Original Research

Identifying relationships between the professional culture of pharmacy, pharmacists’ personality traits, and the provision of advanced pharmacy services

Meagen Rosenthal, Ph.D.\textsuperscript{a,c}, Nicole W. Tsao, M.Sc., Ph.D.(c)\textsuperscript{b}, Ross T. Tsuyuki, M.Sc., Pharm.D.\textsuperscript{a}, Carlo A. Marra, Pharm.D., Ph.D.\textsuperscript{b,*}

\textsuperscript{a}EPICORE Centre, University of Alberta, Suite 4000, Research Transition Facility (RTF), 8308-114 Street, NW, Edmonton, AB, Canada T6G 2V2
\textsuperscript{b}Faculty of Pharmaceutical Sciences, University of British Columbia, 2405 Wesbrook Mall, Vancouver, BC, Canada V6T 1Z3

Abstract

Background: Legislative changes are affording pharmacists the opportunity to provide more advanced pharmacy services. However, many pharmacists have not yet been able to provide these services sustainably. Research from implementation science suggests that before sustained change in pharmacy can be achieved an improved understanding of pharmacy context, through the professional culture of pharmacy and pharmacists’ personality traits, is required.

Objective: The primary objective of this study was to investigate possible relationships between cultural factors, and personality traits, and the uptake of advanced practice opportunities by pharmacists in British Columbia, Canada.

Methods and materials: The study design was a cross-sectional survey of registered, and practicing, pharmacists from one Canadian province. The survey gauged respondents’ characteristics, practice setting, and the provision of advanced pharmacy services, and contained the Organizational Culture Profile (OCP), a measure of professional culture, as well as the Big Five Inventory (BFI), a measure of personality traits.

Results: A total of 945 completed survey instruments were returned. The majority of respondents were female (61%), the average age of respondents was 42 years (SD: 12), and the average number of years in practice was 19 (SD: 12). A significant positive relationship was identified for respondents perceiving greater value in the OCP factors competitiveness and innovation and providing a higher number of all advanced services. A positive relationship was observed for respondents scoring higher on the BFI traits extraversion and the immunizations provided, and agreeableness and openness and medication reviews completed.

Conclusion: This is the first work to identify statistically significant relationships between the OCP and BFI, and the provision of advanced pharmacy services. As such, this work serves as a starting place from...
which to develop more detailed insight into how the professional culture of pharmacy and pharmacists' personality traits may influence the adoption of advanced pharmacy services. © 2016 Elsevier Inc. All rights reserved.

Keywords: Advanced pharmacy practice; Pharmacy culture; Pharmacists’ personality traits; Pharmacy practice change; Improved pharmacy practice

Introduction

Health legislation is changing around the world to allow pharmacists to provide additional health services to patients. In British Columbia, Canada, pharmacists now have the ability to adapt prescriptions, provide immunizations, and conduct medication reviews. Moreover, pharmacists are now being paid by the government to provide these services. While progress has been made with respect to the integration of some of these services into practice, implementation has been far from complete. In fact, a recent longitudinal study found that almost half of pharmacist respondents from the US were not providing clinical, or counseling services. With the advent of these new abilities, renewed and increasingly urgent, calls have been made for all pharmacists to integrate these services into their daily practices, so that the value to the larger health system can be formally assessed.

Indeed, evolving and transforming how pharmacists’ practice has been a preoccupation of the profession since the 1970s. In that time, many studies have examined why substantial and sustained change has not taken place within the profession. Some of the most frequently mentioned barriers to change include a lack of time, payment, support, and resources. While these barriers are important, they represent just one dimension explaining the overall lack of change within the profession of pharmacy.

Professional culture

An examination of the change management literature suggests that understanding organizational culture, or the manner in which group members come to conceptualize, and therefore enact, their role, is key to understanding how those group members approach change. The Promoting Action on Research Implementation in Health Services (PARIHS) framework, which is from the implementation science literature, also echoes the importance of culture. The PARIHS framework’s “context” demands gaining insight into, not only leadership roles and monitoring systems, but the prevailing culture of the groups wherein the change is to take place.

