

## RESEARCH ARTICLES

# Pharmacy Student Entrepreneurial Orientation: A Measure to Identify Potential Pharmacist Entrepreneurs

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**Objectives.** A multidimensional scale was developed and tested to measure pharmacy students' proclivity toward becoming entrepreneurs within their chosen pharmacy work environments.

**Methods.** A descriptive, cross-sectional design was used to survey a convenience sample of PharmD students attending a single public university during the spring semester of 2003.

**Results.** The response rate was 77.5%, representing 66.7% to 100% of each of 4 PharmD classes. The resulting 3-factor, 23-item Pharmacy Student Entrepreneurial Orientation (PSEO) summated scale was shown to be reliable (Cronbach alpha = 0.9351) and normally distributed. Scale validity in this population was supported. Higher mean PSEO scores were found for students aspiring to pharmacy ownership ( $p < 0.05$ ) and unspecified business ownership ( $p < 0.05$ ), and for those who had led efforts to create change ( $p < 0.01$ ).

**Conclusions.** Measuring entrepreneurial orientation may help to identify students inclined to be future entrepreneurs in the profession, inform academic advising efforts, and direct attempts to foster innovation by future pharmacists.

**Keywords:** entrepreneur, innovation, pharmacy student, survey

## INTRODUCTION

A major agenda of the pharmacy profession is to herald in the era of pharmaceutical care, in part, by assisting individual pharmacists in their efforts to develop and promote new and innovative pharmacy services. New books, professional association meetings, research funding, pharmacy continuing education, and pharmacy school coursework provide opportunities for educating and motivating pharmacists and pharmacy students in hopes they will develop, manage, and market new services as part of the pharmaceutical care movement.<sup>1-9</sup> Some of these instructional and motivational efforts come from entrepreneurs who have proven themselves capable and are willing to pass along what they have learned. Identifying potential entrepreneurs before they prove themselves, or take on the challenge, is the focus of this study. Such identification may be one way to hasten the fulfillment of this professional agenda. Academic interest in how to better develop an entrepreneurial spirit among pharmacy students was raised nearly 20 years ago.<sup>10,11</sup> This interest within the profession is evidenced by a recent survey conducted by the National Community Pharmacy Association regarding the

extent to which entrepreneurial coursework is taught in United States pharmacy schools.<sup>12</sup> Indeed, time spent teaching and nurturing students' entrepreneurial inclinations and providing needed resources could be a valuable means by which the academy, in particular, can contribute to advancing the professional status of pharmacists, the financial stability and growth of pharmacies, and the quality of pharmacist-provided patient care.

Aside from self-selection and informal identification by pharmacy school faculty members or practitioners who interact with students, there is no published means developed to assess pharmacy students' entrepreneurial inclinations. However, entrepreneurship constructs have been developed for pharmacists and pharmacies.<sup>13,14</sup> Finding ways to identify students who are inclined to be future entrepreneurs in the profession could be a helpful way to identify and target these students regarding entrepreneurial pursuits, encouraging and supporting them with real resources before and after graduation. We report here a multidimensional scale for measuring pharmacy students' proclivity toward becoming entrepreneurs within the pharmacy profession and, specifically, their chosen pharmacy work environment. Our purpose was to develop a measure of pharmacy student entrepreneurial orientation, and test its reliability and validity.

Entrepreneurialism and entrepreneurship have been addressed in terms of marketplace behaviors that lead to

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new and creative use of resources<sup>15</sup> and in terms of the psychology or personality of individuals who may behave in these ways.<sup>16</sup> Its conceptualization has included individual, environmental, and organizational factors.<sup>17</sup> Intending to clarify the nuances of the related but different terms, a distinction between entrepreneurship and entrepreneurial orientation was put forth by Lumpkin and Dess.<sup>17</sup> They conceptualized entrepreneurship as representing new market entry, that is, what happens regarding new and creative resource use in the marketplace, and entrepreneurial orientation as describing how new entry is accomplished. Thus, entrepreneurial orientation is purported to embody the processes and requirements, as well as the intentions and behaviors, of key marketplace players that include 5 dimensions: the willingness to take risks (risk-taking) and innovate (innovativeness), proactive behaviors designed to find and act upon marketplace opportunities (proactiveness), the propensity to be autonomous (autonomy), and an aggressive tendency toward the competition (competitive aggressiveness).<sup>17</sup>

In this study, the focus was on the processes and requirements of future new market entry as it pertains to students, thus focusing on individual students' entrepreneurial orientation. We define *pharmacy student entrepreneurial orientation* to be the beliefs, behavioral intentions, and self-reported behaviors that suggest a pharmacy student's proclivity to instigate new market-entry activities. In particular, the focus was on the case of developing new, innovative pharmacy services as a future pharmacist. Here, students' present day, self-described characteristics and behaviors, in addition to their behavioral intentions and beliefs about their future work as pharmacists, were included. Organizational and environmental influences on actual entrepreneurship within the health care marketplace were also acknowledged.

