

Relationship between personality traits and pharmacist performance in a pharmacy practice research trial

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The scope of practice for pharmacists continues to expand, and the evidence for the value of pharmacists' interventions is strong. This research provides insights to help pharmacists integrate these new opportunities into practice sustainably, and it allows for the scale-up and spread of this practice across the profession.

Le champ d'exercice des pharmaciens continue de s'élargir, et les données démontrant la valeur de leurs interventions sont probantes. Cette étude fournit aux pharmaciens des renseignements qui les aideront à intégrer les nouvelles occasions d'intervention de façon durable. Elle permettra également d'en faire la promotion et d'en généraliser l'adoption au sein de la profession.

ABSTRACT



Background: Pharmacy practice research is one avenue through which new pharmacy services can be integrated into daily pharmacy practice. However, pharmacists' participation in this research has not been well characterized. Drawing from the literature on work performance and personality traits, 4 hypotheses were developed to gain insight into pharmacists' performance in a pharmacy practice research trial.

Methods: This study was an observational, cross-sectional survey of pharmacists participating in a research trial. All pharmacists were asked to complete the Big Five Inventory (BFI), a validated, reliable instrument of personality traits. These results were then compared with measures of pharmacists' performance in the trial.

Results: Thirty pharmacists expressed interest in participating in the trial; 23 completed the BFI and 14 actively participated in the pharmacy practice research trial. No statistically significant differences were identified in the examination of the predetermined hypotheses. Exploratory analyses revealed significant relationships between the BFI trait of extroversion and pharmacists' participation in the study, obtaining prescribing authority for the study and the number of patients lost to follow-up.

Discussion: In addition to identifying a number of personality traits that have been shared by other samples of pharmacists, this work suggests the possibility of an interaction between pharmacists' personality traits and their performance in a pharmacy practice research trial.

Conclusion: Future research should better characterize the relationship between pharmacists' personality traits and participation in pharmacy practice research trials to gain insight into the context of pharmacy practice and how pharmacists are integrating this research into their practices. *Can Pharm J (Ott)* 2015;148:209-216.

Background

The volume of output of pharmacy practice research has increased steadily over time. This can be observed in the proliferation of systematic reviews and meta-analyses of studies of pharmacists' impact on the clinical outcomes of patients. For example, recent systematic reviews have demonstrated that pharmacists' direct care of patients has reduced hemoglobin A1C levels, reduced the risk of all-cause and heart

failure-related hospitalizations, decreased low-density lipoprotein cholesterol (LDL-c) levels and improved the identification of patients at high risk of osteoporosis.¹⁻⁴ The value of pharmacists has also been shown in a recent systematic review of health care teams. In this case, older patients attended to by teams containing pharmacists were more likely to achieve therapeutic, safety and adherence outcomes and to have decreased rates of rehospitalization.⁵ It is clear

KNOWLEDGE INTO PRACTICE



- Personality traits may play an important role in how pharmacists approach the adoption of new scopes of practice.
- Insight into the context of pharmacy practice can be used in future studies of knowledge implementation in pharmacy practice.

that pharmacy practice research provides key evidence for the value of pharmacists' direct care of patients.^{6,7}

Pharmacy practice research is also considered to be a method through which clinically relevant and important information is translated into the practice setting.⁶ For this reason, pharmacists' perceptions of and attitudes toward pharmacy practice research are important. A recent systematic review examining pharmacists' attitudes toward research suggests that over time they have become more positive and that more pharmacists are actively participating in this research.⁸ While such improvements are always heartening, these self-reported measures are difficult to interpret in a completely positive light.

A recent study of community pharmacists' interest in participating in a practice-based research network found that only 56% of respondents saw it as an opportunity for the development of new pharmaceutical practices.⁹ Another study using post hoc interviews of pharmacists who had participated in data collection for a pharmacy practice research study found that they had not collected very much data because of time constraints.¹⁰ This was despite observations made by research team members that the act of data collection took only seconds per patient.¹⁰ If it is to be assumed that pharmacy practice research is a pathway to the integration of new practices, a greater understanding of how pharmacists participate in this research is needed.