Traditional examinations of culture in the change management literature have largely treated it as an all-encompassing entity into which participants are enveloped. As empty vessels, new members essentially have the culture “poured” into them. By extension, this perspective demands the assumption that the culture is preexisting, and more than likely developed by the founding leaders of the organization. Furthermore, this culture is developed at one particular point in time, to meet the needs of founding members. Taking this perspective to the study of culture, therefore, means that changing culture becomes very difficult, as it exists outside of the influence of individual members. As such, this perspective to the study of culture is not conducive to leveraging knowledge of a culture to making changes.

An alternative perspective on culture suggests that it is possible, and even likely, that individuals belong to multiple cultures simultaneously. For example, consider a community pharmacist working in a small rural town. From even this limited description, it could be suggested that this pharmacist belongs to the professional culture of community pharmacy, as opposed to that of a hospital pharmacy, to a rural culture, as opposed to an urban one, and to the culture of their particular province, as opposed to that of any other Canadian province. However, this list is not exhaustive, and it is possible that the exemplar pharmacist belongs to other cultures as well. Further to this, it is unreasonable to expect that this pharmacist would be able to “turn-off” what it means to be from a rural setting when they enter the pharmacy to care for their patients.

The acknowledgment that participants are multicultural beings, not simply empty vessels waiting to be filled, means that it must be expected that these other cultures help to inform behavior of participants in any given environment. Making this shift in the approach to the study of culture means that the manifestation of culture within a
particular setting becomes something that is not fixed, and therefore open to change.

While the culture being referred to in much of this previous literature is that of the organization, examining the culture of professions, which evidence suggests also exist within larger organizations or systems,\textsuperscript{21} contributes to the overall understanding the PARiHS framework’s context. Similarly to the definitions offered for organizational culture, professional culture can be understood as a group of people sharing a, “common socialization, education, and knowledge to perform a specific task …” (p. 290). Within the healthcare setting, preliminary work into professional culture has been undertaken in medicine, nursing, social work, and pharmacy.\textsuperscript{26–30} Due to its preliminary nature, this work has yet to examine the connection between a profession’s culture, and behavior in the clinical practice environment.

This has not been the case in a number of other professions, including probation officers, human resources specialists, and management accountants.\textsuperscript{31–33} In particular, the identified professional culture of probation officers was found to influence the success of supervisory outcomes of parolees.\textsuperscript{31} The professional culture of human resources specialists was found to shift focus to the needs of the employee, and away from the larger organization for which human resource specialist worked.\textsuperscript{32} The professional culture of management accountants was found to lead to miscommunication between accountant sub-groups, due to differences in the use of particular accounting terminology.\textsuperscript{33}

\textit{Personality traits}

Literature also suggests that culture’s influence on behavior cannot be considered in isolation, as it is also informed by an individual’s personality. Personality is generally understood as basic differences in patterns of thinking, feeling, and behaving.\textsuperscript{34} While there has been debate around the nature of the relationship between culture and personality traits,\textsuperscript{35–37} one approach, which was adopted for this work, suggests that culture and personality are independent variables interacting to produce a particular set of behaviors in individuals.\textsuperscript{37} As such, when examining the cultural perspectives of members working within a group, like the profession of pharmacy, it is also important to account for the personality traits of the group. With this in mind, the primary objective of this study was to investigate possible relationships between cultural factors, and personality traits, and the uptake of advanced practice opportunities by pharmacists in British Columbia, Canada. The secondary objective of this work was to gain insight into pharmacy’s professional culture and pharmacists’ personality traits.

\textbf{Methods}

\textit{Design}

The design of this study was a cross-sectional survey.

\textit{Population}

The population of respondents for this survey was composed of registered and practicing pharmacists from British Columbia, Canada.

