or present, in student government, local, state or national pharmacy organizations. A separate percentile norm table was prepared for this group of pharmacists (Appendix B). Percentile norm tables (Appendix C) have also been established for the student body of one school of pharmacy (University of North Carolina) to provide data for a comparison between pharmacy students and practicing pharmacists.

## **Sampling**

**Survey Sample.** A total of 590 pharmacists were mailed surveys. A copy of the Gordon Personal Profile-Inventory was sent to: (i) a random sample of 195 practitioner-instructors who serve as preceptors in the School of Pharmacy's experiential program; (ii) 50 pharmacists who applied to the School's first external PharmD class; and (iii) 48 pharmacists who were past or currently-serving officers in a school, local, state or national pharmacy organization. A list of the approximately 6,300 registered pharmacists living in the state was obtained from the Board of Pharmacy. A random sample of 297 pharmacists was selected from this list who belonged to none of the pharmacy leader categories described above. These pharmacists also had not applied to the external PharmD program nor were they members of the state pharmaceutical association or the state health system pharmacists association. A cover letter described the purpose of the survey as trying to characterize the pharmacists of the state to assist the School in its admission process. A post card reminder was sent ten days after the initial mailing to remind the pharmacists to return the completed GPP-I.

The student body population enrolled in the BS or PharmD curriculum (517 students) in the School of Pharmacy was administered the GPP-I. Permission was obtained from the University's Human Rights Office to allow release of this information for research purposes.

**Sample Demographics.** Pharmacist respondents were asked to provide information on: workplace, academic degree(s), gender, year of birth, year of pharmacy degree and membership in their local pharmacy organization. Respondents were not asked to identify themselves but were offered the opportunity to do so if they wished feedback from the survey on their own self-rated personality traits.

## **Measurement**

Gender was measured as a dichotomous variable (0=male, 1=female). Age and years since graduation from pharmacy school were measured as continuous variables in years. Pharmacist involvement in the profession was measured as a dichotomous variable (0=not a pharmacy leader, preceptor, or accepted into the external PharmD program; 1=a pharmacy leader, preceptor, and/or accepted into the PharmD program). Pharmacist workplace was measured as a dichotomous variable (0=community or hospital setting; 1=nontraditional setting). Academic degree was measured as a dichotomous variable (0=Bachelor's in Pharmacy; 1=any type of advanced degree beyond a Bachelor's in Pharmacy). Membership in professional pharmacy organizations was measured as a dichotomous variable (0=not a member of any organization; 1=belongs to one or more organizations).

## **Analysis**

Basic descriptive statistics (means, standard deviations, percent distributions) were calculated for pharmacist and pharmacy student characteristics. Next examined were the bivariate relationships between dichotomous pharmacist demographic characteristics (gender, degree, involvement, workplace, and organizational involvement) and pharmacist mean scores on the different GPP-I scales using two-tailed *t*-tests for comparing group means. Pearson correlation coefficients, means, and standard deviations were cal

**Table I. Demographics of pharmacists' survey sample**

Pharmacist characteristics	Respondents	
	Surveyed	(Percent) <sup>a</sup>
Active Pharmacists		
Practitioner-Instructors	195	129 (66.2)
Officer in Rx Organization	48	38 (82.8)
External PharmD Students	50	35 (75.1)
Subtotal	293	202 (68.9)
Pharmacists-Not Active <sup>b</sup>	297	138 (46.5)
Total	590	340 (57.6)
Gender		
Male	315	163(51.7)
Female	275	177 (57.6)
Age		
Male		27-71 years (range) mean 43.1 years
Female		25-59 years (range) mean 35.8 years
Overall mean age		39.6 years
Workplace		
Community		150(44)
Hospital		112 (33)
Nontraditional		78 (23)
Total		340
Degree		
BS		279 (82)
PharmD		34 (10)
MS, MBA, other		27(8)
Total		340

<sup>a</sup>Percent of those surveyed.