One approach for contextualizing an understanding of pharmacists' research participation is thinking about this issue as a knowledge translation (KT) problem. The Promoting Action on Research Implementation in Health Services (PARiHS) framework is a KT theory that describes 3 factors—research evidence, context of practice and a facilitation plan—that must be optimized before a new activity can successfully be undertaken.¹¹

According to the PARiHS Framework, the evidence component includes both codified (i.e.,

clinical research evidence) and noncodified (i.e., tacit or “craft”) knowledge. Based on the volume of evidence of pharmacists' benefit to patient care as described by the systematic reviews, it can be assumed that the codified knowledge is relatively well optimized.¹⁻⁵ However, the manner in which pharmacists have constructed the noncodified knowledge of pharmacy practice and how that knowledge is enacted in practice may not be optimized.¹¹

For instance, a recently published study found that pharmacists agreed or strongly agreed, despite the lack of evidence of effectiveness, that cough medicine was an important management option for patients with a cold.¹² Other studies examining the evidence-based practice of various health care professionals, including physicians and pharmacists, found that pharmacists often felt they lacked the skills, knowledge and confidence to integrate evidence-based knowledge into their practice.^{13,14} These examples suggest the possibility that noncodified knowledge in pharmacy may not emphasize the timely integration of codified knowledge into practice.

A review of the literature on the development, transmission and enactment of noncodified knowledge suggests that it may depend, in part, on individual personality traits. For example, in the economic psychology literature, a study of teams from an engineering company demonstrated significant positive correlations between knowledge sharing and the personality traits of agreeableness, conscientiousness and openness as measured by the NEO Five-Factor Inventory.¹⁵ Additional studies have also demonstrated correlations between work-related performance and successes and personality traits. A pharmacy simulation study found that undergraduate psychology students with higher scores on the personality trait neuroticism, as measured by the Eysenck Personality Inventory, had lower false alarm rates when checking mock prescriptions.¹⁶

Furthermore, a systematic review examining job performance, which was defined as the confluence of job and training proficiency and personnel data, in a number of job groups that included professionals and managers, found a positive correlation with scores on the trait of conscientiousness, as measured across a number of instruments.¹⁷ Finally, a study focusing on the sales performance of pharmaceutical company sales representatives found that when employees

were in the maintenance phase of their careers, performance growth was positively correlated with scores on conscientiousness, as measured by the NEO Five-Factor Inventory.¹⁸ However, when in a transitional phase of their careers, the traits of agreeableness and openness were positively correlated with sales representatives' performance.¹⁸

While some work on the characterization of the personality traits of pharmacists has been undertaken,^{19,20} it is important to begin to establish how these traits may correlate with pharmacists' behaviours. This work has yet to be undertaken with pharmacists who are participating in pharmacy practice research. For this reason, the objective of this study was to explore the relationship between pharmacists' personality traits and their actions in a pharmacy practice research trial. This will provide a basis for further research in this field.

Hypotheses

A number of hypotheses have been developed based on an examination of the literature surrounding personality traits and work performance. However, it is important to note that none of this work has been undertaken in pharmacy or other health professions. Therefore, due to the exploratory nature of this study, several additional analyses were performed to more thoroughly explore the data collected. These analyses are detailed in the analysis section.

The first hypothesis was based on previous research suggesting that people who scored higher on the trait "conscientiousness" also exhibited greater training proficiency, which is a marker of overall job performance.¹⁷

Hypothesis 1: There will be a positive relationship between obtaining independent prescribing authority and pharmacists' scores on conscientiousness as measured by the Big Five Inventory (BFI). The specific prediction is that pharmacists who have prescribing authority will score more highly on the trait "conscientiousness."

Previous research also suggests that those people who exhibit behaviours associated with the trait "extroversion" tend to be more successful in the area of pharmaceutical sales performance.¹⁷ The second and third hypotheses were developed based on this information.