\textit{Instrument}

The survey instrument contained four sections. The first section contained basic demographic and practice setting questions. Section two contained questions about the respondents’ current practice setting and the kinds of advanced practice services they offer to patients. This section was adapted to reflect the pharmacy services currently being reimbursed in BC, which include prescription adaptations (renewing a prescription; changing the dose, formulation, or instructions of a prescription; or therapeutic substitution); immunizations; and medication reviews (producing a best possible medication history; and identifying and resolving drug therapy problems). In particular, questions were asked about the number of prescription adaptations, immunizations and medication reviews provided, and conducted, each month. The final two sections of the instrument contained the Organizational Culture Profile (OCP) and Big Five Inventory (BFI).

The OCP was originally developed to measure organizational culture, however, in a number of person/organizational fit studies it has been used to evaluate individual members’ values.\textsuperscript{38–40} The 40-item version of the instrument developed by Sarros et al (2005)\textsuperscript{41} was used herein because it utilizes five-point Likert scales for measuring respondents’ evaluation of OCP values and can be self-administered. The instrument is composed of seven cultural factors: innovation, supportiveness, social responsibility, competitiveness, stability, performance orientation, and reward orientation.
The degree to which a group identifies with each of these factors is determined by averaging Likert responses to a particular sub-set of the 40 items linked specifically to a cultural factor.

Groups that perceive themselves to be “quick to take advantage of opportunities,” “risk taking,” and “take individual responsibility” may score higher on the trait of innovation. Groups that perceive themselves to be “team and people oriented,” that “share information freely,” and are “collaborative,” may score higher on “supportiveness.”

Groups that perceive themselves to be “reflective,” “having a good reputation,” and a “clear guiding philosophy,” may score higher on “social responsibility.” Groups that perceive themselves to be “calm,” “to have low conflict,” and a “sense of job security” may score higher on “stability.” Groups that perceive themselves to have “high expectations for performance,” “enthusiasm for their job,” to be “results oriented” and “highly organized,” may score higher on “performance orientation.”

The BFI is a validated, reliable instrument, which has been used to measure respondents’ personality traits. The BFI is considered to be a short instrument, suitable for self-administration, utilizing 44 phrases measured on five-point, Likert scales. As with the OCP, scoring the BFI involves combining the Likert scale responses, on a specific sub-set of the 44 phrases, related to each of the identified personality traits. The BFI measures five personality traits: extraversion, agreeableness, conscientiousness, neuroticism, and openness.

The trait “extraversion” describes behaviors such as being “energetic” and “enthusiastic,” “social,” “assertive,” “confident,” and “ambitious.” “Agreeableness” describes behaviors such as being “altruistic,” “cooperative,” “willing to conform to group norms,” and “displaying warmth and kindness.” “Conscientiousness” includes the ability to “control impulses” to “facilitate goal-directed behavior,” to “follow norms and rules,” and “efficiency in planning, organizing and prioritizing tasks.” “Neuroticism” as opposed to emotional stability, describes behaviors associated with “feelings of anxiety,” “nervousness,” and “depression.” People who score more highly on neuroticism in Big Five measures of personality may also display “self-consciousness,” be more “moody,” “impulsive,” and “stress-prone.” Finally, people who score more highly on the “openness to experience” trait are likely to have a “wide, deep and complex level of experience in the world.” Such people may also be more likely to be “knowledgeable,” “perceptive” and “analytical,” “seek out new experiences,” and are more “artistic” and “investigative.”

**Administration**

The survey was administered online with the assistance of the College of Pharmacists of British Columbia. All registered pharmacists in the province were sent an email invitation describing the survey, and inviting them to complete it. A link was embedded within the email invitation that could be used by respondents to complete the survey instrument, two separate email reminders were sent to registrants during the data collection period. The data was collected from October 1st through November 10, 2013.