<sup>b</sup>The not active pharmacist sample included those who were not practitioner instructors, past or present officers of pharmacy organizations. Neither had they applied to the External PharmD program, nor were they members of either their local or state pharmacy association or the state health-system pharmacists association.

culated for continuous pharmacist demographic variables (age, years since graduated from pharmacy school) and pharmacist scores on the different GPP-I scales. Pharmacist and pharmacy student mean scores on the different GPP-I scales were calculated using two-tailed *t*-tests for comparing group means. Bivariate analyses between pharmacist demographic characteristics and active involvement in the profession were conducted. Chi-square statistics for dichotomous variables and two tail *t*-tests for continuous variables were calculated for pharmacist active involvement in the profession and other variables used in the analysis.

Finally, logistic regression techniques were used to predict pharmacist active involvement in the profession(15,16). Pharmacist active involvement in the profession was regressed on: (i) pharmacist demographic characteristics (gender, age, organizational involvement, work setting, type of degree); and (ii) pharmacist scores on the GPP-I scales (Ascendancy, Responsibility, Emotional Stability, Sociability, Cautiousness, Original Thinking, Personal Relations and Vigor). Ninety-five percent confidence intervals for the odd ratios were calculated using the exact method (17). Also, percentile norms tables for all pharmacists, pharmacy leaders, and pharmacy students were calculated using the cumulative percentile distributions for the scores of respective groups on the different GPP-I scales (see Appendixes A, B and C).

## RESULTS

### Pharmacist and Student Demographic Characteristics

Table I summarizes the demographic characteristics of the pharmacists surveyed. Pharmacist age ranged from 25 to 71 years (mean=39.6). The change in pharmacy student populations over time, becoming predominantly female, resulted in a significant difference in the age of the two genders of pharmacists surveyed. Male pharmacist age ranged from 27–71 (mean=43.1) while female age ranged from 25–59 (mean=35.8). The female pharmacists in the survey are younger and have been out of school significantly fewer years than their male counterparts. Pharmacists had been out of pharmacy school from 1 to 51 years (mean=15.4). Fifty-two percent of the responding pharmacists were female. Two hundred seventy-five (46.6 percent) of the 590 pharmacists surveyed were female.

A total of 340 useable surveys (57.6 percent) were returned. Of those returned, 129 were from preceptors (66 percent), 35 from pharmacists who applied to the external PharmD program (70 percent), 38 from those identified as having been elected to offices in pharmacy-related organizations (79 percent) and 138 from a random sample of pharmacists who did not belong to any of the above-mentioned groups (46 percent). Of the pharmacists who responded to the survey, 279 (82 percent) had a Bachelor's of Science degree in Pharmacy. Thirty-four (10 percent) had PharmD degrees, 27 (eight percent) had Master of Science, MBA, or other advanced degrees. Seventy-eight (23 percent) of the pharmacists worked in nontraditional settings, 150 (44 percent) in community pharmacies and 112 (33 percent) in hospital pharmacies. Seventy-one percent of pharmacists belonged to one or more local pharmacy organization. Thirty-eight percent of the respondents were preceptors, 17 percent had been or are officers in pharmacy organizations, six percent had applied to the external PharmD program, and 39 percent were not preceptors nor leaders, and had not applied to the external PharmD program (Table I)

Pharmacy student age ranged from 20 to 54 years (mean=24.0). Twenty-five percent of the student sample was male.

Table II summarizes the mean raw scores on the eight traits measured by the GPP-I for the 340 returned surveys. The data show that pharmacists who can be identified as active because they have either applied to an external PharmD program, are preceptors for the School of Pharmacy, or have been elected to an office in pharmacy-related organizations self-score themselves significantly higher on ascendancy, ( $P<0.001$ ), sociability, ( $P<0.001$ ), and original thinking ( $P<0.001$ ) traits as measured by the GPP-I than do those who are not in any of the above-indicated categories. Individuals who belong to pharmacy organizations also self-score themselves significantly higher in ascendancy, sociability and original thinking than those who do not. Pharmacists who reported having a formal education beyond the bachelor's degree (PharmD, MS, or other) have significantly higher mean scores in ascendancy ( $P<0.01$ ) and original thinking ( $P<0.05$ ). Respondents who work in community or hospital pharmacies do not have significantly different mean values when compared to those who are in nontraditional types of pharmacy careers (e.g., long-term care, industry, ambulatory care clinics, HMO's). Female pharmacists were significantly different than their male pharmacist counterparts in GPP-I traits responsibility, emotional sta-

