

UNIVERSITY OF CALGARY

Using Chiropractic Judgment Vignettes Interview to Assess
Chiropractors' Non-cognitive Attributes: A Generalizability Study

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF SCIENCE

DEPARTMENT OF MEDICAL SCIENCES

CALGARY, ALBERTA

December, 2011

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ABSTRACT

The purpose of this study was to determine the reliability and validity of the chiropractic judgment vignettes (CJV) interview to assess the non-cognitive attributes of chiropractors. The study had 24 chiropractors acting as candidates rotating through six CJV interview stations. The research process had two stages: first, was a two-facet, nested design utilizing six chiropractors as initial raters; and second, was a two-facet fully crossed design utilizing two well-trained independent raters. Correlations between the NEO-Five Factor Inventory and CJV produced mixed results. The generalizability study with the original 6 stations resulted in a G-coefficient of $E\rho_{\delta}^2 = 0.51$ for the independent raters and $E\rho_{\delta}^2 = 0.63$ for the initial raters. Decision study analyses indicated that the G-coefficient could be improved for the independent raters to $E\rho_{\delta}^2 = 0.68$ (12 stations, 2 raters), whereas a similar coefficient of $E\rho_{\delta}^2 = 0.69$ could be achieved for the initial raters (8 stations, 1 rater).

ACKNOWLEDGMENTS

As with most things, it takes a number of people to successfully complete a project of this magnitude. First and foremost I would like to acknowledge the incredible support I received from my supervisor Dr. Tyrone Donnon. Without his expertise I would surely have been lost. The other two members of my supervisory committee, Dr. Elizabeth Oddone Paolucci and Dr. Kent Hecker, are to be acknowledged not only for their input to the organization of the project but also their personal time in participating in the data collection. I am also extremely grateful to those members of my profession who gave of their very valuable time to help with this project. And last but certainly not least, I would like to thank my husband and children for putting up with me for the past four years as I struggled to complete the master's requirements as a 'mature' student.

DEDICATION

To my sister Lisa Baptie, BEd MEd

(1962 – 2009)

A great teacher and life-long learner
who left this world still wanting to do so much more.

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CHAPTER I

INTRODUCTION

The chiropractic profession in Alberta must comply with the requirements as set out in the Alberta Health Professions Act that dictates, in order to maintain the right to self-regulate, the profession must ensure that all members are competent to practice. According to the Health Professions Act, competence is defined as „the combined knowledge, skills, attitudes and judgment required to provide professional services’.¹

Although the Alberta Health Professions Act has determined a definition for competence, the term is used very inconsistently in the literature and is often interchanged with ‘professionalism’ or occasionally the two terms are used in combination. The term ‘non-cognitive attributes’ may be found in the definition of either competence or professionalism, depending on how each term is defined. Similarly, the term ‘non-cognitive attributes’ could be substituted by ‘attitudes and judgments’ as apparently is the case in the definition provide by the Alberta Health Professions Act. This inconsistency in the definitions of the terms competence, professionalism, and non-cognitive attributes leads to inherent difficulties in the assessment of these qualities.

Non-cognitive attributes may include but are not limited to traits such as morals, values and ethics, empathy and altruism. Price et al.² suggest there may be as many as 87 different qualities to be considered. Compliance with the directive given by the Alberta Health Professions Act that all chiropractors practicing in Alberta are competent to do so is achieved by having all applicants who wish to practice in this province successfully complete the Canadian Chiropractic Examining Board (CCEB) licensing exams.³ These

exams include three separate components: Component A, which tests chiropractic knowledge, is a set of two multiple choice exams with each session allowed three hours for completion and; Component B, which tests clinical decision making and diagnostic imaging, also has two sessions of multiple choice exams with each allowed three hours for completion; and Component C, a single three-hour session of an oral/practical exam testing clinical skills using the format of an objective structured clinical examination (OSCE). Aspects of professionalism are assessed in Component B and interpersonal and communication skills are assessed in Component C. For reasons of exam security, the CCEB did not reveal the marking rubric for assessment of these non-cognitive attributes therefore it is not possible to report the psychometrics of these assessment measures.

Although attempts are made to assess non-cognitive attributes of chiropractors, such as the assessments provided by the CCEB, reliable and valid testing instruments are still in the development stage. The use of the semi-structured or structured interview formats have been found to be the best methods to evaluate non-cognitive attributes in medical school applicants.⁴⁻¹⁰ Medical judgment vignettes and multiple mini-interviews are two examples of such interviews respectively. Donnon and Oddone Paolucci⁴ designed a generalizability study utilizing medical judgment vignettes (3 stations/2 judges) and achieved a generalizability coefficient of $E\rho_{\delta}^2 = 0.70$. Donnon et al.⁵ designed a predictive validity study utilizing medical judgment vignettes and achieved an inter-rater reliability of $K = 0.96$ and statistically significant correlations between the vignettes and mandatory clerkship evaluations of $r = 0.39$ ($p < 0.05$) and $r = 0.55$ ($p < 0.01$) thereby showing that the use of medical judgment vignettes as part of an admission's

interview process has good predictive validity. Hecker et al.,⁶ using the multiple mini-interview (MMI) format, produced a generalizability coefficient of $E\rho_{\delta}^2 = 0.88$ and produced evidence of divergent validity. Lemay et al.⁷ found the multiple mini-interviews were able to assess different non-cognitive attributes and claimed the results were fairer and more defensible than traditional interview methods. Eva and various collaborating authors⁸⁻¹⁰ have published articles on multiple mini-interviews, especially with regards to its utility in medical school admissions, showing reliability coefficients from $\alpha = 0.65$ to 0.78 .

Although there may be difficulties in assessing non-cognitive attributes, the importance of health professionals exhibiting these traits is not in dispute. With pressures on the healthcare system such as advanced technology, changing market forces, barriers to healthcare delivery, and outside for-profit influences, professionalism in health care came to the forefront resulting in a charter of medical professionalism.¹¹ The charter dictates that professionalism is the basis of the healthcare practitioners' contract with society. This social contract is based on the trust society has that the profession will maintain levels of competence and integrity of individual practitioners which will then translate into trust of the profession.¹¹ In turn, the medical practitioners will enjoy autonomy, elevated status and financial rewards.^{12,13} The various stakeholders in healthcare from the patients through to the payers such as government or private health insurance plans have a social contract with healthcare providers that is based on the trust that the professions are self-regulating the competence of the practitioners. This competence includes the cognitive aspect of knowledge and skills, as well as the non-

cognitive aspect of attitudes and judgment. Knowledge and skills are fundamental to health care professionals and play a significant part in health care outcomes and patient satisfaction. However, non-cognitive traits are increasingly recognized as also playing a significant part in outcomes and satisfaction, particularly the traits of empathy¹⁴⁻¹⁶ and effective communication.^{17,18} When empathy and good communication are part of a patient's care, the patient responds with higher compliance to medication, increased patient satisfaction and ultimately better health care outcomes.^{19,20} The emerging importance of non-cognitive traits of healthcare providers does not subdue or negate the patient's preference for a practitioner with exemplary knowledge and skills. When a sample of patients were asked to give their preference of hypothetical practitioners based on fictitious report cards indicating the practitioners' traits, the patients showed a strong preference for physicians of high technical quality but a significant portion of the sampled patients indicated they would prefer a practitioner with strong interpersonal traits.²¹ Realizing the importance of empathy and good communication in the physician-patient relationship, Neuwith¹⁵ illustrated a model to enhance these processes in the clinical setting. The illustration provides a visual progression for empathetic opportunities in the primary care setting wherein the patient's verbal clues are recognized by the provider leading to the patient feeling understood. Kane et al.,¹⁶ in an attempt to fill the void of psychometrically sound instruments to measure these traits, developed an empathy assessment tool - the Jefferson Scale of Patient's Perceptions of Physician Empathy. This five item tool showed good psychometric characteristics with factor analysis indicating measurement of only one factor (empathetic engagement) and item-total correlations ranging from $r = 0.77$ to 0.90 ($p < 0.001$).

Non-cognitive attributes have also been linked to patient satisfaction in encounters with chiropractors.²²⁻²⁶ A survey done in 2009 by The Canadian Chiropractic Association revealed eight in ten users of chiropractic services were satisfied with their most recent chiropractic care experience.²² Similar to the studies done on patient satisfaction with medical doctors, studies looking at chiropractic care by Gaumer,²³ Beattie et al.²⁴ and Rowell and Polipnick²⁵ also found that communication between the chiropractor and the patient played a very important role. Meeker and Haldeman²⁶ expanded on this concept with the statement: “The hands-on and compassionate „can-do’ clinical behaviour of the typical chiropractor seems to be concrete, reassuring, and immediately satisfying.”

The importance of the role non-cognitive attributes play in health care is becoming increasingly evident from a patient satisfaction and health outcome perspective. Although somewhat difficult to determine, assessment of these attributes has practical applications to the chiropractic profession. Not only could this process be used to satisfy the requirement for competence to practice as set out in the Alberta Health Professions Act for the assessment of the non-cognitive attributes of practicing chiropractors, the identification of these non-cognitive attributes could potentially be used for the selection of students to enter a chiropractic training program or perhaps the assessment of the students as they proceed through their training.

Basic Study Design

The focus of this study was to test an assessment method that may prove to be useful in determining the non-cognitive attributes that chiropractors are expected to use in everyday practice when faced with dilemmas such as doctor-patient relationships,

financial matters, issues of opinion versus public policy, and providing appropriate care. This study used generalizability theory to determine the dependability or reliability of a chiropractic judgment vignettes interview; the content of the interview vignettes was solicited to reflect possible everyday clinical encounters in a chiropractic practice. There were two designs used in this study. The first was a nested design wherein the initial raters stayed at one station for a full rotation of six participants and then moved to another station. This process was repeated four times resulting in the raters interviewing all 24 participants but only interviewing participants at four of the six vignette stations. This design partially nested the raters within the stations. The second design was a fully crossed design utilizing independent raters. Two raters viewed DVDs of the interviews and assessed each of the 24 participants through all six stations. The participants were also asked to complete a NEO-Five Factor Inventory (NEO-FFI) personality questionnaire after the interview process. The six different judgment vignettes were specifically developed to represent the main dilemmas associated with non-cognitive behaviours in chiropractic practice. For each vignette, a rater reviewed the discussion points presented by the participant and determined the level of non-cognitive development on a 5-stage rubric scale. A generalizability analysis using the G String IV software program was performed to determine the variance components and percentage of variance contributed by each of the three main effects (i.e., participant/candidate, rater and vignette station). A decision study was used to determine how to vary the facets in order to produce the best G coefficient to achieve a standard setting of at least $E\rho_s^2 = 0.70$.

The goal of this study was to investigate the reliability and validity of the chiropractic judgment vignettes used to assess their non-cognitive attributes.

Research Question/Objective 1:

A generalizability analysis was used to determine the variance components (i.e., participant/candidate, stations and raters) of the chiropractic judgment vignettes interview.

Research Question/Objective 2:

A decision study was performed to determine the best configuration of facets to achieve the optimal generalizability coefficient.

Research Question/Objective 3:

Cronbach's alpha was used to determine reliability of the instrument. Content validity was achieved by using experts to devise the vignettes and face validity will be established by interviewing the candidates and the raters in the debriefing session.

Research Question/Objective 4:

Pearson's product-moment correlation was used to determine concurrent validity between the chiropractic judgment vignettes and the five domains or factors of the NEO-FFI (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness).