**Analysis**

Data analysis was completed using SPSS® 19.0 for windows, and SAS v9.3 (SAS institute, Cary, North Carolina). Both the OCP and BFI were first analyzed using the scoring guidelines provided by the authors of the instruments. This procedure yields mean scores for each factor of the OCP and trait of BFI. However, these results do not lend themselves very easily to interpretation. As such, frequency counts of the responses to each item of both the OCP and BFI were made following the approach advocated by Clason and Dormody (1994). This approach has also been published elsewhere by these authors. In short, the ends of the Likert scale are first truncated, combining the “agree” and “disagree” options. Responses to category “3” remain “neutral” in this analysis. Frequency counts were then made for all scale positions for each trait, and were collated by each cultural factor or personality trait. A visual scale of the total proportion of item responses for each factor or trait was then created (see Figs. 1 and 2). This approach presents an alternative view of the data that is more reliably interpreted.

It is also important to note that neither the OCP nor the BFI are demonstrative measures of culture or personality. As such, it would be
inappropriate to suggest that respondents’ culture is innovative, or that respondents’ personality is extraverted. Results from the OCP will be described as suggesting “respondents perceived value in the factors.” Results from the BFI will describe respondents as being “possibly more likely to exhibit behaviors” in line with a particular trait.

The ANOVA procedure was used to examine univariate relationships of OCP factors and BFI traits with frequency of advanced practice services provided. Those meeting the threshold of significance at $P < 0.05$ were considered as covariates in multivariate models, in addition to age and sex. Ordinal logistic regression models were then constructed to examine the relationship between frequency of advanced practice services provided per month (for prescription adaptations, immunizations, and medication reviews) and characteristics from the BFI and OCP. Since these models did not satisfy the proportional odds assumption, we used multinomial logistic regression modeling and all reported odds ratios are those compared to the reference level of providing zero advanced practice services per month. Ethics approval for the conduct of this study was received from the Health Research Ethics board at the University of British Columbia.
Results

A total of 945 completed survey instruments were returned, for a response rate of 19%. The majority of respondents were female (61%), the average age of respondents was 42 years (SD: 12), and the average number of years in practice was 19 (SD: 12). Most respondents practiced in chain community pharmacies (56%), and classified their primary pharmacy role as being staff pharmacists (53%). According to the Canadian Institute of Health Information’s 2011 report 57% of BC pharmacists were female and pharmacists’ mean age was 42 years. A recent wage and benefits survey from British Columbia Pharmacy Association found that 66% worked in chain community pharmacies and 56% of respondents identified as staff pharmacists. These comparisons suggest that respondents from this study were generally representative of BC pharmacists.

In regards to the provision of advanced pharmacy services, the majority of respondents provided between 1 and 10 prescription adaptations (57%), and medication reviews, per month (53%). Furthermore, the largest proportion of respondents (45%) did not provide any immunizations either because they did not have the appropriate certification or just did not provide this service. See Table 1 for complete sample characteristics.

The means and reliability scores for the OCP factors and BFI traits are found in Table 2. A careful examination of the frequency counts of both the OCP and BFI (Figs. 1 and 2), suggest that the majority of pharmacists perceived value in the OCP factors of supportiveness, social responsibility, competitiveness, performance orientation and reward orientation, and the BFI traits of agreeableness, conscientiousness, and openness.

Advanced practice variables

Prescription adaptations provided/month

Age and sex were significantly associated with the number of prescription adaptations provided per month. As outlined in Fig. 3, older respondents provided a lower number of prescription adaptations per month (OR: 0.833, 95% CI: 0.702–0.987, for >10 prescription adaptations/month), when compared to younger respondents. Female respondents also provided a lower number of prescription adaptations (OR: 0.629, 95% CI: 0.418–0.948, for >10 prescription adaptations/month), when compared to male respondents.