**Table II. Pharmacist mean GPP-I scores by different pharmacist characteristics (N=340)<sup>a</sup>**

Variable	GPP-I Scale <sup>b</sup>							
	A	R	E	S	C	O	P	V
Gender								
Males	23.45	29.58	27.44	20.25	28.10	27.79	27.09	27.88
Females	22.87	30.83**	25.86**	21.27*	28.69	26.24**	25.57*	29.07*
Degree								
BS	22.79	30.36	26.84	20.60	28.45	26.72	26.33	28.31
More than BS	24.90**	29.35	25.94	21.40	28.09	28.52*	26.45	29.11
Involvement								
Active	24.26	29.75	26.33	21.42	28.04	28.17	26.72	28.69
Not Active	21.43***	30.85**	27.18	19.63***	28.90	25.34***	25.78	28.12
Work Place								
Comm or Hospital	22.96	30.24	26.77	20.42	28.44	26.96	26.27	28.33
Other	23.92	29.91	26.34	21.83*	28.13	27.31	26.60	28.92
Belong to 1 or more organizations								
No	21.63	30.54	27.13	19.69	28.41	25.66	25.84	28.47
Yes	23.86***	30.00	26.52	21.25**	28.37	27.61**	26.59	28.43

<sup>a</sup>Significance level of two-tail t-test: \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

<sup>b</sup>A=Ascendancy; R=Responsibility; E=Emotional Stability; S=Sociability; C=Cautiousness; O=Original Thinking; P=Personal Relations; V=Vigor.

**Table III. Pharmacist characteristics and active involvement in the profession**

	Percent	
	Active (N)	Not active (N)
Pharmacist		
Male	69 (125)	31 (56)
Female	52 (88)	48 (80)**
Pharmacist age		
25-32	37 (30)	63 (51)
33-37	42 (40)	58 (45)
38-45	64 (63)	36 (36)
46-71	95 (76)	5 (4)***
Belongs to 1 or more organizations		
Yes	77 (189)	23 (55)
No	21 (21)	79 (79)***
Work setting		
Community or hospital	56 (150)	44 (119)
Nontraditional	80 (63)	20 (16)***
Degree		
Bachelor's	54 (154)	46 (133)
Advanced degree	95 (59)	5 (3)***

\* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

bility, sociability, original thinking personal relations and vigor.

Females scored themselves significantly higher than males on responsibility ( $P < 0.01$ ), sociability ( $P < 0.05$ ), and vigor ( $P < 0.05$ ) whereas males self-scored themselves significantly higher than females on emotional stability ( $P < 0.01$ ) and original thinking ( $P < 0.01$ ). However, the female pharmacists in our sample were significantly younger than male pharmacists (Pearson  $r = -0.40$ ,  $P < 0.001$ ), which may explain why male pharmacists self-scored themselves significantly higher than female pharmacists on emotional stability and original thinking. The significant age difference between male and female pharmacists also most likely explains why we found that a significantly greater percentage of male pharmacists (69 percent) than female pharmacists (52 percent) were actively involved in the profession in the bivari-

ate analyses (Table III).

Older pharmacists, pharmacists working in nontraditional settings (e.g., industry, consultant pharmacists), pharmacists belonging to one or more professional organizations, and pharmacists with advanced degrees were more likely to be actively involved in the profession. Several of these pharmacist demographic characteristics are inter-related. Older pharmacists ( $P < 0.001$ ) and pharmacists working in nontraditional settings ( $P < 0.01$ ) were significantly more likely to belong to one or more professional organizations. Pharmacists working in nontraditional settings were also significantly more likely to have an advanced degree ( $P < 0.01$ ).

Table IV illustrates the final fitted regression results for predicting whether pharmacists were actively involved in the profession. As the multivariate analysis shows, pharmacist gender did not influence whether pharmacists were actively involved in the profession. However, consistent with our bivariate results, older pharmacists ( $P < 0.001$ ), pharmacists belonging to one or more professional organizations ( $P < 0.001$ ), pharmacists working in nontraditional settings ( $P < 0.001$ ), and pharmacists with advanced degrees ( $P < 0.001$ ) were more likely to be involved in the profession. Also, pharmacists self-scoring themselves high on the original thinking GPP-I scale were significantly more likely to be actively involved in the profession ( $P < 0.05$ ).