CHAPTER II

LITERATURE REVIEW

When investigating the determination of the non-cognitive attributes of chiropractors, the researcher must be aware of current literature in two important areas. The first area is what might constitute or define non-cognitive attributes and, secondly, what methods have been utilized to date to measure and assess these attributes. This chapter investigates these two issues.

Definition of Non-cognitive Attributes

Practitioners of healthcare must have the requisite cognitive and non-cognitive attributes of knowledge, skills, attitudes and judgment in order to practice effectively. Merriam-Webster²⁷ defines „cognitive’ as “of, relating to, being, or involving conscious intellectual activity (as thinking, reasoning, or remembering).” The cognitive attributes of knowledge and skills are testable and quantifiable through various means such as written examinations and objective structured clinical exams, commonly known as OSCEs. Non-cognitive attributes are far more elusive in both their definition and measurement. Although the term „non-cognitive’ could logically be defined as the opposite of cognitive, just what exactly encompasses non-cognitive attributes is not clear in the literature. Attempts are made in the literature to include non-cognitive attributes in the definitions of competence and professionalism but, again, this poses a problem as the terms „competence’ and „professionalism’ rarely have standard or clear definitions among the various health professions, regulators and educators thereby making it difficult to assess. It appears there are as many definitions of these terms as there are attempts at defining them.

Competence and Professionalism

Regulatory bodies of health care professions in Alberta must be able to ascertain and ensure maintenance of clinical competence and professionalism of their members as a requirement of legislation.¹ The terms „competence’ and ‚professionalism’ are sometimes used interchangeably, and occasionally one term is inclusive of the other. Epstein and Hundert²⁸ use the term “professional competence” and define it as “the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and the community”. Eriksson et al.²⁹ use the term „ethical competence’ encompassing virtues, rules and regulations, and critical reflection. Leach³⁰ is more parsimonious asserting that competence is not an achievement, instead it is a habit derived from life-long learning in order to “get it right”.

In the 1990s, the Royal College of Physicians and Surgeons of Canada initiated a framework of core competencies known as the CanMEDS roles, an acronym for the „Canadian Medical Education Directives for Specialists’.³¹ The seven core competencies outlined in the framework are organized around the main roles deemed to be central for optimal patient outcomes: medical expert, communicator, collaborator, manager, health advocate, scholar and professional. The definition offered for the CanMEDS role of professional is: “As Professionals, physicians are committed to the health and well being of individuals and society through the ethical practice, profession-led regulation, and high personal standards of behavior”.³¹ Sampling of the elements of the CanMEDS professional role are attributes such as altruism, integrity and honesty, compassion and caring, and morality and codes of behavior.

The term ‚professionalism’ is thought to have evolved from the union of ‚profession’ with its core values of service, maintenance of competence, autonomy, and self-regulation, with the caring and compassionate concept of ‚humanism’.³² Arnold and Stern³² differentiate competence from professionalism by stating that “Although technical knowledge, skills, ethics, and communication are foundational to professionalism, principles, as statements of values, are central to the definition of professionalism and distinguish professionalism for the concept of clinical competence.” Again, as was previously stated, elements of competence and professionalism are mixed into this definition as well but there is an attempt to differentiate one from the other. Arnold and Stern³² attempt to further define professionalism by illustrating that the over-arching principle of professionalism is built on three foundational strata of clinical competence, communication skills, and ethical and legal understanding. It is then supported by the four pillars of excellence, humanism, accountability and altruism.

There undoubtedly is dispute in the literature as to the definitions of competence, professionalism and non-cognitive attributes but most professional organizations agree on the basic concepts. As with other concepts that are difficult to define, they may be hard to describe but are recognized when they are seen.

Previous Studies of Professionalism in Chiropractic

Health professionals from time to time find themselves in situations that may challenge their attitudes and judgments about how best to interact and care for their patients. Foreman and Stahl³³ did a comparative study between chiropractors and medical doctors licensed to practice in California and found that chiropractors were more likely to commit fraud or sexual abuse whereas medical doctors were more likely to be

found guilty of negligence or substance abuse. This study also found that there were 4.5 disciplinary actions per 1000 chiropractors versus 2.7 disciplinary actions per 1000 physicians. Toth et al.,³⁴ in a retrospective study from 1990 through 1997, compiled discipline complaints against chiropractors in Canada that resulted in a significant judgment outcome. Since each provincial regulatory body had slightly different definitions of complaints, the authors grouped these complaints into nine major categories: office administrative/accounting issues, consent issues, lack of professionalism/ uncooperativeness, practicing outside scope of profession, advertising, unskilled practice/excessive billing, fraud, sexual innuendo/remarks/gestures/touching, and sexual relations/intercourse with patients. The authors found that the most common complaints against chiropractors in Canada were for lack of professionalism, uncooperativeness, advertising, and excessive billing. The Chiropractic Information Network – Board Action Databank (CIN-BAD)³⁵ of the Federation of Chiropractic Licensing Board in the United States collects information voluntarily submitted by chiropractic regulatory boards in the United States, the US territories, Canada, and Australia. Statistics for 2009 showed the highest number of complaints were in the categories of fraud, advertising violation, felony, unprofessional conduct and the other/not classified category. Again, with the various jurisdictions not having agreement on the definitions for each category, it is difficult to ascertain which violations are more prevalent in the chiropractic profession but there does seem to be a predominance of disciplinary complaints involving financial or practice promotion issues.

It is also difficult to determine what drives members of the chiropractic profession to allow for lapses in professionalism, however, some authors have noticed a change in

the economics of the chiropractic profession which may offer partial explanation. Mior and Laport³⁶ analyzed Ontario provincial data from administrative and education databases, insurance billing data and national population health survey data over a period of fourteen years from 1990 – 2004. The authors concluded that the chiropractic profession in Ontario was in long term oversupply and, coupled with competition from other professions, changing population demographics, and the loss of public funding, was resulting in financial distress.³⁶ Davis et al.³⁷ found similar changes in supply and demand in the United States from 1996-2005. Data for this study was extracted from United States healthcare expenditures, number of chiropractors, recent graduates of chiropractic schools, and the annual self-reported income of US chiropractors. Over the study period, the authors discovered that the number of chiropractic graduates, the rate of growth of practicing chiropractors, and net incomes of chiropractors all declined.³⁷ Foreman and Stahl³⁸ found the attrition rate of licensed chiropractors in California who had been in practice for ten years rose from 10% for those who graduated in 1970, peaked at 27.8% for those who graduated in 1991 and then stayed fairly level at 20 - 25% for those who graduated between 1992-1998. The authors had no definitive answer as to why there was attrition of chiropractors in the state of California although they did have a number of hypotheses. The authors surmised that the rising rate of attrition in the number of practicing chiropractors in California were attributed to the “changes in population, an oversupply of chiropractors, changes in reimbursements, the cost of chiropractic education and general dissatisfaction with the profession.”³⁸ The economics of operating a successful chiropractic practice appears to have played a significant part in answering the question regarding the increasing attrition. During the time of the study, there was a

rise in managed health care in the forms of Preferred Provider Organizations (PPOs) and Health Maintenance Organizations (HMOs). These organizations frequently restricted access to chiropractic care and used fee schedules that reimburse the practitioner at a lesser fee.³⁸ These hypotheses were somewhat supported in a small study of 70 respondents ($\alpha = 0.90$) by Mirtz et al.,³⁹ the only study of its kind to date, who concluded that non-practicing chiropractors (NPCs) discontinued practice due to questionable business tactics, high overhead costs and difficulty with repayment of student loans. Due to the small sample size of this study, the authors conceded the results could not be generalized to the larger NPC population and concluded further study in this area is needed.

Faced with financial hardships, practitioners may push the barriers of professionalism possibly resulting in complaints from patients or third-party payers; complaints which do little to enhance public perception of that profession. A Gallop poll administered in December 2006 indicted that only 36% of the American public thought chiropractors had „high’ or „very high’ practice ethics.⁴⁰ A survey conducted by The Canadian Chiropractic Association²² in 2009 indicated that Canadian chiropractors were held in higher esteem, with the survey results indicating that seven-in-ten Canadians surveyed agreed that chiropractors were ethical and trustworthy. Attempts are made at both the national and provincial levels of governance in the chiropractic profession to guide the ethical behaviour of practicing chiropractors. The Canadian Chiropractic Association has a ten item Code of Ethics and Conduct outlining the chiropractor’s duties to the patient, the profession and to society⁴¹ as does every provincial jurisdiction in Canada that has a regulatory board and are members of the Canadian Federation of

Chiropractic Regulatory and Educational Accrediting Boards.⁴² The Code of Ethics for the Alberta College and Association of Chiropractors⁴³ specifically states that it is “a set of principles of professional conduct, which guides all chiropractors and establishes the expectations for chiropractors in fulfilling their ethical duties to patients, to the public, the profession and to society as a whole.” Details of professional conduct for chiropractors practicing in Alberta are covered in the Standards of Practice⁴⁴ and include areas of advertising and marketing, billing, mandatory practice requirements, patient dignity, patient communication, and patient files and records.

Professional guidelines, rules and regulations for the practicing chiropractor are certainly in place and they are written in clear language with very little probability for misinterpretation. Although the term ‘ethics’ is utilized in these documents, the definition of this term might benefit if it approximated the biomedical ethics definition which encompasses the four principles of autonomy, beneficence, nonmaleficence and justice. Autonomy reflects the patient’s right to make an informed decision, even if that decision is contrary to the recommendation of the healthcare practitioner; beneficence relates to the health benefit provided to the patient by the healthcare provider as well as the removal of harm and steps taken to prevent harm; justice refers to ‘distributive justice’ meaning that scarce resources, in this case healthcare, is made available to all at a decent minimum level.⁴⁵ Kinsinger^{46,47} and Lawrence⁴⁸ have written commentaries in the chiropractic literature expressing the need for the chiropractic profession to embrace principlism, or the four principles of biomedical ethics as stated above. Kinsinger⁴⁶ recognizes that codes of conduct and standards of behaviours state the minimum acceptable standards, but he also notes there have been substantive changes in society

allowing for more leniencies regarding the fiduciary duty of the professional. Not only should chiropractors embrace the four principles of biomedical ethics, they should also practice other virtues such as veracity, excellence, integrity, prudence and fidelity.⁴⁶ He states that particularly novice chiropractic practitioners may be influenced by affluence, entitlement, permissiveness and personal excess as the ultimate reward in healthcare instead of practicing a duty of care that extends to the patient, professional colleagues and to society as a whole.⁴⁷ Lawrence⁴⁸ recapitulates Kinsinger's perspective by stating that: "Principlism provides a rolling set of tools that are used in every day modern health care." Principlism provides guidelines for professional behaviour. Applied in everyday practice, principlism utilizes the non-cognitive attributes such as empathy, altruism and dutifulness in order to fulfill the mandates of autonomy, nonmaleficence, beneficence and justice. Perhaps Johnson⁴⁹ said it best when she stated in her editorial, "With each word that we speak and with each action that we take, we demonstrate the choices we have made. Each of us has the power to choose to act and live with integrity." Each of us chooses our actions knowing our actions will have repercussions for others as well as ourselves. Choosing actions wisely under the guidance of the professional codes of ethics and conduct, and incorporating principlism grounded in non-cognitive attributes will hold the professional in good stead. Becoming a professional is not bestowed when one completes the professional knowledge and skills requirements, but rather is achieved by conscious choice of action guided by attitudes and judgments.