Hypothesis testing was used to test the validity of the scale. Past research of entrepreneurial orientation (EO) in pharmacies revealed that a larger proportion of high-EO pharmacies were independently owned.<sup>14</sup> (High-EO pharmacies were those scoring above the median for Pharmacy Entrepreneurial Orientation, signifying the pharmacy's greater capability of new market entry.) Although not all entrepreneurial activities take place in such pharmacies, the image of the entrepreneur is often that of an independent business owner. Likewise, the organizational structure and market-driven financial needs of independently owned businesses that must compete against larger corporate entities support independent innovation to find a market niche for survival. Thus, students likely associate entrepreneurial tendencies with

independent pharmacy practice and ownership. To test the construct validity of the new scale, we hypothesized that a higher pharmacy student entrepreneurial orientation is associated with:

1. students who report retail-independent pharmacies as first choice of job setting upon graduation, compared with students who report retail-chain, hospital, or clinic pharmacy settings;
2. students who aspire to pharmacy ownership as a career compared with those who do not aspire to ownership; and
3. students who would consider some form of business ownership (unspecified).

Another means of testing for construct validity is to consider past behavior that may predict future behavior. Entrepreneurs act as change agents; they act to bring to the marketplace something new and innovative, using resources differently and with different results.<sup>15</sup> These activities also require leadership, something the entrepreneur provides, to see that new ideas become a reality. Students with past experience of leadership and change agency may be potential entrepreneurs who will lead change as future pharmacists. Thus, we hypothesized that a higher pharmacy student Entrepreneurial Orientation exists for students who report having led efforts to create organizational change, compared with those students who indicate no such past leadership behavior.

How pharmacy students tailor their educational pursuits should reflect, in part, their future career plans and aspirations. Course electives allow students to choose coursework that satisfies personal interests and perceived needs beyond graduation. Business coursework can prepare a student who is inclined toward becoming an entrepreneur because it may provide needed instruction for marketing, managing, and financing a new innovation. As an additional means of testing the construct validity of the entrepreneurial orientation scale, we hypothesized that higher pharmacy student entrepreneurial orientation is associated with those students who report planning to take, or having taken, a business class while in college, compared with students who had not taken or did not plan to take a business course.

Many advances in pharmacy innovation occur on a specialized level. New services often target patients with specific diseases and treatment needs, as is the case with disease management programs, suggesting an entrepreneur may require some type of clinical specialization in order to succeed. With this in mind, we hypothesized that higher PSEO is present for those students who aspire to specialize as pharmacists, compared with those who do not aspire to a specialization.

## **METHODS**

### **Design, Population, and Sampling**

A descriptive, cross-sectional design was used. All PharmD students attending a single public university during the 2002–2003 academic year were eligible ( $N = 182$ ). Investigational Review Board approval was obtained for conducting the survey. Students from each of 4 PharmD classes were invited to participate in the voluntary and anonymous survey by completing a 3-page self-administered questionnaire. The invitation and data collection were done in 4 different on-campus classroom settings during the spring 2003 semester, generating a convenience sample of students who were in attendance and who consented to participate.

### **Survey Development**

A new summated scale was developed and tested. No measure of entrepreneurialism designed for pharmacy students or other health professional students was located prior to scale development. Pharmacy entrepreneurial orientation and pharmacist entrepreneurship measures and conceptualizations were used to generate the construct dimensions and related pool of items for the PSEO summated scale.<sup>13,14</sup>

Entrepreneurial orientation has been measured among pharmacies. Researchers measured such an orientation by surveying a random sample of community-based pharmacy managers in 9 states.<sup>14</sup> They defined pharmacy entrepreneurial orientation as the decision-making activities, processes, and practices that describe a pharmacy's capability of new market entry, as in the case of developing a new pharmacy service. Specifically, they included the same 5 dimensions described by Lumpkin and Dess<sup>15</sup>: risk-taking, innovativeness, proactiveness, autonomy, and competitive aggressiveness. In addition, they included having a strong work ethic as a sixth dimension. Second-order confirmatory factor analysis and reliability analysis were used to create the final Pharmacy Entrepreneurial Orientation (PHARMEO) scale that evidenced good reliability among its subscales. Its validity also was supported, as higher scores were associated with evidence of prior pharmacy entrepreneurial activities.