Table V compares the mean raw self-scored values on each of the eight traits measured by the GPP-I of the pharmacists and the students. The scores on all of the eight traits were significantly different ( $P < 0.001$ ) between the pharmacists and the students. Pharmacist self-scored themselves higher for ascendancy, responsibility, emotional stability, cautiousness, original thinking, personal relations and vigor. Students self-ratings in sociability ( $P < 0.001$ ) were significantly higher than those of pharmacists.

## DISCUSSION

### More Active Versus Less Active Pharmacists

Pharmacists who are more active in their profession are, generally, good representatives of pharmacy. They are of-

**Table IV. Final fitted regression results for predicting whether pharmacists are actively involved in their profession (N=340)**

Independent variables	Beta (se)	Odds ratio	95% Confidence interval
Pharmacist gender-female	-0.27 (0.37)	0.76	(0.36, 1.58)
Pharmacist age	0.16 (0.03)	1.20***	(1.10, 1.25)
Organizational Membership	2.19 (0.36)	8.97***	(4.39, 18.17)
Nontraditional work setting	1.14 (0.41)	3.11***	(1.40, 6.96)
Advanced degree	2.80 (0.67)	16.4***	(4.44, 60.9)
<b>GPP-I Traits</b>			
Ascendancy <sup>†</sup>	-0.01 (0.06)	1.0	(0.88, 1.12)
Responsibility	-0.02 (0.06)	1.0	(0.87, 1.11)
Emotional stability	-0.07 (0.05)	0.94	(0.84, 1.03)
Sociability	0.05 (0.05)	1.05	(0.95, 1.16)
Cautiousness	0.01 (0.04)	1.00	(0.93, 1.09)
Original thinking	0.08 (0.04)	1.09*	(1.00, 1.17)
Personal relations	0.02 (0.03)	1.02	(0.96, 1.08)
Vigor	0.05 (0.04)	1.05	(0.97, 1.14)

\* $P < 0.05$ ; \*\*\* $P < 0.001$ .

**Table V. Comparison of pharmacist and pharmacy student GPP-I scores<sup>a</sup>**

Variable	GPP-I Scale <sup>b</sup>							
	A	R	E	S	C	O	P	V
Pharmacists (n=340)	23.15	30.18	26.67	20.72	28.37	27.04	26.37	28.47
Students (N=517)	21.91***	28.20***	23.95***	22.36***	26.55***	25.18***	24.82***	25.82***

<sup>a</sup> Significance level of two-tail *t*-test: \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

<sup>b</sup> A=Ascendancy; R=Responsibility; E=Emotional Stability; S=Sociability; C=Cautiousness; O=Original Thinking; P=Personal Relations; V=Vigor.

ten successful in their business, visible, respected, and sometimes, envied by their professional colleagues. Using the traits measured in the GPP-I, we identified differences between the population of pharmacists surveyed that characterize the active pharmacist from the one who may be less active. For this study, those who were preceptors, students in the external PharmD program, and/or officers in pharmacy organizations were categorized as pharmacy leaders. One of the criteria for identifying a pharmacist as a “pharmacy leader” was their application to the newly initiated nontraditional external PharmD program of the School. While the present professional climate identifying the Doctor of Pharmacy degree as the entry-level degree for employment in institutional pharmacy settings may have been a driving force to apply to the external PharmD program, all pharmacists in the state received correspondence about the program but only these took the initiative to apply. The criteria for selection of pharmacy preceptors includes a contemporary standard of practice at the clerkship site, a preceptor training experience, and initiative by the preceptor. This group of individuals, together with those who are officers in pharmacy organizations we identified as “active,” self-scored themselves significantly higher on original thinking ( $P < 0.05$ ). According to Dyer(18), original thinking is significantly correlated with intellectual ability measures.

There is very little information in the literature of GPP-I traits of health professionals. Baldwin and Levine(19) found that optometrists who were identified as being successful self-scored themselves significantly higher on the ascendancy, sociability, original thinking, personal relations, and vigor GPP-I scales. Our findings are similar to those of Baldwin and Levine in that we found that pharmacists who scored higher on the original thinking scale of the GPP-I were more actively involved in the profession.