Low public perception of a profession's ethics undermines the public trust of that profession and conceivably could be detrimental to the public acceptance and growth of that profession, a construct known as „cultural authority'. The term „cultural authority'

was used by Paul Starr in his Pulitzer Prize winning book *The Social Transformation of American Medicine*.⁵⁰ In his treatise on the rise and fall of American medicine, Starr differentiates between „social authority’ and „cultural authority’. He quotes Max Weber’s definition of *Herrschaft* or social authority as the “probability that people will obey a command recognized as legitimate according to the prevailing rules in the society.”⁵⁰ Starr contrasts this definition with his own definition of cultural authority stating it is the “probability that particular definitions of reality and judgments of meaning and value will prevail as valid and true.”⁵⁰ Professional authority therefore has its roots in cultural authority. Starr states:

...legitimation of professional authority involves three distinctive claims: first, that the knowledge and competence of the professional have been validated by a community of his or her peers; second, that this consensually validated knowledge and competence rest on rational, scientific grounds; and third, that the professional’s judgment and advice are oriented toward a set of substantive values, such as health. These aspects of legitimacy correspond to the kinds of attributes – collegial, cognitive, and moral – usually cited in definitions of the term ‚profession’.⁵⁰

Without this legitimation of professional authority, Starr states: “Occupations may or may not succeed, depending on their means of collective organization and the receptivity of the public and the government.”⁵⁰ Chiropractic is a very unusual profession which, at times, attempts to retain its historical status as being complementary and/or alternative medicine yet, in other instances, is starting to realize this categorization is hindering its acceptance by factions of the public and orthodox medicine hence hindering its utilization and growth. The receptivity by the public is multifactoral depending on personal and cultural needs, acceptance of chiropractic by other respected professions, and the perception of trustworthiness of the clinical experience, an

experience which, although containing some similar elements, may be diverse as it reflects the individual chiropractic practitioner. Coulter⁵¹ recognizes the diversity within the chiropractic profession and states that “Tremendous variation in practice patterns has always characterized chiropractic along with differing definitions of chiropractic.” This has often made it difficult for the public and particularly legislative bodies to clearly understand where chiropractic stands in relation to other healthcare professions. Villanueva-Russell,⁵² a sociologist and therefore an outside observer of the chiropractic profession, writes “For the sake of quality patient care, for protection from interlopers, for legitimacy against third party payers and malpractice suits, chiropractic needs to define *for itself* what the parameters of the profession are, and how to legitimate and validate these knowledge claims.” Johnson⁵³ recognizes that the chiropractic profession contributes to its cultural authority, stating “The position of chiropractic in our social order is of our own making. We are the only ones who can raise or lower it, and we must govern ourselves prudently if chiropractic is to develop and progress to its full possibilities as a science.” All stakeholders in the chiropractic profession including practitioners, researchers, educators, regulators, administrators, and healthcare policy consultants may want to take a discerning look at the current state of the profession and decide where it wants to be positioned in society. Murphy et al. states that:

A credible profession is one that is established by society to meet a need that society itself has decided must be met. Based on all the evidence regarding chiropractic practice and education, there is only one societal need (but it a huge one) that chiropractic medicine has the potential to meet: non-surgical spine care.⁵⁴

Chiropractic is recognized as the profession that treats back pain however the diagnostic workup and the clinical intervention does not have uniformity across the

profession. Triano et al.⁵⁵ postulated a strategy for professional renewal of chiropractic that focused on the following five leverage points with examples of priorities given for each point: 1) education (enhance critical thinking and ethical commitment), 2) research (develop health services research evaluating existing and new best practices and models of care), 3) regulation (develop a patient's Bill of Rights and Responsibilities), 4) workplace (establish and support uniform ethical practice standards) and 5) leadership (ethics, fostering cultural authority). Villanueva-Russell⁵² proposes that "The reliance on objective, scientific research would not only validate current procedures, but would get chiropractic a 'seat at the table' of mainstream medicine". In this area, the profession of chiropractic has made tremendous strides. There has been a plethora of research in the area of effectiveness of spinal manipulation, especially for low back pain and neck pain.⁵⁶ Not only would an increase in the research possibly improve the relations with mainstream medicine, McGregor,⁵⁷ using system dynamics modeling, found that an increase in the chiropractic profession's abstract knowledge had a positive market share effect. Lehman and Suozzi⁵⁸ argue that "chiropractic colleges could, should, and must 'invest' in controlled academic research, and also teach a regiment of evidence-based treatments to greatly improve the cultural authority position of chiropractors." Commensurate to this, the authors suggest the chiropractic profession become actively involved in the increasing national and worldwide shift toward integrative health care services.⁵⁸ The sentiment of chiropractors working in evidence-based, integrative health care is echoed by Taylor⁵⁹ who opines that the profession as a whole, if it is to survive, must gain public trust and move toward integration and authority. Nelson et al. concur that the chiropractic profession further embrace integration by stating:

The benefits of integration to the profession are too great to ignore. To be a part of the system is to have access to all the resources of the system – funds for research, state supported education institutions, training opportunities in hospital and other integrative clinical settings, access to other educational institutions and nearly universal inclusion in all reimbursement systems.⁶⁰

Chiropractic is a relatively new profession and is emerging as a clinically and cost effective member of the healthcare system. Greater acceptance as a legitimate healthcare profession requires the profession to move toward evidence-based treatments and integrative care operating under the tenets of sound ethical attitudes and judgments. It is from this foundation of solid patient-centered care, grounded in the knowledge and skills and enhanced by the non-cognitive attributes, that the profession of chiropractic will gain more trust and increased involvement in mainstream healthcare.

Assessing Non-cognitive Attributes

Assessing Professionalism

The measurement of professionalism is a difficult task. First and foremost, as previously mentioned, is the disagreement as to what constitutes „professionalism’ and, secondly the paucity of reliable and valid testing tools. In addition, there are the considerations for acquiring a testing facility if necessary, recruiting raters or judges, establishing a marking rubric or scoring technique, subsequently using the appropriate statistical analysis and all the while keeping in mind the financial cost of the assessment. Measurement methods of professionalism, or non-cognitive attributes, may include written assessments, portfolios, mentoring, direct or indirect observations, simulations, objective structured clinical examinations, and structured interviews.⁶¹⁻⁶⁹ The tools to measure professionalism have been reviewed and analyzed for reliability and validity and

some instruments are seen to be psychometrically stronger than others.⁷⁰ Interviews have high face validity and have therefore been utilized as part of the admission process for healthcare professions schools for many years. Their use is not without criticism, however. Morris⁷¹ succinctly summarized the weaknesses in his review assessing the interview process. Cost of the interview process, in both monetary and man-hours terms, is very high with the return on this expensive investment not clearly achieved. The validity and reliability of the interviews have also been called into question.^{72,73} Harasym et al.,⁷² in a study that utilized simulated candidates, found that interviewer validity was questionable (accounting for up to 56% of the variability in ratings) and there were examples of interviewer leniency/stringency (dove/hawk) and halo effect – ratings being influenced by a preconceived idea that the candidate was a „good’ candidate. Kreiter et al.,⁷³ analyzing results of structured interviews at a medical school over a two year period, showed low to moderate levels of reliability and cautions that “the fairness of using the interview as a highly influential component of the interview process is called into question.”

In light of the criticisms which still exist concerning interviews, it could be construed there was room for improvement if interviews are to continue to play a role in determining the non-cognitive attributes of healthcare professionals. The redesigned structured and semi-structured interview formats being used to determine non-cognitive attributes are the multiple mini-interviews and the clinical judgment vignettes interview.

The multiple mini-interview (MMI) was introduced in 2004 under the guidance of Eva et al.⁸ as an alternative approach to the subjectivity involved in traditional interview procedures for selecting candidates for medical school. MMIs are similar to an objective

structured clinical exam except that they are neither fully structured nor are they clinical. The similarity is simply in the design. MMIs are planned so that the candidate rotates through number of short interviews of approximately eight minutes in duration. Each interview station involves discussion of a defined aspect of medicine that was determined through blueprinting of the interview experience. The design was thought to decrease or perhaps eliminate the interviewer effect of leniency/stringency and any bias that may occur because of similarities of interest between the interviewer and the candidate. Since this introduction, other researchers have studied the MMI process especially as it relates to identifying non-cognitive traits of those persons applying to medical or veterinary college school.^{6,7,74,75} Hecker et al.⁶ successfully identified empathy, communication skills and critical thinking skills. Lemay et al.⁷ effectively used multiple mini-interviews to identify nine distinct non-cognitive attributes including advocacy, ethics, and honesty and integrity. Humphrey et al.⁷⁶ stated that both the candidates and the interviewers found the process to be “reliable, fair and asked appropriate, easy to understand questions”. Rosenfeld et al.⁷⁷ reported that the MMI was more cost effective than panel interviews because of the fewer person-hours of effort during the interviews, but required more time and effort to prepare the examiners for the interview process.

An alternative to the MMI is the use of a semi-structured, medical judgment vignettes interview. The difference between the MMI and medical judgment vignette is more in the context than in the design. The medical judgment vignette is conceptualized to have each of the vignettes specify a non-cognitive element of medical practice and, unlike the MMI, the attribute being measured is not overtly stated. Donnon and Oddone Paolucci⁴ used medical judgment vignettes interview to successfully identify the levels

of moral, altruistic and dutiful traits of medical students, and later Donnon et al.⁵ showed the predictive validity of the vignettes to assess similar non-cognitive attributes in a three-year prospective longitudinal study. The use of vignettes in medical education and assessment of professionalism has seen its own evolution starting with judgment analysis, or social judgment theory, developed in the 1950s, and conjoint analysis which studied preference and choice developed in the 1970s.⁷⁸ These two theories progressed to analysis of medical decision-making which, helped by cognitive psychology research, have discovered that physicians problem solve by utilizing their own heuristics of which non-cognitive characteristics would have influence. Previous research has utilized the written form of vignettes⁷⁹⁻⁸² primarily due to the lesser cost,⁷⁹ however, Donnon and Oddone Paolucci⁴ and Donnon et al.⁵ utilized the interview method stating there is “no other reasonable way to select the most appropriate candidates from such a highly qualified pool of applicants.” Donnon et al.⁵ further assessed the utility of the clinical judgment vignette in selecting applicants who might prove to be ‘good’ doctors by showing the predictive validity of the three vignettes used in the study to predict the students’ results on their in-training evaluation reports (ITERs).

One of the difficulties in using either the MMI or the judgment vignettes interview is the scoring of the responses. Donnon and Oddone Paolucci⁴ and Donnon et al.⁵ chose to use a scoring rubric modeled after Lawrence Kohlberg’s stages of moral development.⁸³ This rubric uses certain responses such as particular words or phrases as ‘anchors’ to one of the five stages of development proposed by Kohlberg. Familiarity with the characteristics of each of Kohlberg’s five stages is absolutely essential in order

to correctly identify the correct stage that an individual has achieved in his or her moral development.

Lawrence Kohlberg worked with adolescents and young adults for many years and was fascinated by how their morals and values changed as they matured. This research prompted him to write his doctoral dissertation, published in 1958, on the responses he received when the adolescents were asked to give their opinions on three moral dilemmas, the most quoted being the „Heinz’ vignette.⁸⁴ The Heinz vignette tells a story of a husband whose wife is seriously ill and encounters ethical dilemmas in securing the medication needed to save his wife’s life. Children of various ages were asked to respond to the Heinz vignette by giving their opinions of Heinz’ behaviour. Kohlberg’s research resulted in a theory that described moral development as progressing through six levels of moral development with the lowest level being obedience to avoid punishment, to the highest level of being socially conscious. The progression through the stages was always sequential but not necessarily at the same rate, nor did an individual progress thorough all six stages. Each individual would reach their own maximum personal moral development stage.