All 6 dimensions of the PHARMEO measure were included in the item pool generation for the PSEO. Because they were used for a different level of analysis (pharmacy student rather than pharmacy), their definitions and the means by which they were operationalized (using items) were modified. The new scale reported here is intended to include the following 6 dimensions: belief in the need for risk-taking (risk-taking), innovativeness in the workplace (innovativeness), proactive-

ness regarding one's pharmacy career (proactiveness), desiring workplace autonomy to support innovation (autonomy), competitiveness as a person (competitiveness), and having a strong work ethic (work ethic). The item pool generated to measure these dimensions included items from the PHARMEO measure adapted to account for the targeted respondents being individual students not yet employed as pharmacists. New items also were written where existing items could not be adapted to capture the essence of the dimension. In adapting and writing new items to measure these dimensions among future pharmacists, present beliefs and behaviors, as well as future behavioral intentions, were included for a total pool of 29 items.

An investigation into the entrepreneurship of pharmacists using the psychological typologies of entrepreneurs developed by Miner<sup>16</sup> provided an additional dimension to our proposed scale.<sup>13</sup> While 3 of the 4 typologies were somewhat similar to dimensions identified in the PHARMEO measure, the fourth was unique. The *empathic supersalesperson* typology is characterized by strong interpersonal skills and relationship-building beliefs, including the belief in the importance of contributing to society and of personal selling, the ability to empathize well with others, and the desire to help others.<sup>13,16</sup> The 5-item subscale as measured among pharmacists<sup>13</sup> had an acceptable Cronbach alpha of 0.78 and was added to the item pool. A 7-point Likert-type agreement scale was used for rating all 34 items, with anchors labeled as "strongly disagree" (1) and "strongly agree" (7).

### **Other Variables**

Students' choice of job setting upon graduation and their career aspirations were collected. Students were given the option to indicate their first and second choice of job setting postgraduation. Categorical answers were listed as follows: retail (chain), retail (independently owned), hospital, clinic, nursing home/pharmacy consultant, home infusion/home care, academia/teaching, other, and don't know. Respondents were asked to check all career aspirations that applied using the following non-mutually exclusive check list: residency (general), residency (specialized), certification and/or specialization, staff pharmacist or clinical pharmacist, pharmacy owner, managerial role, supervisory role, and MS and/or PhD degree(s). From this checklist, 3 dichotomous variables were created to represent those who aspire to pharmacy ownership, residency (general or specialized), and specialization (via residency, certification or other means of specialization). Other variables were dichotomous descriptive questions (yes or no); students were asked if

they had ever led efforts to create organizational change, whether they had taken or were planning to take a business class while in college, and whether they would ever consider owning a business (unidentified).

Two global items were included as a potential construct validity comparison of the scale. The first was self-identification as a future entrepreneur: "I see myself becoming some type of entrepreneur some day." The second was a potential change agent identifier: "I want to make my mark on the pharmacy profession." The same 7-point agreement scale was used for these 2 items. Additional categorical study variables included in the survey were demographic, including gender, year in school (P1, P2, P3, or P4), previous degree (yes or no), and nontraditional student status (defined on the survey as not going directly from high school to college or having left college for >1 year and returning).

### **Analysis**

Data analysis included descriptive statistics of all data gathered to assist with data cleaning. There were no missing data for scale items. Summated scale refinement was conducted using reliability testing including inter-item correlations, item-to-total correlations, and Cronbach coefficient alpha. An acceptable Cronbach coefficient alpha was set a priori at 0.70 for each possible subscale and the combined total scale.<sup>18</sup> Construct validity testing via the first hypothesis required use of 1-way analysis of variance, with planned post hoc tests comparing independent pharmacy as a job setting to chain, hospital, and clinic. Testing of the directional hypotheses required use of the independent sample *t* test (1-tailed). Pearson correlations were used to compare scale and subscale scores to the 2 global item scores, as an additional test of validity. Because the chosen dimensions had not yet been tested on the individual student level of analysis, confirmatory factor analysis was not used. Instead principal component analysis was used with Promax rotation to allow for inter-factor correlations. Eigen values (approximately >1) and the Scree plot were used together to decide the number of factors resulting. For all statistical tests, including 1-tailed *t* tests, significance was set a priori at  $p < 0.05$ . Before use in the chosen population, survey pretesting was done among 3 pharmacists to improve formatting.