### Pharmacists versus Pharmacy Students

Data from the Gordon Personal Profile-Inventory show age to be a factor in how one responds to the questions in the Inventory. The Inventory is of the self report variety, asking individuals to make positive statements about themselves and endorse which of four statements presented to be “most” like oneself and which is “least” like oneself. Older individuals have had the opportunity to accumulate more life experiences. Their social development is at a different stage, including their aspirations.

Therefore, it is not surprising to find a significant difference in all of the GPP-I traits between the practicing pharmacists and the students in the school of pharmacy who were surveyed. Pharmacists self-scored themselves significantly higher than students on the traits of ascendancy ( $P < 0.001$ ), responsibility ( $P < 0.001$ ), emotional stability ( $P < 0.001$ ) cautiousness ( $P < 0.001$ ), personal relations ( $P < 0.001$ ), original thinking ( $P < 0.001$ ) and vigor ( $P < 0.001$ ). Only in the trait, sociability, ( $P < 0.001$ ) did students self-score themselves higher (Table V). Table VI describes the correlation coefficients for variables related to pharmacists’ GPP-I scores. The data show that the mean scores on traits of ascendancy, emotional stability, sociability, original thinking increase as pharmacists age or as time increases following receipt of their pharmacy degree. Our findings parallel those of Gordon(14) who presents the mean scores of high school students, college students, and adults on the different GPP-I scales. Gordon found that adults had higher mean scores than college students and high school students on the ascendancy, responsibility, emotional stability, cautiousness, personal relations, original thinking and vigor scales, but lower mean scores on the sociability scales. One would expect that age and life experience do have a maturing effect on an individual that is reflected in the response to the typing of

**Table VI. Correlation coefficients, means and standard deviations for variables related to pharmacists' GPP-I scores<sup>a</sup>**

Variable	GPP-I Scale <sup>b</sup>								
	A	R	E	S	C	O	P	V	
Age	0.22***	-0.15**	0.12	0.01	0.00	0.15**	0.19***	-0.09	
Years out of Rx School	0.20***	-0.13*	0.12*	0.03	0.03	0.12*	0.18**	-0.08	
Mean	23.15	30.18	26.67	20.72	28.38	27.04	26.37	28.47	
SD	4.46	3.57	4.31	4.65	4.71	5.19	5.81	4.89	

<sup>a</sup>Based on a two-tail *t*-test: *P* < 0.05; *P* < 0.01; *P* < 0.001.

<sup>b</sup>A=Ascendancy; R=Responsibility; E=Emotional Stability; S=Sociability; C=Cautiousness; O=Original Thinking; P=Personal Relations; V=Vigor.

these characteristics. While a more mature individual may be more socially conscious, this scale is primarily a measure of gregariousness (18) in which higher scorers have a strong investment in social interaction. It can also be reasoned that at a younger age one is more active socially, hence the significantly higher sociability score for students.

Few would argue that pharmacists will not practice in a different environment in the future. Retail settings where most graduates find employment may remain the same but practitioners will need to become more aggressive and innovative if they are to succeed as professionals in the contemporary health care marketplace. The pharmacist who will be most likely to cope with change is one who is willing to be challenged and to challenge the status quo. The need for pharmacists who have these traits can not be overemphasized. Pharmacy education continues to change to meet the demands for the contemporary practice of the profession and to keep pace with the changes that are affecting health care practice today. The students in pharmacy programs today need the human characteristics that will allow adaptation in directions impossible to predict for the future of pharmacy practice at this time. These individuals must not be passive, they must have the willingness to interact with a wide variety of people and have the capability to develop and be unafraid to examine new venues for the practice of pharmacy. The responsibility of admission committees is to select from the applicant pool individuals who have the highest probability of displaying these traits.