The six stages are separated into three levels: Level I, preconventional morality, contains stages 1 and 2; Level II, conventional morality, contains stages 3 and 4; and Level III, post conventional morality, containing stages 5 and 6 as listed in Table 1 below.

Table 1: Kohlberg's Levels and Stages of Moral Development

Level and Stage	Behaviour	Reasons	Sociomoral perspective of stage
Level One: Preconventional			
Stage 1	Punishment- avoidance and obedience.	Avoidance of punishment. Fearful of the superior power of authorities.	Egocentric point of view. Doesn't consider the interest of others.
Stage 2	Follows rules only if it has advantages. Exchange of favours.	Serving one's own needs but recognizes others have needs, too.	Aware everyone has personal needs which may conflict with others.
Level Two: Conventional:			
Stage 3	Good boy/good girl	Follow the Golden Rule.	Shared feelings, agreements and expectations take primacy over individual interest.
Stage 4	Law and order Maintain society	Keep the institution going as a whole.	Differentiates societal point of view from interpersonal agreement.
Level three: Postconventional or Principled			
Stage 5	"good society" Societal contract	Obligation to the law for the welfare of all "the greatest good for the greatest number".	Considers moral and legal points of view but recognizes they sometimes conflict.
Stage 6	Personal ethics and universal principles of justice. When laws are in contradiction to these principles, one acts in accordance with the principles.	Personal commitment to universal moral principles.	Persons are ends in themselves and must be treated as such.

(adapted from Colby and Kohlberg The Measurement of Moral Judgment Vol I & II, 1987⁸³ and Kohlberg Essays on Moral Development Vol II, 1984⁸⁵)

Kohlberg had no delusion that the stages presented in his dissertation were fixed and absolute, in fact he stated he "never thought my method of stage assignments was adequate. As noted, my thesis described stages not as true stages but only as ideal-type moral orientations."⁸⁵ Stage six may be too ambitious in its quest to achieve the four

universal moral principles of nonmaleficence, beneficence, autonomy, and justice.

Research in this area, including work done by Kohlberg himself, has found that very few people actually achieve level six, therefore most researchers only use the first five of Kohlberg's stages.⁸⁶

Along with criticism of the sixth level, there was also criticism of Kohlberg's gender bias. Carol Gilligan was a graduate student of Kohlberg and wrote extensively on the gender differences in developing morality. Her research, which culminated in a book entitled „In a Different Voice'⁸⁷ determined that girls exhibited caring and nurturing motivation for their actions, a theory that seemingly clashed with Kohlberg's theory that the pursuit of justice was the motivation for moral development. However, in studies where both justice-oriented and caring-oriented choices of action were offered, each gender showed ample awareness and consideration of both orientations.⁸⁸ When asked to write an article after Lawrence Kohlberg had died, Gilligan wrote:⁸⁹“ I want to end this discussion of knowing and not knowing by saying that I did not, nor did others doing similar work, introduce the notion of gender into psychology, or specifically into moral development.” This sentiment is reflected by Jorgensen citing an interview he had with Gilligan in 2003 in which he states:

She [Gilligan] also argued that, while both men and women were using both justice and care types of reasoning, women were more prone to caring and men to justice. It is, however, important to notice here that her definition of care probably is more contextual and content-filled than the simple 'hard' stage definitions Kohlberg was striving for.⁹⁰

Colby and Kohlberg,⁸³ along with many collaborators, developed a complex scoring system for determining moral development set out in two volumes. Volume One

outlines how the interview is to be constructed and conducted, the rules and procedures, as well as giving helpful suggestions on how to draw out a response that could be scored. Volume Two acts as a reference manual and cannot be used without first becoming very familiar with the contents of Volume One.

If Kohlberg's stages of moral development are to be used in an interview format to assess the non-cognitive attributes of healthcare practitioners, the interviewers must be very well versed in recognizing the anchors associated with each stage and distinguishing the language used by the candidates that would allow accurate assignment to the appropriate stage. Measuring moral development may be the foundation from which to build an assessment instrument to determine the non-cognitive characteristics of professional attitudes and judgments. If using moral reasoning is to have any utility in this quest, it must be established as having a demonstrable relationship with the desired attitudes and judgments. The relationship between moral reasoning and moral behaviour is complex and not well understood and requires further study. Without this relationship, further development in measuring moral reasoning may not bring this quest to fruition. This sentiment is reflected by Self and Baldwin⁹¹ who state: "Ultimately objective measures of moral reasoning must be found to be empirically related to measurable dimensions of professional behaviour and performance if they are to gain widespread acceptance."

Admissions Interview

Admittance to a school of advanced training in healthcare usually requires the applicant to attend a personal interview in order for the admissions committee to assess the non-cognitive characteristics of the applicant. The applicant has already been

assessed for suitability by reviewing his/her academic achievements, volunteerism, and motivation to attend the school of higher learning but the assessment of the attributes that might define the applicant as potentially a „good’ doctor is a formidable task with little assurance of the reliability and validity of the assessment tool. Generally, the reliability and validity of the interviews was found to increase with interviewer training regarding familiarity with the interview content and the marking rubric, communication with the applicant, and time management.^{4,6,10,75}

Interest in the non-cognitive attributes of healthcare practitioners has prompted some innovative suggestions as to how this might be achieved. Cohen¹² has proposed that the academic institutions set a threshold for the academic requirements which then permits the admissions committee to assess the applicant’s personality and character traits. With the minimum academic requirements met, the admissions committee may then focus on determining if the applicant demonstrates or possesses the desired non-cognitive attributes and make their selection perhaps with a higher weighting on the non-cognitive attributes. Cohen also suggested that the selection process may be reversed, that is the choosing of the applicant is based on the personality traits first and consideration of the MCATs and GPAs takes place later.

With regards to the admission process to chiropractic college in Canada, the minimum admission requirements are set by the Canadian Federation of Chiropractic Regulatory and Educational Accrediting Boards.⁹² Acceptance requires the applicant to have a minimum 2.5 out of 4 grade point average over a minimum of three years of postsecondary education. If the academic requirements are met, the applicant may be invited to attend an interview. The personal interview lasts about 20 minutes wherein the

interview team ‘considers the applicant’s motivation, problem solving ability, self-directed learning experience, past chiropractic experience, personal qualities, leadership qualities, and interest in wellness and health promotion. The interview also allows the candidate to clarify his/her understanding of the profession, the program and student life.’⁹³

Teaching professionalism

The ever increasing interest in the non-cognitive aspect of medical practice has prompted medical educators to formalize the teaching of professionalism. But before professionalism may be taught it must first be defined and, again, the problem of the definition arises. In Canada, for medical education, the goal is for the students to achieve success in meeting the CanMEDS Roles as mentioned previously. Knowing the end point and then working in reverse allows medical educators to structure their courses and programs to take incremental steps towards this success. Setting the learning objectives in the course outline prepares the student for the upcoming material with clearly defined content. Courses in professionalism set out in the curriculum for the program allows administrators, educators and students to all work toward a common goal, each encouraged to provide feedback to others.

A possible stumbling block toward this common goal may be that medical schools are thought to have three curricula; the formal, the informal, and the hidden. The formal curriculum is composed of the courses, laboratory work, rotations and clinical experience incorporating not only the necessary knowledge and skills, or cognitive attributes of medicine, but also bedside manner, communication skills, empathy, or other personality traits that may be described as professionalism or the non-cognitive attributes. The

informal curriculum is the learning that takes place outside of the classroom and is based on the interpersonal relationships between students, faculty and administrators. The hidden curriculum is thought to pertain to adhering to the hierarchy and culture of medicine and sometimes what is learned in the hidden curriculum runs counter to the formal curriculum.⁹⁴⁻⁹⁶ Learning the culture of medicine is a socialization process that turns the student from a lay person into a physician.⁹⁴ This socialization is achieved through the student's exposure not only to the knowledge and skills associated with medicine but also the attitudes and beliefs transferred to the student through mentors and role modeling. It has, however, been proposed that mentoring and role modeling are not the same thing. Mentoring is thought to be more of the formal type of teaching in which more senior physicians encourage and support the learners whereas role modeling is watching professionalism in action that is unintentional, spontaneous and often episodic.⁹⁷ It may be described that mentoring reflects the formal curriculum whereas role modeling is more reflective of both the informal and hidden curricula. Although this role modeling was thought to be happening in a positive manner, studies have shown that it may be counterproductive to achieving these goals.⁹⁴ As with other comments on the hidden curriculum, role modeling has sometimes been described on the continuum of „heroic' to „horrible' .⁹⁷ Effective role modeling requires the teaching physician to demonstrate professionalism productively and sensitively; role models should „walk the talk' and „practice what they preach.'⁹⁸ Because of this difference between the formal, informal and the hidden curricula, the actual student experience may be quite different from the expected experience.⁹⁹ Students may find themselves in a power differential that leaves them in a precarious position of wanting to do „the right thing' but are under

tremendous pressure to behave otherwise. Unprofessional conduct by faculty and residents is left undeterred and unpunished, with the perpetrators protected by the established hierarchy.⁹⁹

Since professionalism is a desired competence in medicine, steps were taken to make the hidden curriculum part of the formal curriculum. Lucey and Souba¹⁰⁰ consider the teaching of professionalism to be a complex learning problem because it is subject to unpredictable variables, strong emotions, and external forces. Finding the solution to this complex learning problem requires developing a shared vision, a shared understanding of the problem, and a willingness to change and adapt to a new reality.¹⁰⁰ The practice of health care is changing and so too are the professional requirements. The difficulty, as has been mentioned previously, is identifying these changes and what now constitutes the new requirements. Tsai et al¹⁰¹ identified eight factors that constitute the latent traits of professionalism with factor 1 (commitment to patient care) contributing the largest variance (34.9%) and factors 2,3 and 4 (righteous and rule-abiding, pursuing quality patient care, and habit of professional practice) collectively contributing 19.25% for a total of 54.15%. These four factors generally agree with the qualities put forth in the physician's charter proposed by the American Board of Internal Medicine¹¹ of duty, honour and integrity, excellence in patient care, and habit of professional practice. These characteristics also correspond with the elements of professionalism as outlined in the CanMEDS Roles.³¹ This identification would aid in designing the curriculum as well as constructing a reliable and valid assessment tool for measuring such traits. Identifying these latent traits may aid with the definition of professionalism, which along with

formalizing the ‚hidden‘ curriculum and the proper utilization of mentors and role models, may lead to success in teaching professionalism.

There are also questions regarding whether or not the teaching of professionalism results in professional behaviour. Courses teaching professionalism are criticized because they are taught out the context of the reality of actual medical practice. The courses don’t take into consideration the stresses of dealing with multiple problems all at once; the management not only of patient care but also of dealing with colleagues and coworkers in a work environment that may not always be conducive to learning. A possible solution to this might be situated learning theory which recognizes that learning is specific to a given situation and is determined by the interaction with others as well as the working/learning environment.⁹⁸ Learning is enhanced when the learner is encouraged to talk about their experiences and challenges in conjunction with the formal didactic sessions when they listen to their role models talk about their experiences and challenges. This balance of listening as well as talking by both the learner and the teacher increases the likelihood of identifying issues that may result in lapses of professionalism. These lapses in professionalism are thought to sometimes be not so much lapses in attitude but lapses in judgment and skills; that occasionally practitioners find themselves in situations that are beyond their capabilities to handle.¹⁰⁰

With the increased interest in medical professionalism and the inclusion of medical ethics and professionalism in the formal curriculum, it has been found that teaching professionalism does not always result in professional behaviour. In fact, Patenaude et al,¹⁰² using Kohlberg’s Moral Judgment Interview, found that the medical students actually showed a half-level decrease in the weighted average scores over their

three years of medical education leading the authors to ask whether a hidden curriculum exists that influenced the decrease. Papadakis et al¹⁰³⁻¹⁰⁵ found a correlation between disciplinary actions during medical school and subsequent disciplinary actions by medical boards. Predictors of future disciplinary action were negative comments regarding professionalism in their medical school file,¹⁰³ medical students who showed unprofessional behaviours such as severe irresponsibility and severely diminished capacity for self-improvement,¹⁰⁴ and internal medicine residents who achieved a low professionalism rating on their Residents' Annual Evaluation Summary.¹⁰⁵ The authors concluded there is now evidence that medical student display warning signs of future disciplinary action and that early identification of such behaviours could facilitate remediation and decrease future disciplinary actions.