### **RESULTS**

A convenience sample of 141 useable surveys was obtained. This represents 77.5% of all enrolled students, with 66.7% to 100% representation from each of 4 PharmD classes. Sample characteristics revealed 56% were female, 37.6% held a previous degree, and 27.7%

were nontraditional students. When asked about first choice of job setting upon graduation, 35.5% indicated chain retail; 11.3%, independent retail; 20.6%, hospital; and 9.9%, clinic. The remaining 22.7% of the responses included home infusion/home care, academia, other, and don't know. Twenty-four percent of surveyed students aspired to pharmacy ownership, 55% aspired to business ownership (unspecified), 44% aspired to a pharmacy residency, and 46.1% indicated they would like to specialize. Sixty-one percent of respondents indicated having led the creation of change in an organization (on or off campus) and 61% reported they took, or were planning to take, at least 1 business course while in college. See Table 1.

### **Pharmacy Student Entrepreneurial Orientation Scale**

Of the pool of 34 items included on the survey, 1 item was omitted from the analysis because of a typographical error not found during pretesting that may have confounded students' responses. Of the remaining 33 items, 23 were retained, resulting in a 3-factor solution that explains 62% of the variance (Appendix 1). The 10 items not retained included 2 items measuring competitive aggressiveness, a dimension that was not adequately correlated with the other factors. Inter-item correlations were consistently low ( $< 0.20$ ) and the 2 items loaded extremely high (0.89 and 0.91) on a separate factor that had inter-factor correlations ranging from -0.18 to -0.28. Apart from the items measuring competitive aggressiveness, 2 others had consistently low inter-item correlations ( $< 0.20$ ) and were not included in the final scale. Six other items were excluded from the scale based on low item-to-total correlations and improved reliability (Cronbach alpha) when items were deleted from the scale. The resulting 3-factor, 23-item Pharmacy Student Entrepreneurial Orientation (PSEO) summated scale, still representing the construct as defined, achieved an overall Cronbach alpha of 0.94 and an approximately normal distribution (Table 2 and Figure 1).

Factor 1 (11 items) encompassed the dimensions of proactiveness, work ethic, and empathic supersalesperson. Subscale reliability was very good ( $\alpha = 0.93$ ) and scores obtained included the full range of possible responses, though the distribution is somewhat positively skewed. Subscale factor 2 (9 items), which included innovativeness and autonomy, also had very good reliability ( $\alpha = 0.92$ ) and more closely revealed a normal distribution. Factor 3 (3 items) accounted for the career risk-taking dimension alone, had acceptable reliability ( $\alpha = 0.71$ ), and an approximately normal distribution. Inter-factor correlations were significant ( $p < 0.01$ ) and positive (Table 2).

Table 1. Descriptive Statistics of Pharmacy Student Study Sample (n=141)

Variable	Percent	
Female	56.0	
Year in PharmD program		
P1	26.2	
P2	22.7	
P3	22.0	
P4	29.1	
Holds a previous degree	37.6	
Business	1.4	
Science	28.4	
Other	7.1	
Non-traditional, returning student *	27.7	
Has led efforts to create change in an organization	61.0	
Has taken, or plans to take, a business class while in college	61.0	
Would consider owning a business (unspecified)	55.3	
Future career aspirations (maximum of 4 per student)		
Residency (general)	32.6	
Residency (specialized)	25.5	
Certification/other specialization	30.5	
Staff or clinical pharmacist	60.9	
Pharmacy owner	24.1	
Managerial role	34.8	
Supervisory role	22.0	
MS and/or PhD degree(s)	9.2	
When you graduate, in what setting would you like to work?	<b>First Choice</b>	<b>Second Choice</b>
Retail (chain)	35.5	12.8
Retail (independent)	11.3	14.9
Hospital	20.6	20.6
Clinic	9.9	14.2
Home infusion/home care/consultant	2.1	10.0
Academia/teaching	6.4	9.9
Other	9.2	2.1
Don't know	4.3	0

\* Defined on survey as not going directly from high school to college, or having left college for > 1 year and returned.

A comparison of subscale and scale scores to the 2 global items provided support for construct validity in this sample. The item worded, “I see myself becoming some type of entrepreneur some day,” had low to moderate positive Pearson correlations with the PSEO scale (0.33,  $p < .01$ ) and the Factor 2 and 3 subscales (0.44, 0.27 respectively;  $p < .01$ ), but not with the Factor 1 subscale (0.13,  $p > .05$ ). The item worded, “I want to make my mark on the pharmacy profession,” had higher positive correlations with the PSEO scale ( $r = 0.66$ ,  $p < .01$ ) and with the Factor 1, 2, and 3 subscales (0.57, 0.65, and 0.27 respectively,  $p < .01$ ).