Admission committees often are confronted with many suggestions on the selection of applicants for a new pharmacy class. Faculty want the neophyte student to have strong academic credentials, have expressed an understanding of the profession, be highly motivated, and to exhibit good communication skills among other positive attributes. Alumni want graduates are dependable, trustworthy, knowledgeable and eager to learn and adapt. Little consideration is given by either of these two groups on the longitudinal development of the future graduate and the impact this individual will have on pharmacy. The conservative approach to the selection of applicants for admission has been the almost exclusive use of academic records and standardized tests. The data supplied in this paper can be considered as another measure of the potential of the applicant. The GPP-I provides a comprehensive description of self-rated personality functioning through the measurement of eight factorially distinct personality traits. These personality trait measurements meet or exceed standards for psychometric devices (20). These data could be used by admissions officers to supplement the subjective measurement of applicants such as the interview, the evaluation of written essays in the

application and other credentials such as letters of recommendation.

#### SUMMARY

The use of practicing pharmacist GPP-I norm scores on original thinking to estimate the probability of active involvement as a pharmacist in the changing health care environment is supported by our findings that pharmacists who self-scored themselves significantly higher than the students on this trait. It is further supported by data showing older pharmacists to have significantly higher scores on the original thinking trait than younger pharmacists. Therefore, admissions committees might consider using student GPP-I scores on the original thinking trait as an added criterion to the admission process. Admission committees who admit students who score high on original thinking, should expect these students to have an improved GPP-I trait of original thinking as they grow older.

There are several limitations to the study. First, the study was conducted in only one state and one school of pharmacy. Therefore, the findings are not generalizable to all pharmacists and pharmacy students. Future research should examine pharmacist and pharmacy student GPP-I scores on a broader geographic basis. Second, the current study was a cross-sectional design in that pharmacist GPP-I scores and involvement in the profession were related to current pharmacy student GPP-I scores. Future longitudinal studies need to be conducted that follow pharmacy students over time to examine how their GPP-I scores as students relate to their later involvement in the profession.

A third limitation of the study is that the non-active group of pharmacists had a much lower response rate (46 percent) than the response rate of the active pharmacists (69 percent). The lower response rate of non-active pharmacists could be a reflection on their lack of involvement in the profession. Therefore, the results of the current study need to be interpreted with care, because we do not know what the GPP-I scores on non-responders in either group would have been. Fourth, one could argue that there are pharmacy leaders in the community who are different than the ones we examined in the current study (*e.g.*, preceptors, pharmacists enrolled in external PharmD program, or elected officers in pharmacy organizations). Therefore, our results are not generalizable to all types of pharmacy leaders.

Despite the limitations of the study, this research provides important new information about the use of the Gordon Personal Profile-Inventory in pharmacy schools' admission processes to identify potential future leaders of the profession. The interest in the survey by the practicing pharmacists was good as shown by the 57.8 percent return of

the survey document. Moreover, 244 (71.8 percent) surveys were signed by the pharmacist to request information on their self-rated personality characteristics as measured by the GPP-I. Therefore, there appears to be a real interest shown on the part of pharmacists in the information provided by the Gordon Personal Profile-Inventory instrument.

Finally, in addition to having schools of pharmacy possibly select pharmacy students who self-scored themselves high on the trait of original thinking, the faculty and administration of our schools need to provide supportive and nurturing programs for students. Also, students need to be carefully mentored by pharmacy faculty and practitioners so that they can develop into the type of innovative practitioner that they want to become.

*Am. J. Pharm. Educ.*, **61**, 257-265(1997); received 8/26/96, accepted 5/16/97.