With regards to teaching professionalism to chiropractic students, Canada has two chiropractic colleges: the Canadian Memorial Chiropractic College (CMCC) instructing in English, and the Département de Chiropractique with the Université du Québec a Trois-Rivières (UQTR), instructing in French. Both of the Canadian chiropractic colleges have courses in professionalism and ethics. CMCC teaches professionalism in three courses and a simulation laboratory. The first year course is entitled CP 1101 Chiropractic Practice: Principles & Professional Ethics I of which the course description reads:

The historical and foundational approach to health which is unique to chiropractic is presented. Issues pertaining to the philosophy, art, and science of chiropractic, professionalism and ethics, informed consent, and the unique ethical responsibilities of the health professional student and practitioner are explored.¹⁰⁶

The second course is a third year course entitled CP 3303 Chiropractic Practice:

Principles and Professional Ethics II and is described as:

Integration and clinical application of topics including informed consent, professional boundaries and other ethical issues, all focused on clinical issues between the practitioner and patient, are presented. Scientific evidence in support of the chiropractic management of certain non-musculoskeletal disorders is considered. Mind body medicine is introduced.¹⁰⁷

The third and final course is a third year course entitled CP 3304 Chiropractic

Practice: Business and Law. Description of the course is as follows:

The Canadian legal system, provincial Acts, Regulations, Codes, Standards of Practice, Guidelines, Policies and By-Laws; regulatory, administrative, criminal, constitutional, tort and contract law and how these affect the practice of chiropractic; laws that govern privacy, confidentiality, consent, capacity and professional negligence; the history of self-regulation; the role of regulatory bodies and different models of regulation under which chiropractors practice are presented. The rights and obligations of the chiropractor and, more importantly, of the patient are emphasized. Attendance at a disciplinary hearing of a regulated health care professional is required.¹⁰⁸

The simulation lab gives the chiropractic students an opportunity to practice professionalism by role-playing a practicing chiropractor. The students are placed in different scenarios wherein they must manage not only the life-like mannequin but also other chiropractic students who are role-playing family members, other patients, and/or support staff. (Office of the Dean, Undergraduate Education, CMCC, personal communication, 2011.)

The chiropractic department at UQTR offers one course in ethics: CPR 1026: Ethique et droit professionnel [Ethics and professional law]. A translation of the course syllabus is as follows:

Specific legal terminology. Bioethics (ethanasia, contraception, abortion, fertilization in vitro). Privacy. Obligations to the patient. Privileges of the patient. Rules of conduct. Ethics. Mechanisms of control of professional practice. The rights and duties of a chiropractor in the health system. Interprofessional relationships. Quebec's professional system. Decisions relating to different elements of law, such as consent to treatment, malpractice, professional negligence and interprofessional conduct.¹⁰⁹

As may be seen in the outlines of the courses in professionalism taught at the two chiropractic colleges in Canada, the courses seem to emphasize the regulatory aspect of professionalism with little emphasis on the humanism aspect. Non-cognitive traits such as altruism, dutifulness and empathy may be discussed within the courses but there is no evidence of assessing the students for these traits. As mentioned previously, this may be another opportunity for the utilization of the chiropractic judgment vignette interviews proposed in this study.

NEO-Five Factor Inventory

One of the questions for this study was to determine concurrent validity between the chiropractic judgment vignettes and the five subscales or factors of the NEO-Five Factor Inventory (NEO-FFI): neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. Before this question may be answered, the validity of the NEO-FFI must be established.

The NEO-FFI was developed by Costa and McCrae¹¹⁰ in an attempt to provide a more concise measure of the five factors of personality. It is a shortened version of the NEO-Personality Inventory – Revised (NEO PI-R) but retains its validity and reliability. Unlike the NEO PI-R which has 240 questions, the NEO-FFI has 60 questions rated on a 5-point scale and can be completed in ten to fifteen minutes with raw scores calculated in two minutes. It offers two observer-rating versions of the instrument: Form R (Adult

men) and Form R (Adult women). The NEO-FFI subscales show correlations of 0.88 to 0.94 with the NEO PI-R domain scales and internal consistency values ranging from 0.76 to 0.90.

The NEO-FFI is not without criticism. Studies have shown that the test can be manipulated¹¹¹⁻¹¹³ and that it was initially developed without validity scales.¹¹⁴ A study by Scandell¹¹⁴ indicated a solution to the validation question with ANOVA results indicating the validity scales were differentially sensitive to random responding, and positive and negative impression management. Similarly the subscales of the NEO-FFI needed to be validated. In a study by Whiteman et al,¹¹⁵ the NEO-FFI was administered to participants in the British Edinburgh Artery Study with the means and standard deviations compared to the reference sample provided in the NEO-FFI manual. The results are shown in Table 2.

Table 2: A comparison of the means and standard deviations of the NEO-Five Factor Inventory Adult Form S (NEO-FFI) domains in the Edinburgh Artery Study with those reported by Costa and McCrae (1992), by sex.¹¹⁵

NEO - FFI Domains ^a	Costa and McCrae(1992)	Edinburgh Artery Study	P-values
<i>Men</i>	(n=500)	(n=447)	
N	17.6 (7.5)	17.3 (7.3)	NS ^b
E	27.2 (5.9)	25.0 (5.3)	P<0.01
O	27.1 (5.8)	23.8 (5.9)	P<0.01
A	31.9 (5.0)	31.5 (5.2)	P<0.01
C	34.1 (6.0)	33.1 (5.8)	P<0.01
<i>Women</i>	(n=500)	(n=452)	
N	20.5 (7.6)	20.9 (7.9)	NS
E	28.2 (5.8)	24.9 (5.6)	P<0.01
O	27.0 (5.9)	24.7 (7.0)	NS
A	33.8 (4.7)	33.6 (4.7)	P<0.01
C	35.0 (5.8)	33.2 (5.7)	P<0.01

^a N, neuroticism; E, extraversion; O, openness; A, agreeableness; C, conscientiousness

^b NS = non significant

The British participants scored similar scores to those of the American reference group on neuroticism, agreeableness and conscientiousness but the British participants scored slightly lower on extraversion and openness. The differences in scores were not statistically significant for neuroticism for both the men and women, nor were they significant for the women on openness. Because of the large sample sizes of both groups, the difference in the remaining scores, although not large in terms of effect size were statistically significant ($P < 0.01$).

Schmitz et al¹¹⁶ tested the subscales of the NEO-FFI by administering the test to psychosomatic outpatients and found the internal consistencies and intercorrelations were in agreement with other studies as illustrated in Table 3.

Table 3: Descriptive statistics of the NEO-Five Factor Inventory (FFI) subscales¹¹⁶

NEO-FFI subscales	Psychosomatic outpatient sample(n=950)			Reference Sample			Effect size
	Mean	SD	Cronbach's alpha	Mean	SD	Cronbach's alpha	
Neuroticism	29.8	8.2	0.84	22.1	8.4	0.85	0.92
Extraversion	24.0	7.0	0.79	28.3	6.8	0.80	-0.63
Openness	29.0	5.7	0.66	32.5	6.2	0.71	-0.58
Agreeableness	29.4	5.6	0.68	29.3	5.9	0.71	0.01
Conscientiousness	29.4	6.9	0.79	30.4	7.6	0.71	-0.14

Generalizability Theory

When an individual participates in a test, the performance on that particular test has many influences, called „factors’ or „facets’. These facets may include but are not limited to the difficulty of the items on the test, the examiner, the environment in which the test is written, as well as the ability of the writer. Classical Test Theory (CTT) hypothesizes that the writer’s performance on the test, the Observed Score (X), is the

combination of the True Score (T) plus the error (E or e) but does not determine the source of the error. Generalizability Theory (GT or G theory) was developed by Cronbach in the early 1960s to “disentangle multiple sources of error that contribute to E”.¹¹⁷ Vanleeuwen¹¹⁸ describes generalizability theory as being able to give “a broader view and a deeper understanding of the dependability of measurements and the role different sources of error in the variability of measures”. Brennan stated that:

Perhaps the most important aspect and unique feature of generalizability theory is its conceptual framework. Among the concepts are *universes of admissible observations* and G (*generalizability*) studies, as well as *universes of generalization* and D (decision) studies.¹¹⁹

This means that generalizability theory “enables the decision maker to determine how many occasions, test forms, *and* administrators are needed to obtain dependable scores.”¹²⁰ G theory acknowledges that the decision maker might want to use the data to make two types of decisions; relative (norm referenced, δ) and/or absolute (criterion referenced, Δ). A relative decision focuses on the rank order of persons, meaning the score is put into perspective relative to the score of other writers of the same test. An absolute decision focuses on the level of performance, regardless of rank, and is based on the writer’s knowledge of the information; the more complete the knowledge, the higher the score. Generalizability theory provides a generalizability coefficient ($E\rho_{\delta}^2$) which ranges from 0.0 to 1.0 and is determined for relative error. This coefficient indicates how close the observed score is to the universe, or true, score. Donnon et al.⁵ and Eva et al.⁸ successfully used generalizability theory to determine the reliability and variance

components related to each facet. The equation to determine the generalizability coefficient is as follows:

$$E\rho_{\delta}^2 = \frac{\sigma_c^2}{\sigma_c^2 + \left[\frac{\sigma_{cs}^2}{n_s} + \frac{\sigma_{cr}^2}{n_r} + \frac{\sigma_{csr,e}^2}{n_s n_r} \right]}$$

Where: $E\rho_{\delta}^2$ = Generalizability coefficient

σ^2 , sigma squared = variance component

n = number

c = candidate, s = station, r = rater

e = unknown error

The absolute error equation or the Index of Dependability (Φ) is as follows:

$$\Phi = \frac{\sigma_c^2}{\sigma_c^2 + \left[\frac{\sigma_s^2}{n_s} + \frac{\sigma_r^2}{n_r} + \frac{\sigma_{cs}^2}{n_s} + \frac{\sigma_{cs}^2}{n_s} + \frac{\sigma_{cr}^2}{n_r} + \frac{\sigma_{sr}^2}{n_s n_r} + \frac{\sigma_{csr,e}^2}{n_s n_r} \right]}$$

Where: Φ , phi = Index of Dependability

σ^2 , sigma squared = variance component

n = number

c = candidate, s = station, r = rater

e = unknown error

The absolute error is generally larger than the relative error therefore the Index of Dependability is generally smaller than the Generalizability Coefficient.

The design of the G study will depend on the resources available in terms of time, personnel, and finances. Examples of a G study design may be a fully crossed or nested designs. In a fully crossed design, all raters will assess all candidates at all stations ($c \times s \times r$) as illustrated in Figure 1. This design is easily analyzed through an analysis of variance.