The omnibus F test comparing PSEO scores among 4 different first choices for job settings (retail-chain, retail-independent, hospital, and clinic) was not significant ( $F = 2.6$ ,  $p = 0.056$ ). Thus, no planned comparisons

were performed to test whether higher entrepreneurial orientation is associated with those who report retail-independent as their first choice of job setting compared with the other 3 settings. In spite of this, a trend in the hypothesized direction was noted in that students choosing independent pharmacy as their first choice of job setting had a mean PSEO score of 135 ( $n = 16$ ), while those choosing chain pharmacy, hospital, and clinic settings had lower mean PSEO scores of 122 ( $n = 50$ ), 125 ( $n = 29$ ), and 126 ( $n = 14$ ), respectively. (Note: 32 students chose a pharmacy setting other than these top 4 choices as their first choice of job setting and were not included in this hypothesis test.) Factors 2 and 3 subscales approximate a normal distribution in this sample. Therefore we tested the hypothesis using these subscales

Table 2. Factor (Subscale) and Pharmacy Student Entrepreneurial Orientation (PSEO) Scale Statistics

	Factor 1	Factor 2	Factor 3	PSEO Scale
Factor 1	<b>0.9291</b>			
Factor 2	0.640*	<b>0.9163</b>		
Factor 3	0.292*	0.424*	<b>0.7090</b>	
PSEO scale	0.884*	0.897*	0.554*	<b>0.9351</b>
Summated PSEO Scale Mean (SD) †	64.7 (9.5)	44.7 (8.8)	14.4 (3.7)	123.74 (18.3)
Median	66	46	15	125
Number of items	11	9	3	23
Possible min/max	11/77	9/63	3/21	23/161
Score range	11-77	15-63	3-21	31-156

Bolded diagonal values = Cronbach coefficient alpha for scale or subscale

\* Inter-subscale correlation significant at  $p < 0.01$  (2-tailed)

† Higher scores indicate higher entrepreneurial orientation (original item scaling: 1 = Strongly Disagree, 7 = Strongly Agree)

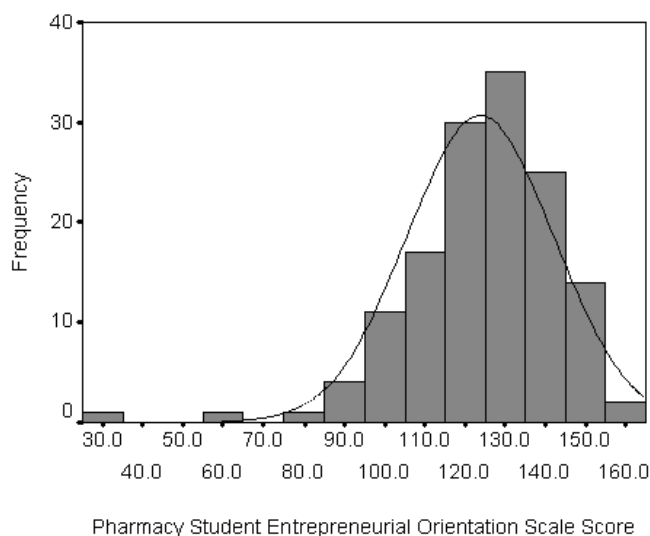


Figure 1. Histogram of pharmacy student entrepreneurial orientation scale.

to gain another perspective using 1-way analysis of variance. Factor 2 mean scores, which represent innovativeness and desired workplace autonomy, were significantly different across students' first choice of job setting ( $F=2.99, p<0.05$ ). Although not tested for significance, again, the choice independent retail setting had the highest of the 4 scores (50), followed by hospital (46), clinic (45), and retail-chain setting (43). Factor 3 mean scores (representing career risk taking inclinations) were not significantly different across job setting choices ( $F=0.90, p = 0.443$ ). See Table 3.