#### References

- (1) Chisholm, M.A., Cobb III, H.H. and Kotzan, J.A., "Significant factors for predicting academic success of first-year pharmacy students," *Am. J. Pharm. Educ.* **59**, 364-370(1995).
- (2) Cunny, K.A. and Perri III, M., "Historical perspective on undergraduate pharmacy student admissions: The PCAT," *ibid.*, **54**, 1-6(1990).
- (3) Charupatanapong, N., McCormick, W. and Rascati, K., "Predicting academic performance of pharmacy students: Demographic comparisons," *ibid.*, **58**, 262-268(1994).
- (4) Lowenthal, W., Wergin, J. and Smith, H.L., "Predictors of success in pharmacy school vs. other admission criteria," *ibid.*, **41**, 267-269(1997).
- (5) Lowenthal, W., "Relationships among student characteristics, licensing examinations and academic performance: A comparison of three graduating classes," *ibid.*, **45**, 132-139(1981).
- (6) Kotzan, J.A. and Entekin, D.N., "Validity comparison of PCAT and SAT in the prediction of first year GPA," *ibid.*, **41**, 4-7(1977).
- (7) Popovich, N.G., Grieshaber, L. D., Losey, M.M. and Brown, C.H., "An evaluation of the PCAT examination based on academic performance," *ibid.*, **41**, 128-132(1977).
- (8) Belmonte, A.A. and Strickland, E.I., "Prediction of academic success using selected variables: I," *ibid.*, **41**, 122-124(1977).
- (9) Munson, J.W. and Bourne, D. W.A., "Pharmacy college Admission Test (PCAT) as a predictor of academic success. II," *ibid.*, **41**, 272-274(1977).
- (10) Meyer, S.W., "The pharmacy student population: Applications received 1994-95, degrees conferred 1994-95 fall 1995 enrollments," *ibid.*, **60**, 64-74S (1996).
- (11) *Pharmacy School Admission Requirements 1996-1997*, American Association of Colleges of Pharmacy, Alexandria VA (1995).
- (12) Lowenthal, W. and Meth, H., "Myers-Briggs Type Inventory personality preferences and academic performance," *Am. J. Pharm. Educ.*, **53**, 226-28(1989).
- (13) Sauter, R.C. and Bulgin, J.M., "Are pharmacy schools admitting the right students for the wrong reasons? Or vice versa," *ibid.*, **41**, 450-452(1977).
- (14) Gordon, L.V., *Manual: Gordon Personal Profile-Inventory*. The Psychological Corporation, San Antonio TX (1993) pp. 43-76.
- (15) Cleary, P.D., and Angel, R., "The analysis of relationships involving dichotomous dependent variables," *J. Hlth. Soc. Behavior*, **25**, 334-348 (1984).
- (16) Agresti, A., *Categorical Analysis*, John Wiley and Sons, New York NY (1990).
- (17) Dawson-Saunders, B. and Trapp, R., *Basic and Clinical Biostatistics*, Appleton and Lange, Norwalk CT (1990).
- (18) Dyer, F.J., *Gordon Personal Profile-Inventory: An Interpretive Guide*, Harcourt Brace Jovanovich, New York NY (1984).
- (19) Baldwin, W.R., and Levine, N.R., "Personality norms characteristic of optometrists," *Am. J. Optometry*, **46**, 616-627(1969).
- (20) *Standards for Educational and Psychological Tests*, American Psychological Association, Washington, DC (1974).

#### APPENDIX A. PERCENTILE NORMS FOR ALL PHARMACISTS SURVEYED (N=340)

Raw Score	GPP-I Scale <sup>a</sup>								Raw Score
	A	R	E	S	C	O	P	V	
38									38
37					99	99	99	99	37
36					98	98	99	97	36
35		98			95	97	96	93	35
34		91	99		92	94	94	90	34
33		81	96		87	91	92	84	33
32		70	93		81	87	88	78	32
31	99	59	88	99	73	79	80	70	31
30	96	49	82	99	64	74	73	63	30
29	92	39	74	98	55	66	66	56	29
28	88	28	65	96	48	60	59	47	28
27	83	22	53	95	40	53	55	42	27
26	75	15	44	92	33	44	46	35	26
25	68	11	36	85	27	35	42	28	25
24	63	7	29	80	21	28	35	21	24
23	54	5	21	73	16	21	30	15	23
22	43	3	15	63	16	21	30	15	22
21	33	3	12	55	8	14	18	9	21
20	26	1	8	48	6	11	16	5	20
19	20		5	37	4	8	12	4	19
18	14		3	25	2	6	10	3	18
17	10		2	21	1	4	8	2	17
16	8		2	16	1	3	6	2	16
15	5		2	13	1	2	4	1	15
14	4		2	11	1	2	3	1	14

Raw Score	GPP-I Scale <sup>a</sup>							Raw Score	
	A	R	E	S	C	O	P		V
13	2		1	7		1	3		13
12	1			5		1	2		12
11				3		1	2		11
10				2		1	2		10
9				2			1		9
8				1					8
7				1					7
6				1					6
5									5
Mean	23.15	30.18	26.67	20.72	28.38	27.04	26.37	28.47	Mean
SD	4.46	3.57	4.31	4.65	4.71	5.19	5.81	4.89	SD

<sup>a</sup>A=Ascendancy; R=Responsibility; E=Emotional Stability; S=Sociability; C=Cautiousness; O=Original Thinking; P=Personal Relations; V=Vigor.