MISE EN PRATIQUE DES CONNAISSANCES



- Les traits de personnalité peuvent influencer grandement sur la façon dont un pharmacien envisage les nouvelles activités du champ de pratique.
- Les renseignements tirés de l'exercice de la pharmacie peuvent être utilisés pour de futures études sur l'application des connaissances en milieu pharmaceutique.

Hypothesis 2: There will be a positive relationship between the number of patients recruited by each pharmacist and pharmacists' scores on the extroversion scale of the BFI. The specific prediction is that pharmacists who recruit a higher number of patients will also score more highly on the trait "extroversion."

Hypothesis 3: There will be a negative relationship between the number of patients lost to follow-up and pharmacists' scores on the extroversion scale of the BFI. The specific prediction here is that pharmacists who lose fewer patients to follow-up will score more highly on the trait "extroversion."

The fourth and final hypothesis is exploratory in nature, as no specific literature in this area was identified.

Hypothesis 4: There will be a relationship between the proportion of patients achieving target LDL-c levels and the pharmacists' scores on any factors on the BFI (1-tailed test).

Methods

Design

This was a pragmatic, observational, cross-sectional survey substudy of pharmacists participating in a larger pharmacy practice research trial. No sample size calculation was conducted for this study. While no definitive causal conclusions about the results can be made, the exploratory nature of this work will allow the development of hypotheses for future research studies. Ethics approval for this study was received from the Health Research Ethics Board at the University of Alberta.

Participants

Participants included all Alberta community pharmacists who expressed interest in participating in a pharmacy practice research trial examining pharmacists' management of a chronic condition using independent prescribing authorization. To participate in the trial, pharmacists had to obtain additional prescribing authorization (APA). All interested pharmacists who did not have this ability were provided assistance in completing the application process outlined by the Alberta College of Pharmacists.

Procedures

All pharmacists who expressed interest in participating in the pharmacy practice research trial were provided with a brief introductory letter and the BFI instrument, either in hard copy form or electronically, depending upon their individual preference. The primary purpose of this substudy was not revealed to pharmacist participants. Rather, the substudy was explained as being one part of a larger study seeking insight into pharmacists' personalities, as a means of improving training and education programs for pharmacists.

The reason for this was to minimize the impact of social desirability bias.¹⁷ More specifically, it was felt that knowledge of the primary purpose of this study might have unduly influenced pharmacists' conduct within the pharmacy practice research trial. Pharmacists returned the completed BFI instrument via mail or e-mail. Completing the instrument was not mandatory, and all pharmacists received the same level of support and training in the pharmacy practice research trial regardless of whether they completed the BFI instrument.

Instruments and measures

The Big Five Inventory (BFI), a validated, reliable instrument, was used to measure pharmacists' personality traits.²¹ Reliability scores from a population-based sample of respondents are as follows: extroversion 0.86, agreeableness 0.79, conscientiousness 0.82, neuroticism 0.87 and openness 0.83.²¹ The BFI is considered to be a short instrument, suitable for self-administration, using 44 phrases measured on 5-point Likert scales.²¹

The 5 traits measured include extroversion, agreeableness, conscientiousness, neuroticism and openness. The trait "extroversion" describes

behaviours such as being "energetic" and "enthusiastic," "social," "assertive," "confident" and "ambitious."²¹ "Agreeableness" describes behaviours such as being "altruistic," "cooperative," "willing to conform to group norms" and "displaying warmth and kindness."²¹ "Conscientiousness" includes the ability to "control impulses" to "facilitate goal-directed behaviour," to "follow norms and rules," and "efficiency in planning, organizing and prioritizing tasks."²¹ "Neuroticism," as opposed to emotional stability, describes behaviours associated with "feelings of anxiety," "nervousness" and "depression." People who score more highly on "neuroticism" may also display "self-consciousness," be more "moody," "impulsive" and "stress-prone."²¹ 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."²¹ Such people are also likely to be "knowledgeable," "perceptive" and "analytical," "seek out new experiences" and are more "artistic" and "investigative."²¹

Pharmacists' performance within the study was determined largely using the objectives from the main trial. More specifically, these measures included 1) the number of patients achieving guideline disease targets and 2) the proportion of reduction in the disease-specific measure from baseline to 6 months. Three measures were added examining 1) the total number of patients recruited, 2) the number of patients lost to follow-up and 3) whether pharmacists obtained APA. This final measure only applied to those pharmacists who did not have this ability when they originally expressed interest in the study.