Students who aspired to pharmacy ownership ( $n = 34$ ) had a combined mean PSEO score of 129, while students who did not ( $n = 107$ ) had a mean PSEO score of 122 ( $t = -1.975, p<0.05$ ). Those who would consider business ownership (unspecified) scored significantly higher on the PSEO measure than those who would not (125 and 122, respectively;  $t=-2.264, p<0.05$ ). Also, students

who reported having led efforts to create change within an organization had a significantly higher mean PSEO scores (128 vs 117) than their colleagues without this leadership experience ( $t = -3.946, p<0.01$ ). Further hypothesis testing shows student respondents who have taken, or who are planning to take, a business course outside of pharmacy did not have higher PSEO scores than those who had not taken a business course (123 and 125, respectively;  $t = 0.773, p = 0.441$ ). Also, desiring to specialize was not related to higher PSEO scores compared with those not wanting to specialize (125 and 123, respectively;  $t = 0.704, p = 0.482$ ).

## DISCUSSION

A 3-factor, 23-item summated scale of Pharmacy Student Entrepreneurial Orientation was developed to measure pharmacy students' inclination to instigate new, innovative pharmacy services as a pharmacist. The full scale has good reliability, with subscales also having acceptable to good reliability. Interfactor correlations support creation of the summated 3-factor scale. Factor 1, which represents being proactive in school and work, having a good work ethic, and valuing and having good interpersonal skills, appears to capture characteristics in which one would expect pharmacy students to score highly. The somewhat positively skewed distribution of this factor is consistent with this observation. Pharmacy school admittance is quite competitive, suggesting harder working and more proactive students are more likely to be admitted. Also, interpersonal skills are highly valued and espoused in the curriculum. Factor 2 focuses on students' desire and foreseen ability to innovate and have workplace autonomy that allows for independent decision-making and steps toward innovation. This factor addresses a key aspect of being an entrepreneur in that it emphasizes the creation of new, innovative resource use

Table 3. Pharmacy Student Entrepreneurial Orientation Mean Score (SD) Comparisons Across Study Variables

Variable		Factor 1	Factor 2	Factor 3	PSEO Scale
First choice of job setting					
Retail (chain)		64.5 (7.5)	42.8 (8.1)*	14.3 (3.4)	122 (15)
Retail (independent)		69.2 (3.3)	49.8 (7.7)*	16.0 (3.5)	135 (11)
Hospital		64.7 (11.6)	45.7 (9.6)*	14.6 (4.0)	125 (22)
Clinic		66.4 (7.3)	45.3 (6.5)*	14.1 (4.3)	126 (14)
Business Ownership (unspecified)	No	64.8 (9.7)	43.4 (9.2)	13.6 (3.6)	122 (18) †
	Yes	64.6 (9.4)	45.7 (8.4)	15.0 (3.6)	125 (18) †
Pharmacy ownership	No	64.3 (10.4)	43.9 (9.0)	13.8 (3.6)	122 (19) ‡
	Yes	66.0 (5.8)	47.0 (7.6)	16.1 (3.3)	129 (14) ‡
Led change in organization	No	61.9 (11.7)	41.3 (9.3)	13.3 (3.7)	117 (21) §
	Yes	66.5 (7.3)	46.9 (7.7)	15.0 (3.4)	128 (15) §
Business course in college	No	65.5 (7.6)	45.1 (8.6)	14.6 (3.5)	125 (16)
	Yes	64.1 (10.5)	44.4 (8.9)	14.2 (3.7)	123 (20)
Specialization	No	64.9 (7.3)	44.8 (8.5)	15.1 (3.3)	125 (16)
	Yes	64.5 (11.6)	44.6 (9.2)	13.5 (3.9)	123 (20)

PSEO = Pharmacy Student Entrepreneurial Orientation

\* 1-way ANOVA,  $F = 2.994, p < 0.05$

† 1-tailed t-test,  $t = -2.264, p < 0.05$

‡ 1-tailed t-test,  $t = -2.341, p < 0.05$

§ 1-tailed t-test,  $t = -3.679, p < 0.01$

and activities within the marketplace.<sup>15,17</sup> Factor 3 explains the extent to which a student believes in the need to take some risks, a proxy measure for students' future potential risk-taking behaviors which are suggestive of entrepreneurialism, as innovative use of resources requires such risk-taking.<sup>17</sup> As measured among pharmacy students, being willing to take risks appears to be a distinct dimension of being an individual pharmacist entrepreneur.