#### APPENDIX B. PERCENTILE NORMS FOR PHARMACY LEADERS (N=202)

Raw Score	GPP-I Scale <sup>a</sup>							Raw Score	
	A	R	E	S	C	O	P		V
38									38
37						99	99	99	37
36					98	97	99	97	36
35		98			95	96	98	93	35
34		92	99		92	91	95	90	34
33		83	96		87	86	93	83	33
32		73	94		82	80	89	77	32
31	98	63	89	99	74	72	81	70	31
30	94	55	85	99	67	65	73	62	30
29	88	45	77	96	57	57	66	52	29
28	82	34	68	95	50	50	58	45	28
27	75	27	59	93	44	44	53	40	27
26	66	18	49	90	36	36	44	34	26
25	59	14	40	83	27	27	39	27	25
24	52	8	32	76	20	20	31	20	24
23	43	6	23	69	14	14	26	14	23
22	32	4	17	59	11	11	21	10	22
21	23	3	13	50	9	9	16	8	21
20	19	2	8	43	6	8	13	4	20
19	15		5	34	5	6	9	3	19
18	11		3	21	4	5	7	2	18
17	7		1	16	3	4	5	1	17
16	5			11	2	3	4	1	16
15	2			8	2	2	3	1	15
14	2			6	1	2	2		14
13	1			5		1	2		13
12	1			2			2		12
11				2			1		11
10				1			1		10
9									9
Mean	24.26	29.76	26.33	21.43	28.04	28.17	26.72	28.69	Mean
SD	4.31	3.67	4.24	4.29	4.82	5.12	5.40	4.75	SD

<sup>a</sup>A=Ascendancy; R=Responsibility; E=Emotional Stability; S=Sociability; C=Cautiousness; O=Original Thinking; P=Personal Relations; V=Vigor.



APPENDIX C. PERCENTILE NORMS FOR PHARMACY STUDENTS (N=517)

Raw Score	GPP-I Scale <sup>a</sup>								Raw Score
	A	R	E	S	C	O	P	V	
39									39
38					99				38
37					98	99	99		37
36					97	99	99	99	36
35		99			95	99	98	98	35
34		98	99		92	97	97	97	34
33		94	99	99	86	96	94	95	33
32	99	86	97	98	82	92	91	92	32
31	98	77	96	96	78	89	87	87	31
30	98	68	92	94	73	83	81	81	30
29	95	58	88	91	67	75	74	76	29
28	93	50	80	86	60	68	70	68	28
27	88	38	73	81	53	62	63	61	27
26	83	29	65	75	47	56	60	53	26
25	76	22	57	71	40	49	53	43	25
24	69	18	52	63	35	42	45	36	24
23	60	14	44	56	29	35	41	31	23
22	53	9	37	48	24	29	35	24	22
21	44	7	31	42	19	24	30	20	21
20	35	5	23	35	15	20	24	15	20
19	29	3	19	29	13	16	21	11	19
18	24	2	14	23	11	13	16	8	18
17	17	2	11	18	8	11	13	5	17
16	12	1	8	14	6	9	9	5	16
15	10	1	5	11	5	7	7	4	15
14	8		4	9	3	6	4	3	14
13	6		4	7	3	3	2	2	13
12	5		3	5	2	3	2	1	12
11	3		1	4	1	1	2	1	11
10	2			3	1	1	2		10
9	2			2			1		9
8	1			1					8
7	1			1					7
6	1								6
5	1								5
4									4
Mean	21.91	28.20	23.95	22.36	26.55	25.18	24.82	25.83	Mean
SD	4.91	4.15	5.11	5.58	6.07	5.70	6.00	5.19	SD

<sup>a</sup>A=Ascendancy; R=Responsibility; E=Emotional Stability; S=Sociability; C=Cautiousness; O=Original Thinking; P=Personal Relations; V=Vigor.