Analysis

Data analyses were completed using SPSS 20.0 for Windows. First scoring of the BFI was completed in accordance with guidelines set out by instrument authors (www.ocf.berkeley.edu/~johnlab/bfi.htm). In particular, scoring the BFI involves summing and then averaging the Likert scale responses on a specific subset of the 44 phrases related to each of the identified personality traits. These average scores were then used in testing the outlined hypotheses. It is important to note that this treatment of the results from the BFI has met with some criticism within the literature.²² However, recent work suggests that applying parametric methods to this type of data does

TABLE 1 Reliability scores for Big Five Inventory (BFI) traits

BFI trait	Cronbach's α
Extroversion	0.90
Agreeableness	0.69
Conscientiousness	0.86
Neuroticism	0.83
Openness	0.82

not yield incorrect results.²³ That being said, this does not address the issue of the interpretability of these average scores without comparison on some other variable.

In an effort to improve the understanding of the BFI scores, to answer the question “what do these scores mean?” a second representation of the BFI results is provided.^{19,22} To begin, it is important to keep in mind that the BFI is not a demonstrative measure of personality and as such it is inappropriate to suggest that respondents are “extroverted” or “conscientious.” Rather, this measure should be interpreted as providing insight into the characteristics an individual may be more likely to express in any given situation.

In this alternative representation, frequency counts of responses to each of the BFI's 44 items, associated specifically with each trait, have been made. That is, counts were made of the number of times each respondent “strongly agreed,” “agreed,” was “neutral,” “disagreed” or “strongly disagreed” with each item. These counts were then added together for each of the 5 traits to develop a proportionally representative scale. For the purposes of readability of this scale, the data on the ends of the Likert scale were truncated, combining the “strongly agree” and “agree” into one category (“agree”), and doing the same with the “strongly disagree” and “disagree” categories. Responses to category 3 remain “neutral.” When more than 50% of respondents “agreed” with the items composing any one trait, it might be suggested that they may be more likely to exhibit behaviours in line with that trait. No direct comparisons will be made between these results and the population level means.

All hypothesis testing was performed using the mean BFI scores. For these analyses a significance level of 0.05 was established. Hypothesis 1 was tested using independent samples *t*-test.

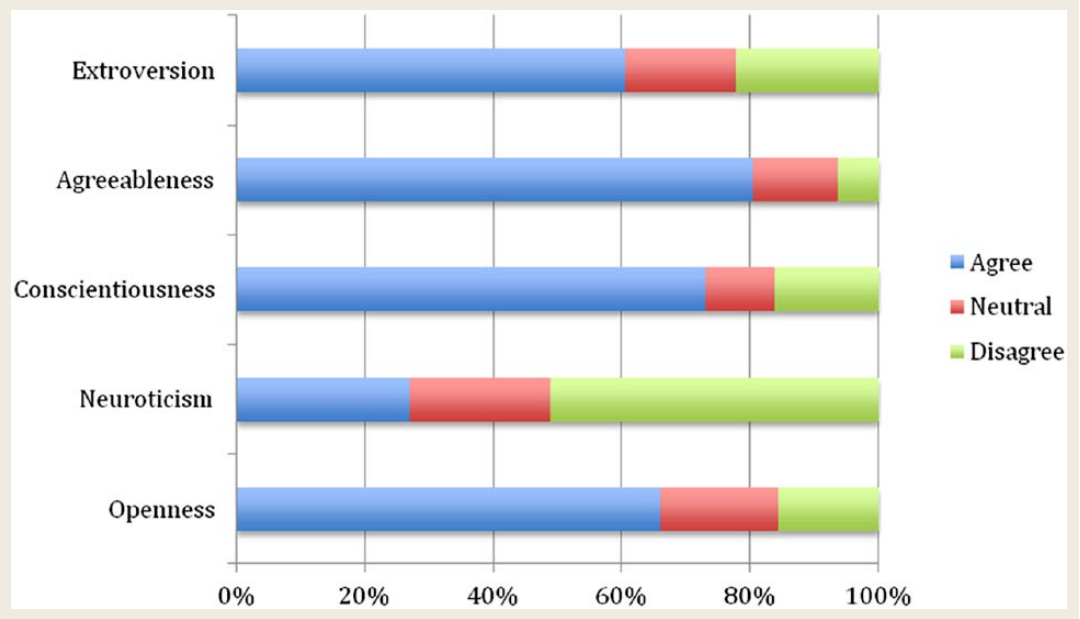
Where significant differences/relations were identified, further analyses were conducted to identify the nature of that relation using exploratory post hoc testing. Hypotheses 2 through 4 were tested using a simple linear regression analysis. All exploratory analyses were conducted using independent samples *t*-test, using the effect size measures established by Field.²⁴