Comparison of the scale to 2 global measures suggests the term "entrepreneur" may not appropriately capture students' means of self-identification as future innovators. The item stating, "I see myself as becoming some type of entrepreneur some day," did not correlate as highly with the PSEO scale as did the item worded, "I want to make my mark on the pharmacy profession." The change agency indicative of the latter item may supercede the idea of being an "entrepreneur," that is, going beyond the idea of independent pharmacy ownership. Indeed, a comparison shows that students aspiring to pharmacy ownership scored much higher on the item which self-identifies them as future entrepreneurs (mean = 5.41, SD = 1.2) compared with those not aspiring to pharmacy ownership (mean = 3.59, SD = 1.6). Implications are to broaden the ideas of entrepreneurialism in the minds of students (and educators and pharmacists), extending beyond ownership opportunities to emphasize the innovative use of resources in the marketplace, no matter the pharmacy practice setting.

Hypothesis testing for construct validity in the population offers moderate support for scale validity. Students aspiring to the entrepreneurial activity of owning a pharmacy (or a business, unspecified) scored higher on the scale than their peers who do not aspire to ownership. Also, although not significant, a trend was identified of higher PSEO scores among students choosing the retail-independent setting over retail-chain, hospital, and clinic settings (for both the full-scale and the factor 2, innovativeness and autonomy, subscale). Students who are more inclined to look for work environments that support innovation seem likely to pursue pharmacy sites where it would be easier to communicate with management (the owners) and guarantee aligned professional beliefs and goals. Traditionally, independently owned pharmacies seem to attract these individuals; however, arguably, other pharmacy settings need entrepreneurs as well if pharmaceutical care principles are to pervade pharmacy practice. As more pharmacists become employees of retail and health system corporate entities, entrepreneurially oriented pharmacists will be hired into positions from which innovation could emerge. These "intrapreneurs," active employee entrepreneurs who create change from within an organization, also are needed to move forward innovative pharmacist services, visions, and objectives for pharmacy practice.

As hypothesized, students with past efforts to lead change scored higher on the PSEO scale than those stu-

dents without this past experience. While our findings support the validity of the scale, future research is needed to investigate more closely the types of change pharmacy students lead, and the potential role of these efforts in developing students' future innovative leadership. Who are these students and are they more likely to be the change agents of pharmacy's future? Toward what practice settings do they gravitate? Will their practice experience nurture or squelch their entrepreneurial tendencies? Will their education and professional contacts as students serve them well, equipping them for entrepreneurial applications? This simple dichotomous question about leading change followed by descriptive elaboration of the experience could be an important one to ask during school of pharmacy admission processes to support our desire to move the profession forward.

While ownership is not required for entrepreneurial activities, over half of the students surveyed indicated some interest in business ownership (unspecified). Fewer than half of these students aspire to pharmacy ownership. The survey was conducted at a university in a rural state. Those students who grew up in a rural environment where a large proportion of the population work independently may more easily recognize the benefits of "being one's own boss." However, many of these students may not have as favorable an attitude towards pharmacy ownership. Indeed, the potential benefits of pharmacy ownership are likely to not be well understood by students,<sup>9</sup> suggesting an opportunity for educators.

An important potential application of this scale would be to better inform student advising regarding elective coursework. In this study, taking or planning to take a business course was not related to students' entrepreneurial orientation, suggesting room for improvement in this area. Traditionally, entrepreneurial activity is supported by knowledge of marketing, management, and finance. The students in the study sample have the opportunity to take courses outside of the pharmacy curriculum as electives, including business courses. In our sample, 61% of respondents indicated they planned to take or had taken a business course while in college. Because not all students with high entrepreneurial orientation aspire to pharmacy ownership, they may not foresee a need for coursework in business, in spite of the fact that new service development activities require knowledge in these areas, regardless of ownership status. If those who advise the students on curricular matters do not know of students' tendencies toward entrepreneurial activities, and if students who have these inclinations do not self-identify as entrepreneurs, the recommendation for taking business coursework may not be considered or made. Some students choose combined

PharmD/MBA programs,<sup>19</sup> and some have a previous business degree or pursue a minor or double major; however, students with less-developed career ambitions may benefit from PSEO scale administration to facilitate thinking and prompt discussion with an advisor.