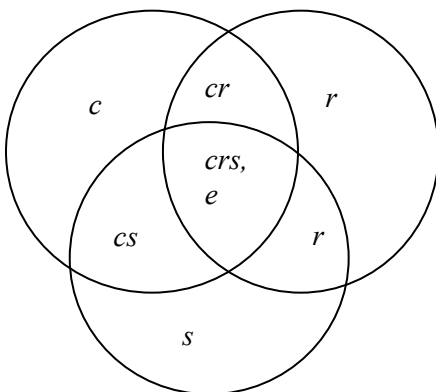


Figure 1: Venn Diagram for Two-facet ($c \times s \times r$) Fully Crossed design (c -candidate, r – rater, s - station, e – unknown error)

In a nested design, one facet is embedded in another facet and does not change throughout the study. An example of a nested design would be to have a single rater stay at one station and assess all candidates for that station ($r:s \times c$, with $r:s$ denoting the raters are nested within the stations). This is illustrated in Figure 2.

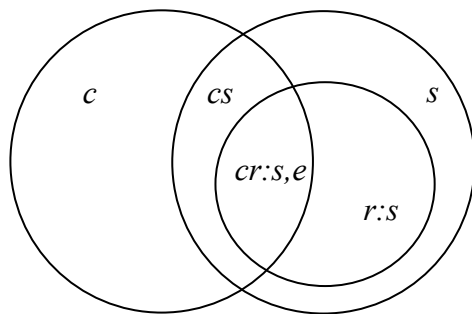


Figure 2: Venn Diagram for Two-facet ($r:s \times c$) Nested design (r – rater, s - station, c - candidate, e – unknown error)

CHAPTER III

METHODS

Participants

There were a number of people needed to accomplish this research project: a trainer, an administrator, six initial and two independent raters, and twenty-four candidates. The trainer was an accomplished researcher and teacher who had previous experience working with the study methods and scoring rubric. The trainer was responsible for introducing the raters to the interview protocol and scoring technique using the established rubric developed for each of the stations. The training was initiated by explaining the purpose of the interview process and background to the scoring rubric, followed with practice sessions consisting of reviewing and scoring all six of the chiropractic judgment vignettes. During the practice sessions the trainer asked the initial raters to role-play as both the rater and the candidate, alternating the roles so as to get as much practice as time would allow. The raters were shown the testing facility and were briefed on the rotation sequence through the testing site rooms. The trainer also gave a very brief overview of the research project to the candidates, the brevity being an attempt not to bias their responses to the questions asked by the raters at each of the six stations. Both candidates and raters were requested to sign an acknowledgment of participation form and the candidates were asked to complete the personality inventory which was supervised by the trainer.

The administrator was responsible for recruiting the candidates for participation in the project, gathering the candidates together at the testing centre prior to the interview

session, ensuring smooth movement of candidates between interview stations, timing the length of the interview sessions, and debriefing the candidates to receive feedback on the interview process. Both the trainer and the administrator debriefed the raters to obtain feedback on the training and interview processes.

The initial raters invited to participate in this study were six practicing chiropractors who had previous experience using an interview format for examinations, some for the chiropractic national licensing board. The raters were trained to facilitate the semi-structured interview and evaluate the responses by completing a scoring sheet for each candidate pertaining to a specific chiropractic judgment vignette.

The twenty-four candidates represented a sample of convenience from a list of practicing chiropractors willing to participate voluntarily in this study. They were 75% males, 25% females, had different levels of experience ($M = 12.8$ years, $SD = 9.7$ years), and had graduated from various chiropractic colleges (54.2% Canadian chiropractic college, 45.8% US chiropractic colleges). The candidates were licensed practicing chiropractors from the city of Calgary, Alberta and were contacted through email to seek their participation in this study.

This research project was approved by the Conjoint Health Research Ethics Board of the University of Calgary. Please see the included document.

Instrumentation

There were two instruments administered, a NEO-FFI (five factor inventory) personality questionnaire and a series of six chiropractic judgment vignettes interviews

wherein the candidates were asked to provide responses to probing questions for each vignette.

The NEO-FFI is a 64 item instrument which measures five personality domains: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. The predecessor of the NEO-FFI was the NEO PI-R, or the NEO Personality Inventory – Revised which is a longer test encompassing 240 items with an administration time of 30 -40 minutes. The NEO-FFI retains the reliability and validity of the NEO PI-R and may be completed in as little as ten minutes. Further description of the NEO-FFI and the schedule for the writing of the questionnaire (Table 16) may be found in Appendix 1.

The chiropractic judgment vignettes interview process consisted of six vignettes, the content of which were solicited from the registrar of the Association and College of Chiropractors of Alberta, the past-president of the Canadian Federation of Chiropractic Regulatory and Educational Accrediting Boards, and the Chief Executive Officer of the Canadian Chiropractic Protective Association. The suggested scenarios were based on previous experiences dealing with the chiropractic profession each had encountered in their role as registrar, regulator, or representative of a malpractice insurer in litigation wherein the practicing chiropractor may have had to rely on their non-cognitive attributes such as morals or ethics.

The six chiropractic judgment vignettes were based on possible real practice situations in an attempt to measure the chiropractor's non-cognitive attributes. The vignettes were structured to give a brief overview of the situation and then provide three or four probing questions upon which the rater asked the candidate to comment. The

station vignette and the non-cognitive attribute it was attempting to discover are listed in

Table 4.

Table 4: Stations, vignettes and non-cognitive attributes

Station	Vignette	Non-cognitive attribute
1	A patient confides to her chiropractor that she has recently lost her job and therefore no longer has healthcare benefits. This is making it financially difficult for her to continue with chiropractic care.	Empathy towards patients
2	A patient, who on a number of occasions could be perceived as acting provocatively, asks a chiropractor if he would like to see her socially. Both the chiropractor and the patient are unmarried and the chiropractor is interested in pursuing a personal relationship.	Interpersonal professionalism
3	A chiropractor treats a family that has a large number of children. One of the children needs frequent care and the family is of minimal financial means. The father suggests the chiropractor use another child's name for insurance reimbursement purposes when the one child runs out of insurance coverage.	Flexibility in meeting patient's needs
4	A patient who has a newborn asks her chiropractor about immunizations. The patient states she has heard that immunizations are potentially poisonous to a newborn and should be avoided as long as possible.	Professional honesty and integrity
5	After assessing a new patient, a chiropractor tells her chiropractic intern that she feels that the patient could be treated and released from care with the problem resolved in a total of six treatments. However, the intern notes that the chiropractor books this new patient as she would book any new patient for 3x/week for 3 weeks, 2x/week for five weeks and then once a week for six weeks.	Practice philosophy of care
6	A chiropractor is made aware of a colleague who may be abusing alcohol and/or drugs and still treats patients while impaired. The chiropractor knows that the colleague is under a lot of stress due to a recent divorce and that the alcohol abuse is probably a temporary setback.	Intraprofessionalism and collegiality

Scoring of the answers the candidates offered was based on Kohlberg's Theory of Moral Development. Key words and phrases, or „anchors', for each of the five stages were extracted from the writings of Colby and Kohlberg.⁸³ Each rater listened carefully to the candidate's responses and attempted to match the responses with the anchors which would then aid the rater in assigning the most correct stage of development. The anchors for each of the five stages are as follows:

Stage one: Punishment - avoidance and obedience

Anchors: -it's all about me
 -rules are rules, need to obey the law
 -if caught, disobeying will result in punishment sanctioned by authorities/
 institutions
 -balance adherence to practice expectations based on avoidance of
 punishment

Stage two: Exchange of favours

Anchors: -me and her/him
 -recognize that different people have differing viewpoints
 -may help others -"You scratch my back, I'll scratch yours"
 - punishment is simply a risk that one naturally wants to avoid

Stage three: Good boy/good girl

Anchors: -believe that people should live up to the expectations of the family and
 community and behave in 'good ways'
 -intentions are good, focus on meeting the needs of the patient/client

- considers issues of trust, concern, empathy when passing judgment

- actions will depend on the outcome for relationships

Stage four: Law and order, Maintain society

Anchors: -considers ‘my community’

- performs one’s duties to maintain a social order

- obeying the rules set by the authorities within the context of societal expectations

- think from a full-fledged member-of-society perspective

- places needs of society above self

Stage five: ‘good society’

Anchors: -considers ‘my country’ or ‘my organization’

- rules are agreed upon to benefit society, but not to the detriment of an individual’s right to life and liberty

- rules are flexible: considering the rights and values that a society ought to uphold

With the exam set, the next step was to train the raters. Training of the raters ensured they were very familiar with the vignettes to be discussed as well as how to assess the responses. The raters were asked to meet three hours prior to the start of testing. The training started with a brief overview of the testing procedures, followed by a discussion of the assessment rubric based on Kohlberg’s Theory of Moral Development. Each of the vignettes used in the study were introduced and the raters were given examples by the trainer of comments that could apply to all five stages of the

assessment rubric. The raters were encouraged to provide their own examples of possible answers to the probing questions which were discussed within the group and given a score according to the marking rubric.

Data Collection Procedures

Utilizing the University of Calgary medical school testing centre, candidates completed the NEO-FFI during the introductory session with the trainer before moving into the interview process. The completion of the NEO-FFI was a pencil and paper exercise and was completed in approximately ten minutes. The candidates then proceeded through the interviews.

Development of the interview process is very similar to the Objective Structured Clinical Examination (OSCE) and therefore required steps comparable to the OSCE development as outlined by Newble.¹²¹ The content of the exam was determined by a panel of experts in the field of study to be tested in order for the examination to have content validity.⁶¹ The content reflected real-life practice using situations that every chiropractor could face on a fairly regular basis.

When progressing through the interview process, individual candidates were assessed by the rater at each station immediately at the conclusion of the interview once the candidate had left the room. Each station had a different vignette administered by a single rater at each station lasting seven minutes and each encounter was recorded on DVD.

The twenty-four interview encounters were divided into four sessions, each session administering the interview to six candidates. The raters moved to a different

station for each of the four interview sessions, thereby administering four out of the six stations. Not all raters viewed all candidates at all stations resulting in a partially-nested design for the initial raters. After the initial four testing sessions, all of the vignettes were viewed individually by two independent raters following the same scoring rubric as the original raters. Since both independent raters viewed all candidates at all stations this resulted in a fully-crossed design for the independent raters. Copies of the raters' marking sheets which include the vignettes, probing questions and anchors may be found in Appendix 1.

It was important that the administration of the judgment vignettes be organized well in advance.¹²² Facilities were booked early in order to ensure availability and participants in the study were secured in advance. Each station was timed and the rotation through the stations was overseen by the administrator who also ensured each station was clearly marked. All candidates were required to be at the testing site well in advance of their test time. Security of the vignettes was not necessary as Reiter et al¹²³ found that giving the vignettes to the candidate ahead of their test time made no significant difference in their test scores. In this study, there were four groups of candidates with six candidates in each group for a total of twenty-four candidates. When each candidate had completed the NEO-FFI, he or she was issued a sheet containing six labels; each label indicated their examination identification number. At each station the rater was given one label by the candidate, which was affixed to their assessment sheet along with the rater's label. When the administrator announced the commencement of interview, the rater would read the scenario from his or her printed copy and the

candidate would follow along with the copy left in the interview room. The rater would score the candidate's responses to the probing questions using the assessment sheets and these assessment sheets were returned to the administrator at the end of each rotation. The interviews were recorded on DVDs and re-scored at a later time by the two independent raters for each of the 24 candidates.

The primary outcome variables were the results of NEO-FFI and responses to the vignettes.