Results

A total of 30 pharmacists originally expressed interest in participating in the pharmacy practice research trial. Twenty-three of these pharmacists completed the BFI. Fourteen of the 23 actively participated in patient recruitment and follow-up. The remaining pharmacists were not involved in the pharmacy practice research trial. The majority (87%) of the originally interested pharmacists worked in a chain pharmacy setting. Just less than half (48%) of the interested pharmacists already had their APA; 33% of pharmacists who did not have APA went on to obtain it and participate in the trial. The participating pharmacists who completed the BFI recruited a total of 76 patients—24 of these patients achieved LDL-c guideline targets and a total of 6 patients were lost-to-follow up. These patient losses were spread across the group of participating pharmacists.

The mean scores (SD) of pharmacists on the BFI traits were as follows: 3.56 (0.92) on extroversion, 4.21 (0.46) on agreeableness, 4.01 (0.71) on conscientiousness, 2.51 (0.76) on neuroticism and 3.67 (0.65) on openness. Reliability scores for BFI scores can be found in Table 1. An examination of Figure 1 reveals that pharmacist respondents may be more likely to exhibit behaviour in line with the traits of extroversion, agreeableness, conscientiousness and openness.

Results from the prespecified hypotheses are presented first. Each of these hypotheses was tested using the BFI responses from those pharmacists who actively participated in patient recruitment and follow-up in the trial. There was no support for hypothesis 1, measuring a positive association between obtaining APA and the conscientiousness score ($t(21) = 0.93$, $p = 0.372$); hypothesis 2, measuring a positive linear relationship between the number of patients recruited and extroversion score ($b = 0.08$, $t(10) = 1.38$, $p = 0.199$); hypothesis 3, measuring a negative linear relationship between the numbers of patients lost to follow-up and extroversion score ($b = -0.62$,

FIGURE 1 Proportional representation of Big Five Inventory (BFI) scores

$t(10) = -1.74, p = 0.113$); or hypothesis 4, measuring a relationship between the number of patients achieving guideline targets and pharmacists scores on any of the traits of the BFI (extroversion, $b = 0.12, t(10) = 0.95, p = 0.364$; agreeableness, $b = 0.03, t(10) = 0.50, p = 0.628$; conscientiousness, $b = 0.06, t(10) = 0.82, p = 0.432$; neuroticism, $b = -0.11, t(10) = -0.98, p = 0.352$; openness, $b = -0.05, t(10) = -0.47, p = 0.647$).

The following results are from the exploratory analyses of nonspecified hypotheses. Where appropriate, these analyses included the results from those pharmacists who originally expressed interest in participating in the study but may not have actively recruited patients. For the purpose of this analysis, all of the performance variables were truncated when compared with the BFI traits. A significant relationship was noted between pharmacist scores on extroversion and whether the pharmacists ultimately participated in the trial for all those pharmacists who completed the BFI ($t(21) = 2.24, p = 0.036$). On average, pharmacists who scored more highly on the extroversion trait ($M = 3.94, SE = 0.25$) were more likely to participate than those pharmacists who scored lower ($M = 3.15, SE = 0.25$). The effect of the extroversion score on participation was medium ($r = 0.31$).