In the age- and sex-adjusted multinomial logistic regression models, those who perceived value in OCP factor competitiveness provided at

### Table 1

<table>
<thead>
<tr>
<th>Characteristic (n missing)</th>
<th>Sub-grouping</th>
<th>Percentage (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>39% (364)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>61% (581)</td>
</tr>
<tr>
<td>Practice setting</td>
<td>1. Independent pharmacy</td>
<td>18% (173)</td>
</tr>
<tr>
<td></td>
<td>2. Chain pharmacy</td>
<td>56% (553)</td>
</tr>
<tr>
<td></td>
<td>3. Compounding pharmacy</td>
<td>1% (11)</td>
</tr>
<tr>
<td></td>
<td>4. In-patient hospital pharmacy</td>
<td>12% (114)</td>
</tr>
<tr>
<td></td>
<td>5. Ambulatory/long term care pharmacy</td>
<td>5% (48)</td>
</tr>
<tr>
<td></td>
<td>6. Non-traditional pharmacy/pharmaceutical roles</td>
<td>5% (46)</td>
</tr>
<tr>
<td>Primary role (n = 31)</td>
<td>1. Staff pharmacist</td>
<td>53% (499)</td>
</tr>
<tr>
<td></td>
<td>2. Clinical/specialist pharmacist</td>
<td>11% (105)</td>
</tr>
<tr>
<td></td>
<td>3. Pharmacy manager</td>
<td>27% (250)</td>
</tr>
<tr>
<td></td>
<td>4. Regional pharmacy manager</td>
<td>1% (13)</td>
</tr>
<tr>
<td></td>
<td>5. Relief/casual pharmacist</td>
<td>5% (47)</td>
</tr>
<tr>
<td>Prescription adaptations completed/month (n = 7)</td>
<td>1. Zero times/month (low)</td>
<td>20% (213)</td>
</tr>
<tr>
<td></td>
<td>2. 1–10 times/month (medium)</td>
<td>57% (594)</td>
</tr>
<tr>
<td></td>
<td>3. &gt; 10 times/month (high)</td>
<td>23% (243)</td>
</tr>
<tr>
<td>Immunizations provided/month (n = 7)</td>
<td>1. Zero times/month (low)</td>
<td>45% (472)</td>
</tr>
<tr>
<td></td>
<td>2. 1–10 times/month (medium)</td>
<td>37% (392)</td>
</tr>
<tr>
<td></td>
<td>3. &gt; 10 times/month (high)</td>
<td>18% (187)</td>
</tr>
<tr>
<td>Medication reviews completed/month (n = 7)</td>
<td>1. Zero times/month (low)</td>
<td>13% (135)</td>
</tr>
<tr>
<td></td>
<td>2. 1–10 times/month (medium)</td>
<td>53% (551)</td>
</tr>
<tr>
<td></td>
<td>3. &gt; 10 times/month (high)</td>
<td>35% (363)</td>
</tr>
</tbody>
</table>
least some prescription adaptations when compared to those who did not perceive value in this factor (OR: 1.25, 95% CI: 1.010–1.542, for 1–10 prescription adaptations/month). Those who scored higher on the BFI trait neuroticism were less likely than those scoring lower on this trait to adapt prescriptions (OR: 0.725, 95% CI: 0.560–0.938, for 1–10 prescription adaptations/month) (Fig. 3).

Immunizations provided/month

Age and sex were also significantly associated with the number of immunizations provided per month. As seen in Fig. 4, older respondents provided fewer immunizations per month (OR: 0.664, 95% CI: 0.562–0.784, for >10 immunizations/month). Furthermore, female respondents were less than half as likely as males to provide a high number of immunizations per month (OR: 0.439, 95% CI: 0.299–0.644, for >10 immunizations/month).