After the data was collected, it was formatted so as to be usable for a generalizability analysis in G-string version IV. The variances calculated by the G study were then used to determine the generalizability coefficient (Ep_{δ}^2) and variance components for the decision study. In order to determine if the various stations were testing for independent non-cognitive attributes, a factor analysis was performed. Since there were two groups of raters, a rater agreement analysis was used to assess the agreement between the ratings given by the initial and the independent raters. And finally, since one of the research questions of this study was to determine if there was concurrent validity between the chiropractic judgment vignettes and the five personality domains tested in the NEO-FFI, Pearson's product-moment correlation was calculated to determine if any such correlation existed.

CHAPTER IV

RESULTS

This chapter presents the results of the study. It is organized under six headings:

- 1) descriptive statistics, 2) agreement analysis, 3) factor analysis, 4) generalizability study
- 5) concurrent validity between the chiropractic judgment vignettes and the NEO-FFI, and
- 6) rater and candidate feedback.

The study was designed to use two groups of raters. One group consisted of six practicing chiropractors who had received two hours of training on how to apply the marking rubric when evaluating the responses given by the candidates to the chiropractic judgment vignettes. The other group consisted of two independent raters who had extensive training and experience in rating responses given by the candidates during the interviews. The results from the two groups were analyzed and compared.

Descriptive Statistics

Generally, descriptive statistics of a research project give a summary of the data set. In this case, descriptive statistics were performed on the scoring results of the two groups of raters. The results of the initial rating on a five-point scale determined by the practicing chiropractors were analyzed for the most common scores, the average scores and the highest rating achieved by the candidates and are presented in Table 5.

Cronbach's alpha (α) was found to be the highest utilizing the most common score ($\alpha = .49$) followed closely by the average scores ($\alpha = .40$), and the lowest alpha ($\alpha = .13$) was for the highest rating score.

Table 5: Means (*M*) and standard deviations (*SD*) for initial raters across the three different ratings procedures (Most Common Score, Average Score, Highest Rating Achieved).

	Most Common Scores	Average Scores	Highest Rating Achieved
	<i>*α = .49</i>	<i>α = .40</i>	<i>α = .13</i>
Station description	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Empathy towards patients	2.42 (0.717)	2.25 (0.388)	3.00 (0.590)
Interpersonal professionalism	2.08 (1.381)	2.06 (0.764)	3.13 (1.361)
Flexibility in meeting patients' needs	2.25 (0.989)	2.07 (0.549)	3.00 (0.834)
Professional honesty and integrity	2.08 (0.929)	2.12 (0.666)	3.04 (0.999)
Practice philosophy of care	2.04 (0.859)	1.96 (0.563)	2.79 (0.658)
Intraprofessionalism and collegiality	2.38 (1.096)	2.53 (0.458)	3.79 (0.451)

*Cronbach's alphas reported for each rating procedures.

As was mentioned previously, the lowest reliability coefficient for the initial raters was for the Highest Rating Achieved scores with a Cronbach's alpha of 0.13. The reliability coefficient for the Average Scores was 0.40 and the highest was for the Most Common Scores with an alpha of 0.49. Therefore, for comparison purposes between the initial raters and the independent raters, it was decided to use only the Most Common Scores given by both groups. The means (*M*) and standard deviations (*SD*) for the Most Common Scores given by the independent raters are seen in Table 6.

As may be seen from the mean Most Common Scores given by the initial raters, the candidates appear to fluctuate in the middle to low values of the second stage in the pre-conventional morality level of Kohlberg's moral development rubric. The initial

raters interpreted the candidates' responses to be less self-centred and moving toward a more cooperative appreciation of another's point of view yet still being protective and wary of punishment. The independent raters gave slightly higher Most Common Scores corresponding to the middle to upper values of Kohlberg's second stage. The raters perhaps recognized the responses to be less judgmental and more helpful toward others.

Table 6: Means (*M*) and standard deviations (*SD*) for independent raters using the Most Common Score procedure

Station Number and Description	Most Common Scores <i>M</i> (<i>SD</i>)
1. Empathy towards patients	2.29 (1.051)
2. Interpersonal professionalism	2.19 (1.379)
3. Flexibility in meeting patients' needs	2.44 (0.897)
4. Professional honesty and integrity	2.56 (1.009)
5. Practice philosophy of care	2.71 (0.651)
6. Intraprofessionalism and collegiality	2.65 (0.887)

Agreement Analysis

This study investigated the scoring of Most Common Scores given by both initial and independent raters. Table 7, which shows the agreement between the initial raters and the independent raters, indicates rating scores of only one through four as no candidate achieved a score of five on Kohlberg's moral development rubric. The twenty-four candidates went through six stations for a sum of 144 scores. The bold numbers within the matrix indicate the number of agreements on scoring between the initial raters and the independent raters. The observed rater agreement (P_0) between the two groups of raters was calculated and found to be 36.8%.

Table 7: Agreement between initial raters and independent raters

Independent Rating	Initial Rating				Sum
	1	2	3	4	
1	15	6	11	4	36
2	1	4	3	0	8
3	26	19	32	7	84
4	6	2	6	2	16
Sum	48	31	52	13	144

Note: The bolded numbers represent agreement between the initial raters and the independent raters

$$\text{Observed Rater Agreement} = P_o = \frac{15+4+32+2}{144} = \frac{53}{144} = .368 = 36.8\%$$

Using the sum values in Table 7, the expected rater agreement (P_e) between the two groups of raters was calculated and found to be 31.6%.

$$\begin{aligned} \text{Expected Rater Agreement} = P_e &= \frac{(36)(48) + (8)(31) + (84)(52) + (16)(13)}{(144)^2} \\ &= \frac{1728 + 248 + 4368 + 208}{20,736} = \frac{6552}{20,736} = .316 = 31.6\% \end{aligned}$$

It is important to note that a t-test analysis indicated there was no significant differences between the two independent raters [$t(2, 286) = 1.400, p = 0.163$].

Factor Analysis

Factor analysis was performed on the independent rater scores to determine if relationships exist between the various chiropractic judgment vignette stations of the structured interview. Each vignette attempted to represent a different challenge in the practice of chiropractic. The first step was to determine the Pearson correlations between the individual chiropractic judgment vignette stations as presented in Table 8.

Table 8: Pearson correlations between CJV stations

	1	2	3	4	5	6
1. Empathy towards patients	1.000					
2. Interpersonal professionalism	-.335	1.000				
3. Flexibility in meeting patients' needs	-.202	.018	1.000			
4. Professional honesty and integrity	-.265	.369	.066	1.000		
5. Practice philosophy of care	-.322	.270	.052	.097	1.000	
6. Intraprofessionalism and collegiality	.274	.157	-.027	-.337	-.206	1.000

As indicated by the results listed in Table 8 above, the chiropractic judgment vignettes appear to test individual characteristics. The exception to this may be the correlation between CJV 2 (interpersonal professionalism) and CJV 4 (professional honesty and integrity) which showed a correlation coefficient of 0.369.

The next step was to perform a factor analysis which gave the results of the eigenvalues initially and again after they were rotated. Table 9 reveals there were three factors that were responsible for the greatest percentage of variance, showing both the initial and rotated values.

Table 9: Factor analysis of the CJV stations.

Factor	<u>Initial Results</u>			<u>Rotated</u>		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.985	33.0815	33.085	1.815	30.249	30.249
2	1.159	19.310	52.395	1.277	21.249	51.533
3	1.013	16.888	69.282	1.065	17.750	69.282

Extraction Method: Principal Component Analysis.

Taking into consideration the loading on each of the CJV stations and descriptions of the CJV stations, the three factors that emerged could be defined as „dutifulness’, ‘collegiality’ and „altruism’ as seen in Table 10.

Table 10: Rotated solution from the six CJV stations.

Station Item Subscales	Dutifulness	Collegiality	Altruism
1. Empathy towards patients	-.640	.258	-.361
2. Interpersonal professionalism	.850	.372	-.096
3. Flexibility in meeting patient's needs	.054	.017	.938
4. Professional honesty and integrity	.608	-.392	-.154
5. Practice philosophy of care	.546	-.166	.147
6. Intraprofessionalism and collegiality	-.111	.944	-.025

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 5 iterations

Using the Factor Analysis results from Table 10, the reliability coefficient (α) for stations 2, 4 and 5 was calculated to be 0.48. The item loading value for Station 1 was negative and was subsequently removed from the analysis on this factor.

Generalizability Study

Generalizability theory provides a generalizability, or reliability, coefficient which ranges from 0.0 to 1.0 and is determined for both absolute error and relative error. This coefficient indicates how close the observed score is to the universal, or true, score. The following generalizability coefficients were determined for six stations and both the initial raters (nested) and two independent raters (crossed) using the G-String IV software program. As was previously mentioned, the independent rater study design was a two facet, fully-crossed design and therefore the generalizability coefficient ($E\rho_s^2$) was calculated using all candidates at all stations as rated by both independent raters and was

found to be 0.51. A G-study analysis on the initial raters (raters nested within stations) resulted in a generalizability coefficient of 0.63.

Generalizability Analysis

As may be seen in Table 11, the largest explained variance percentage for the fully crossed design was the candidates (*c*) which accounted for 45.0% of the variance. The second largest explained variance percentage was for the residual (43.1%) and the third largest variance was accounted for by the raters (11.5%). The remaining main and two-way interaction effects accounted for minimal or zero amounts of the explained variance

Table 11: A Two-facet crossed design generalizability analysis for independent raters - 6 Stations

Source of Variation	df	Sum of Squares	Mean Square	Variance Components	Explained Variance (%)
Candidates (<i>c</i>)	23	35.330	1.536	0.098	45.0
Stations (<i>s</i>)	5	2.434	0.487	0.000	0.0
Raters (<i>r</i>)	1	8.337	8.337	0.025	11.5
<i>c</i> x <i>s</i>	115	94.649	0.823	0.000	0.0
<i>c</i> x <i>r</i>	23	15.413	0.670	0.000	0.0
<i>s</i> x <i>r</i>	5	7.517	1.503	0.001	0.5
<i>csr,e</i>	115	130.233	1.132	0.094	43.1
Total	143	163.972		0.218	100.0

Decision Study Analysis

The study with six stations and two raters yielded a generalizability coefficient of 0.51, therefore a decision study analysis was performed to determine the number of

stations and raters needed to obtain a coefficient closer to a standard of 0.70. As shown in Table 12, the decision study analysis revealed a generalizability coefficient of 0.68 if twelve stations and two raters were used. Maintaining the number of stations at 12 but increasing the number of raters from two to three would increase the generalizability coefficient to 0.76. The decision study also indicated that using 14 stations with 2 raters per station would increase the generalizability coefficient to 0.71, but consideration also has to be given to the added cost of increasing the number of stations in terms of a larger facility, the manpower needed to create more scenarios and compensation for more raters.

Table 12: Decision study analysis of results based on independent raters.

Chiropractic Judgment Vignette Stations & Rater Interviewers Combinations	<i>n</i> (stations)	<i>n</i> (raters)	$E\rho_{\delta}^2$
6 CJV stations, 2 raters	6	2	0.51
7 CJV stations, 2 raters	7	2	0.55
8 CJV stations, 2 raters	8	2	0.58
10 CJV stations, 2 raters	10	2	0.63
12 CJV stations, 2 raters	12	2	0.68
12 CJV stations, 3 raters	12	3	0.76
14 CJV stations, 2 raters	14	2	0.71
14 CJV stations, 1 rater	14	1	0.55

Note: Bolded text indicates initial G-study results

The results of a decision study for the initial raters partially-nested design is shown in Table 13. Increasing the number of stations from 6 to 8 but maintaining only one rater would increase the generalizability coefficient to 0.69.