Significant differences were also noted for whether a pharmacist went on to obtain APA and scores on extroversion for those pharmacists who did not have APA at the beginning of the

study ($t(12) = 3.00, p = 0.013$). On average, pharmacists who went on to obtain their APA scored higher on the trait extroversion ($M = 4.41, SE = 0.27$) than those pharmacists who scored lower ($M = 3.06, SE = 0.26$). The effect of the extroversion score was medium ($r = 0.45$). There was also a significant difference on extroversion scores for pharmacists who did and did not lose patients to follow-up ($t(10) = -3.04, p = 0.013$). On average, pharmacists who possessed a higher extroversion score ($M = 4.42, SE = 0.19$) had fewer patients lost to follow-up than pharmacists with a lower extroversion score ($M = 3.26, SE = 0.38$). Furthermore, the effect of the extroversion score on loss to follow-up was large ($r = 0.66$).

Discussion

If pharmacy practice research is to be a pathway to the integration of new practices, a greater understanding of how pharmacists participate in this research is needed. This study represents a preliminary step in understanding the possible relationship between pharmacists' personality traits and behaviour in a pharmacy practice research trial. In general, pharmacists who participated in this study may be more likely to exhibit behaviours in line with the traits of extroversion, agreeableness, conscientiousness and openness. Using the definitions of each of the traits, these pharmacist respondents might be more likely to exhibit energy and enthusiasm, altruism, goal-directed behaviour and an

interest in obtaining new knowledge.²¹ Turning to the 4 predetermined hypotheses, none were confirmed. However, the additional exploratory analyses yielded a number of notable findings. In particular, extroversion demonstrated a significant relationship to whether interested pharmacists participated in the study, to whether pharmacists obtained their APA, and the number of patients lost to follow-up.

Previous work using the BFI with hospital pharmacists and Alberta pharmacists who obtained APA has identified the traits of agreeableness, conscientiousness and openness.^{19,20} The study examining the personality traits of Alberta pharmacists with APA also identified the trait extroversion.²⁰ As described in the background section, the traits of agreeableness, conscientiousness and openness have been related to information-sharing activities (i.e., the development of noncodified knowledge)¹⁵ and success in transitional phases of careers.¹⁸ The replication of these traits across studies suggests that an exploration of how adjusting the pharmacy practice environment to promote the greater activation of these traits is warranted to determine whether behaviour changes also result here. However, given the preliminary nature of this work, no firm conclusions about these findings are reasonable at this time.

The primary limitation of this study is that the sample of pharmacists participating was small. However, as this project was conducted in conjunction with pharmacists' participation in a larger pharmacy practice research trial, a larger sample was not feasible. But clearly, before firm

conclusions can be drawn, additional data are needed.

Future research examining pharmacists' participation in pharmacy practice research studies should seek to confirm that the above-mentioned set of traits holds for additional samples of pharmacists. In so doing it is possible that additional significant relationships may be identified. It will also be important to develop further insights into the context factor of the PARiHS framework. There has been some research in this area,²⁰ but further work applying qualitative methodological approaches is required. Without these insights, the development of facilitated interventions to improve the uptake of pharmacists' participation in pharmacy practice research and the subsequent integration of new practice approaches in daily practice will not be successful.

Conclusion

This is the first study that links pharmacists' results on the BFI to their performance in a pharmacy practice research study. The results suggest that there may be a connection between the trait extroversion and some pharmacy practice research outcomes, including whether the pharmacist ultimately chose to participate in the study. Past explanations for the lack of success in pharmacy practice change have not been well characterized; the information gathered from this study provides some insight into this area. Future research should work to better characterize this possible relationship in order to gain further insight into the context of pharmacy practice. ■

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