In the age- and sex-adjusted multinomial logistic regression model, associations between frequency of immunizations provided and the OCP factors competitiveness and stability were identified. Individuals who perceived greater value in pharmacy being competitive were twice as likely to provide a higher number of immunizations per month, than those who placed less value on competitiveness (OR: 2.055, 95% CI: 1.567–2.696, for >10 immunizations/month) (Fig. 4). Respondents who perceived value in pharmacy being stable were found to be roughly half as likely to

---

Table 2
Means and reliability scores for the OCP and BFI

<table>
<thead>
<tr>
<th>OCP factor</th>
<th>Mean score (SD)</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation</td>
<td>3.14 (0.81)</td>
<td>0.79</td>
</tr>
<tr>
<td>Supportiveness</td>
<td>3.49 (0.92)</td>
<td>0.87</td>
</tr>
<tr>
<td>Social responsibility</td>
<td>3.37 (0.81)</td>
<td>0.81</td>
</tr>
<tr>
<td>Competitiveness</td>
<td>3.44 (0.82)</td>
<td>0.79</td>
</tr>
<tr>
<td>Stability</td>
<td>3.28 (0.60)</td>
<td>0.72</td>
</tr>
<tr>
<td>Performance orientation</td>
<td>3.52 (0.76)</td>
<td>0.75</td>
</tr>
<tr>
<td>Reward orientation</td>
<td>3.04 (0.90)</td>
<td>0.79</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BFI traits</th>
<th>Mean score (SD)</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraversion</td>
<td>3.34 (0.68)</td>
<td>0.84</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>4.09 (0.49)</td>
<td>0.78</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>4.23 (0.52)</td>
<td>0.82</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>2.38 (0.67)</td>
<td>0.82</td>
</tr>
<tr>
<td>Openness</td>
<td>3.45 (0.55)</td>
<td>0.78</td>
</tr>
</tbody>
</table>

OCP: occupational culture profile; BFI: big five index; SD: standard deviation.
provide any immunizations (OR: 0.543 for immunizing 1–10 times/month, and OR: 0.643 for immunizing > 10 times/month). Respondents who scored higher on the BFI trait extraversion provided a higher number of immunizations per month than those who scored lower (OR: 1.538, 95% CI: 1.144–2.067, for > 10 immunizations/month). Those who scored higher on conscientiousness provided fewer immunizations each month when compared to those who scored lower (OR: 0.731, 95% CI: 0.538–0.994, for 1–10 immunizations/month) (Fig. 4).

Medication reviews conducted/month

Age was found to be significantly associated with frequency of medication reviews provided per month. Sex was not statistically significantly associated with frequency of medication reviews provided, however, it was included in the multinomial logistic regression model for adjustment. Similarly to regression results from the prescription adaptation and immunization models, older respondents provided fewer medications reviews per month (OR: 0.586, 95% CI: 0.484–0.709, for > 10 medication reviews/month and OR: 0.731, 95% CI: 0.538–0.994, for 1–10 immunizations/month) (Fig. 4).

In the age- and sex-adjusted multinomial logistic regression model respondents who perceived value in the OCP factor innovation were more likely to perform a higher number of medication reviews per month than those who did not perceive value in this factor (OR: 1.430, 95% CI: 1.083–1.889, for providing medication reviews > 10 times/month). Individuals who scored higher on the BFI trait extraversion performed close to half the number of medication reviews each month when compared to others who scored lower (OR: 0.652, 95% CI: 0.484–0.709, for 1–10 medication reviews/month). However, those respondents who scored higher on the trait agreeableness performed more medication reviews (OR: 1.738, 95% CI: 1.140–2.651, for providing medication reviews 1–10 times/month; and OR: 1.605, 95% CI: 1.015–2.539, for providing medication reviews > 10 times/month). Respondents who scored higher on the trait openness were found to be more than twice as likely to provide a high number of medication reviews per month than those who scored lower.