Personal encouragement and needed skills can be given to nurture existing entrepreneurial inclinations through nondidactic, innovative leadership opportunities found in student-led and off-campus organizations. Students can purposely be introduced to change agents within the school, the local and regional pharmacy communities, and the state pharmacy associations, in hopes of establishing and building long-lasting relationships between the school, the state, the profession, and future pharmacists. Such relationships have the potential to promote a more effective use of state resources and a noteworthy diffusion of innovative ideas as expertise is shared and assistance is granted. Formal mentoring relationships between innovators in the state and students also would be useful. In addition, a spirit of entrepreneurialism can be nurtured by convincingly communicating to students both the professional and financial rewards that can result from pharmacy entrepreneurship.<sup>11</sup>

Innovation by entrepreneur pharmacists includes service development activities which may require some clinical specialization. Close to half of the students sampled expressed a desire to specialize in some way, although this desire did not statistically relate to higher entrepreneurial orientation. Although innovation in the profession can require specialization, it is possible that innovators are more likely to hire or work with those who do specialize than to specialize themselves. It is very possible that students truly inclined toward innovative pursuits may be undecided regarding what form his or her innovation(s) should take. Indecision among those with higher entrepreneurial orientation may be a reason for not wanting to specialize because of the inherent narrowing of one's focus, which may be incompatible with future unknown opportunities in the marketplace. Relatedly, higher factor 3 scores (greater career risk-taking) were found among students not intending to specialize. Is specializing within pharmacy viewed as the "safe" career path? Do those who are entrepreneurially inclined see specialization as too self-limiting? Future investigation into both students' and pharmacists' desires and efforts to specialize within the context of innovation and entrepreneurial orientation is needed to answer these questions.

### **Limitations**

The results of the study are not generalizable to pharmacy students beyond those surveyed at this single univer-



sity at which student advising is conducted by existing faculty members and where the rural environment may implicitly promote entrepreneurialism among its residents. Although career aspirations were sought from students, some may have answered in terms of that for which they will settle, rather than that for which they truly aspire. Factor 1, representing work ethic and proactiveness, was somewhat positively skewed, suggesting these dimensions or traits are not normally distributed in the pharmacy student population. This finding may also be an artifact of surveying students during class, where those not surveyed due to absenteeism may score lower on these attributes.

## CONCLUSIONS

A multidimensional scale to measure pharmacy students' inclination toward entrepreneurial activities after graduation was developed, and in the chosen sample, scale reliability and validity were supported. Using the scale may provide faculty members, advisors, and students themselves, with the opportunity for discovery or affirmation, as well as more informed dialog regarding course elective choices and future career plans. Ascertaining pharmacy students' entrepreneurial orientation sheds light, albeit, just a glimpse, on the future of our profession as we continue to strive towards a heightened and more patient-centered practice model. As students advance through our PharmD programs, measuring these attributes among pharmacy students has the potential to assist with the advice we give, the instruction and encouragement we offer as educators, and the professional relationship building we begin and continue to nurture with students beyond their graduation. While predictive validity does not yet exist for the Pharmacy Student Entrepreneurial Orientation scale, that is, higher scores have not been tested to predict future entrepreneurial activities, the value of the scale may lie in identifying future entrepreneurs early, when we as educators can best reach them.

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Appendix 1. Item Wording for the Pharmacy Student Entrepreneurial Orientation Scale\*

**Factor 1** (11 items, Cronbach alpha = .9291)

Proactiveness

- Planning for future opportunities upon graduation has been, is, or will be an important part of my college career.
- Knowing conditions are changing in pharmacy, I intend to actively seek out new opportunities for myself.
- I want to have what it takes to advance patient care as a pharmacist.

Work Ethic

- I am a hard working individual.
- I imagine I'll be very ambitious about my work as a pharmacist.
- I like the idea of having challenges in my practice as a pharmacist.
- I consider myself as having high motivation toward work.

Empathic Supersalesperson

- Developing strong personal relationships will be critical to my pharmacy practice.
- I have a very strong desire to help others.
- I believe that making a contribution to society is important.
- I will be good at empathizing with my patients by being responsive to their problems.

**Factor 2** (9 items, Cronbach alpha = .9163)

Innovativeness

- I want to be known as an innovator among my colleagues.
- I can imagine myself doing something innovative as a pharmacist.
- I believe I will one day have the skills needed to develop a new pharmacist service.
- I believe I will one day be capable of designing a new patient care service.
- I can see myself starting something innovative in the work-place.

Autonomy

- As a pharmacist, I want to be encouraged to develop new ideas in the work place.
- I want to work where new opportunities are the concern of all employees.
- I want to work where new ideas that I suggest will be acted upon by decision makers.
- As a pharmacist, I want to work for someone who lets me explore and try new ideas.

**Factor 3** (3 items, Cronbach alpha = .7090)

Risk Taking

- Successful pharmacists are likely to have taken some chances along they way.
- I think I am a risk-taker compared to others I know.
- I believe that to be a successful pharmacist, I will have to take some chances with my career.

\*Fully labeled Likert-type agreement scale with 1 = Strongly Disagree, 7 = Strongly Agree