Fig. 4. Odds of providing frequent immunizations associated with demographics, OCP factors, and BFI traits. OCP: occupational culture profile; BFI: big five index; CI: confidence interval.
Discussion

This is the first study to demonstrate a relationship between the professional culture of pharmacy measured by the OCP, as well as pharmacists’ personality traits measured by the BFI, and the provision of advanced pharmacy services. As such, this work should be interpreted as a starting point for understanding how to assist pharmacy practitioners rise to the challenge of improving primary healthcare. Turning specifically to the adjusted relationships, respondents perceiving greater value in the OCP factors competitiveness and innovation provided a greater number of the advanced services explored herein. A positive relationship was also observed for those respondents who scored higher on extraversion in the case of immunizations, and the BFI trait extraversion in the case of medication reviews.

The general evaluation of OCP factors revealed that the majority of respondents identified value in the factors of supportiveness, social responsibility, competitiveness, performance, and reward orientation. As such, it is possible to suggest that respondents’ saw the professional culture as being team oriented, reflective, achievement oriented, having high expectations for performance, and being fairly compensated for their work.41 With regard to the BFI, it would appear that pharmacist respondents might be more likely to exhibit behaviors in line with the traits of agreeableness, conscientiousness, and openness. That is, respondents might be more likely to be altruistic, able to control impulses, and have a wide, deep, and complex level of experience in the world.42

Previous work characterizing pharmacists from other parts of Canada reveals a number of similarities to BC pharmacists on the OCP factors supportiveness, social responsibility, competitiveness, and performance orientation and the BFI traits agreeableness, conscientiousness and openness.44,45 However, BC pharmacist respondents
differed by identifying the OCP factor of stability.44

It is interesting to note that the factor innovation, and the trait extraversion, were not identified by more than 50% of respondents in this survey, or the previous work,44,45 but were positively related to the provision of some of the advanced pharmacy services explored herein. Research from the business literature has demonstrated that innovation is often related to positive business outcomes.48 In fact, the importance of innovation in business is such a central tenet, for better or for worse, that it is often assumed to be a prerequisite for success.49 There is also evidence of the positive influence of extraversion in sales and management positions,50 employee engagement,51 employee adaptability,52 as well as in training proficiency.50 Further, in-depth, qualitative work is needed in understanding pharmacists’ conceptualization of these factors and traits, before firm conclusions can be drawn as how they are manifested in daily practice.

A second parallel avenue of research testing the impact of factors like innovation and traits like extraversion in pharmacy settings is also possible. Through the application of the PARiHS framework, one possibility is to design a study wherein a facilitator may enter a pharmacy, or a group of pharmacies, to assist them to develop an environment wherein innovation is fostered, and pharmacists are afforded to the opportunity to act in a more extraverted fashion.53 An examination of the wider literature around these factors and traits suggests that steps may be take to increase their expression through the implementation of change management techniques such as Six Sigma.54 In particular, this process focuses on identifying efficiencies within the current system,54 which can be interpreted working to remove the systematic barriers often quoted in other pharmacy practice change literature.9,16–19

Limitations

There are several limitations to this study that must be acknowledged. To begin with, the response rate to the survey was relatively low. As such, it is not possible to state whether or not these results are generalizable to the larger pharmacist population in British Columbia. However, the confirmation of these findings by comparison with the national sample of hospital pharmacists and the Alberta pharmacists with independent prescribing is promising.

Conclusion

Results from this work reveal a number of significant positive relationships between the cultural factors competitiveness and innovation, with personality traits of extraversion, agreeableness and openness, and the provision of advanced pharmacy services by pharmacist respondents. This work represents an important starting point in the examination of the influence of professional culture and personality traits on the provision of advanced pharmacy services.

Acknowledgments

We acknowledge the Registrar, Mr. Bob Nakagawa, of the College of Pharmacists of British Columbia who provided funding and operational support for the dissemination of the survey.

References

5. Pharmacy services agreement. British Columbia: Health Services Department; 2010.
of practicing pharmacists. Can Pharm J 2011;144:
125–131.


12. CSHP 2015-Targeting Excellence in Pharmacy Prac-
tice; 2014 [cited 2014 February 5]. Available from:

13. Zardain E, de Valle Maria Olivo, Loza Maria Isabel,
Garcia Eduardo, Lana Alberto. Psychosocial and
behavioural determinants of the implementation of
pharmaceutical care in Spain. Int J Pharm Pract

care – opportunity for innovative pharmacy service.

15. Kidder S. Skilled nursing facilities – a clinical op-
portunity for pharmacists. Am J Hosp Pharm

16. Shoemaker SJ, Staub-De Long L, Wasserman M,
Spranca M. Factors affecting adoption and implemen-
tation of AHRQ health literacy tools in phar-

17. Hughes CA, Guirguis LM, Wong T, Ng K. Ing L,
Fisher K. Influence of pharmacy practice on community
pharmacists' integration of medication and lab value information from electronic health re-

18. Mak VS, Clark A, Poulsen JH, Udengaard KU,
Gilbert AL. Pharmacists awareness of Australia
health care reforms and their beliefs and attitudes
about their current and future roles. Int J Pharm

19. McCaig D, Fitzgerald N, Stewart D. Provision of
advice on alcohol use in community pharmacy: a
cross-sectional survey of pharmacists’ practice,
knowledge, views and confidence. Int J Pharm

20. Scott-Findlay S, Golden-Biddle K. Understanding
how organizational culture shapes research use. J

21. Martin J. Organizational Culture: Mapping the

22. Kitson A, R-M J, Harvey G, McCormack B, Seers K,
Titchen A. Evaluating the successful implementation
of evidence into practice using the PARIHS frame-
work: theoretical and practical challenges. Implement

23. Kitson A, Harvey G, McCormack B. Enabling the
implementation of evidence based practice: a concep-

24. Schein EH. Organizational Culture and Leadership.

25. Livigni R. Occupational subcultures in the work-

26. Boutin-Foster C, Foster J, Konopasek L. Physician,
know thyself: the professional culture of medicine as
a framework for teaching cultural competence.

boundaries in professional care. J R Soc Med

28. Carroll J, Quijada M. Redirecting traditional pro-
fessional values to support safety: changing organi-
zational culture in healthcare. Qual Saf Health Care

Pharmacists’ perceptions of their professional

30. Rosenthal M, Breault R, Austin Z, Tsuyuki R.
Pharmacists’ self perception of their professional
role: insights into community pharmacy culture. J
Am Pharm Assoc 2011;51:363–367.

31. Burke L, Davies K. Introducing the special edition
on occupational culture and skills in probation

32. Hansen CD, Kahnweiler WM, Wilensky AS. Hu-
man resource development as an occupational cul-
ture through organizational stories. Hum Resour

33. Johnson SD, Koh HC, Killough LN. Organiza-
tional and occupational culture and the perception
of managerial accounting terms: an exploratory
study using perceptual mapping techniques. Cont-

34. Personality. Washington, DC: American Psycho-
logical Association; 2014 [cited 2014 September
personality/.

35. McCrae RR. Trait psychology and the revival of
personality and culture studies. Am Behav Sci


37. McCrae RR, Terracciano A. Personality profiles of
cultures: aggregate personality traits. J Pers Soc

38. O’Reilly C, Chatman J, Caldwell D. People and
organizational culture: a profile comparison

39. Adkins B, Caldwell D. Firm or subgroup culture:
where does fitting in matter most? J Organ Behav

40. Cable DM, Judge TA. Interviewers’ perceptions of
person – organization fit and organizational selec-

41. Sarros J, Gray J, Densten I, Cooper B. The organi-
zational culture profile revisited and revised: an
Australian perspective. Aust J Manag 2005;30:
159–182.

42. John O, Naumann L, Soto C. Paradigm Shift to the
Integrative Big Five Taxonomy: History, Measure-
ment and Conceptual Issues. New York: Guilford
Press; 2008.