Table 13: Decision study analysis of results based on initial raters.

Chiropractic Judgment Vignette Stations & Rater Interviewers Combinations	<i>n</i> (stations)	<i>n</i> (raters)	$E\rho_{\delta}^2$
6 CJV stations, 1 rater	6	1	0.63
7 CJV stations, 1 rater	7	1	0.66
8 CJV stations, 1 rater	8	1	0.69
9 CJV stations, 1 rater	9	1	0.72
10 CJV stations, 1 rater	10	1	0.74

Note: Bolded text indicates initial G-study results

Concurrent Validity between the Chiropractic Judgment Vignette (CJV) Stations and NEO-Five Factor Inventory (NEO-FFI)

Using Pearson's product-moment correlation coefficient for the analysis, it was found there were two moderate correlations between the NEO-Five Factor Inventory (NEO-FFI) and the Chiropractic Judgment Vignette (CJV) stations as shown in Table 14. One was between extraversion and CJV number 3 (flexibility in meeting patient's needs) with a correlation of .385, and the other was between agreeableness and CJV number 6 (intraprofessionalism and collegiality) with a correlation of .412. Relationships were also found between subscales on the NEO-FFI. Although negative, there was a strong (-.691) correlation between the neurotic subscale and the extraversion subscale. Two subscales, conscientiousness and extraversion, showed a positive correlation of .368.

Table 14: Correlations between the NEO-FFI subscales and CJV Stations 3, 6 and combined (CJVs 2, 4, and 5).

	1	2	3	4	5	6	7	8
1. Neurotic	1.000							
2. Extraversion	-.691**	1.000						
3. Openness	.067	-.080	1.000					
4. Agreeableness	-.141	.244	.243	1.000				
5. Conscientiousness	-.388	.386	-.062	.198	1.000			
6. CJV 3	-.026	.385	.242	.275	-.153	1.000		
7. CJV 6	-.091	.116	-.024	.412*	.234	.110	1.000	
8. CJV (2, 4, and 5)	-.192	.137	.115	.265	.070	.063	.480*	1.000

* $p < 0.05$, ** $p < 0.01$ (2-tailed)

Concurrent validity of the CJVstations and the NEO-FFI subscales showed two relationships: CJV 3 with extraversion and CJV 6 with agreeableness. A similar attempt to show agreement between the NEO-FFI and the multiple mini-interview was not successful.¹²⁴

Rater and Candidate Feedback

Feedback was solicited from both the raters and the candidates in order to determine face validity for the study. Each group of candidates was sequestered after the testing session and was asked to complete a feedback form as well as give verbal comment about the study process. The candidate feedback form and a synopsis of the responses may be found in Appendix 4. The raters were assembled after the study was completed and were also asked to complete a feedback form and give verbal responses about the study process. The rater feedback form and a synopsis of the rater comments may be found in Appendix 5. Common comments were that the process was well organized but the scenarios could be improved. The ratings given by both the raters and the candidates on the written feedback form are summarized in Table 15.

Table 15: Rater and candidate feedback

Rater Feedback	Mean	SD	Mode
The training session was good preparation for rating the candidates.	4.0	0.6	4
The content of the vignettes was realistic.	4.2	0.7	4
The probing questions allowed for a more detailed response to the vignettes.	3.5	0.8	4
The amount of time allowed to answer the vignettes was adequate.	4.5	0.5	5
The amount of time to rate each candidate adequate.	4.2	1.1	5

Candidate feedback	Mean	SD	Mode
The process was stressful.	2.1	1.0	1
The content of the vignettes was realistic.	4.5	0.5	4
The questions asked by the interviewer allowed for a more detailed response to the vignette.	3.8	0.6	4
The amount of time allowed to answer the vignettes was adequate.	4.6	0.5	5
The amount of time to move to a new station was adequate.	4.6	0.5	5

CHAPTER V

DISCUSSION

This chapter discusses various aspects of the study. It is organized under five main headings: impetus for the study, methods, analysis, limitations and future considerations.

Impetus for the study

Much has been written in the literature concerning the need for assessment of the non-cognitive attributes of healthcare practitioners because of the impact these attributes have on patient satisfaction and health outcomes. Because the profession of chiropractic does not enjoy the cultural authority bestowed on medicine, the profession must be diligent in assuring the knowledge, skills and especially the attitudes and judgments of the individual practitioners. There is a social contract between the healthcare providers and the patients, payers and administrators as well as government regulators that is based on trust and develops into a cultural authority for the profession. This trust is based on a belief held by the stakeholders that the members of the profession will uphold the codes of ethics and standards of practice established by the regulatory bodies of the profession as well as demonstrate duty of service, empathy and altruism in the care of their patients. These traits and other attributes of professionalism may constitute the definition of a „good’ doctor.

For the relatively new profession of chiropractic, this social contract is still developing. Individual practitioners are gaining individual authority but this has yet to transfer to the profession. Unfortunately, if an individual chiropractic practitioner’s

behaviour falls short of the expected professionalism resulting in a loss or deficit of authority and trust, this deficit transfers to the whole profession. As previously mentioned, creating a standard of professionalism is attempted in the writing of the Canadian Chiropractic Examining Board licensing exams and is prescribed in the codes of ethics and standards of practice by the various chiropractic regulatory boards and the national chiropractic association, but there still remains the difficulty of how to accurately assess these desired non-cognitive traits of chiropractors, students of a chiropractic training program or applicants to a chiropractic training program.

The difficulty has been, and continues to be, the development and utilization of a reliable and valid assessment tool. Through various trials it has been determined that the interview process is probably one of the most valid and reliable assessment tools available.

Methods

This study employed chiropractic judgment vignettes interview as the method to assess the non-cognitive attributes of chiropractors. The content of the scenarios used in the vignettes was solicited from the registrar of the Alberta College and Association of Chiropractors, the Chief Executive Officer of the Canadian Chiropractic Protective Association and the past-president of the Canadian Federation of Chiropractic Regulatory Boards. These three highly respected individuals suggested the content for the scenarios based on their experiences with the membership of the chiropractic profession and issues that arise in private practice that may challenge the non-cognitive attributes of the practicing chiropractor. The resulting six vignettes and the associated probing questions

were each constructed as an attempt to reflect a different non-cognitive attribute. The marking rubric was modeled after Kohlberg's theory of moral development and employed predetermined anchors to assign a stage of development based on the language used by the candidates in response to the probing questions.

The administration of this study was designed in manner very similar to the organization and administration of an objective structured clinical examination (OSCE). The facility was a testing area of a medical school and therefore had individual testing rooms, recording equipment, intercom, and a timing device. There was good flow between interviews aided by an administrator who assured the participants were directed into the appropriate interview room or to the debriefing room at the end of the six interviews.

Analysis

Validity of the chiropractic judgment vignettes interview was analyzed through face, content, and concurrent validity testing. Face validity was achieved by the results of the feedback obtained from both the initial raters and the chiropractors that acted as candidates, and content validity was achieved by soliciting vignette content from three chiropractic experts. Concurrent validity was achieved by using Pearson's product-moment correlation between the subscales of the NEO FFI and the chiropractic judgment vignettes interview. The concurrent validity testing showed two relationships: CJV 3 (flexibility in meeting patient's needs) with extraversion and CJV 6 (intraprofessionalism and collegiality) with agreeableness. A similar attempt to show agreement between the NEO-FFI and the multiple mini-interview was not successful.¹²⁴

The descriptive statistics indicated the „most common scores’ gave the highest reliability coefficient of $\alpha = 0.49$ for the initial raters therefore the most common scores given by the independent raters were used when comparing the scores given by the initial and independent raters. An agreement analysis revealed an observed rater agreement of 36.8% and an expected rater agreement of 31.6%.

An exploratory factor analysis of the six chiropractic judgment vignette stations using the independent raters’ scores indicated that the stations were testing distinct attributes. Factor analysis also revealed the six station item subscales loaded onto three factors which could be defined as dutifulness, collegiality and altruism. These three factors represent an initial but not exclusive framework for the desired non-cognitive attributes of a practicing chiropractor. The question then arises as to whether or not these non-cognitive attributes are malleable or stable. As was discussed previously, Patenaude et al¹⁰² found these traits are malleable but move in a negative direction during the training process. Papadakis et al¹⁰³⁻¹⁰⁵ found that serious disciplinary infractions during the training period were predictive of serious practice infractions once the student was in active practice. It therefore appears that non-cognitive attributes may be both malleable and stable, and potentially depends on the trait and the situation in which the trait or traits are being measured.

The G-study of the initial raters utilizing a nested design produced a G coefficient ($E\rho_s^2$) of 0.63. The generalizability coefficient calculated for the independent raters utilizing a fully crossed design generated a value of $E\rho_s^2=0.51$. Both values were less than the desired $E\rho_s^2=0.70$. The lack of experience on the part of the initial raters may

have had some effect on the resultant G coefficients of the initial versus the independent raters. The higher G coefficient for the initial raters may also be explained by the fact that the initial raters were chiropractors and in some instances may have known the chiropractors who were acting as candidates resulting in a hawk/dove effect favouring a more halo rating effect. Perhaps the raters were not experienced enough to differentiate the various stages and defaulted to their personal or professional relationships with the candidates.

For the independent raters, the largest explained variance percentage was the candidates (c) which accounted for 45.0% of the variance. The second largest explained variance percentage was for the residual (43.1%) and the third largest variance was accounted for by the raters (11.5%). The remaining main and two-way interaction effects accounted for minimal or zero amounts of the explained variance. Ideally, the explained variance should rest almost entirely with the candidates themselves and the two-way interaction between the candidates and the stations. The decision study for the independent raters utilizing a fully crossed design revealed an improvement to the generalizability coefficient could be achieved if the study used 12 stations and two raters which should result in a coefficient of $E\rho_{\delta}^2=0.68$. The decision study for the initial raters in the nested design indicated that increasing the number of stations from 6 to 8 but maintaining only one rater would increase the generalizability coefficient to 0.69.

This study utilized the chiropractic judgment vignettes (CJV) interview as opposed to the multiple mini-interview (MMI). The difference between the MMI and the CJV interview is more in the context than in the design. The CJV interview is

conceptualized to have each of the vignettes specify a non-cognitive element of chiropractic practice and, unlike the MMI, the attribute being measured is not overtly stated. The marking rubric was anchored to predetermined stages in an attempt to be less subjective as opposed to the Likert-type scale used in the MMI which lends itself to the rater's subjectivity. As a testament to the concurrent validity of the CJV interview, correlations with the subscales of the NEO FFI were found to exist. No such correlation was found to exist between the NEO FFI and MMI.

Limitations

After performing a literature search, it appears this study was the first attempt to utilize a chiropractic judgment vignettes interview analyzed by generalizability theory in an effort to determine the non-cognitive attributes of chiropractors. Being the first attempt, it was not without shortcomings and deficits.

The first area for consideration for improvement is in the development of the scenarios for the vignettes. Although the post-interview debriefing of both the interviewers/raters and the candidates indicted good face validity for the vignettes, perhaps the face and content validity could be improved by soliciting scenarios from a larger and more diverse group than just the three individuals who contributed to the content of the vignettes. As well as the registrar of the Association and College of Chiropractors of Alberta, the past-president of the Canadian Federation of Chiropractic Regulatory and Educational Accrediting Boards, and the Chief Executive Officer of the Canadian Chiropractic Protective Association, the group contributing to the content of the vignettes could include all the registrars from all the Canadian jurisdictions, lawyers

and/or disciplinary committee members from the two Canadian chiropractic colleges, board members of the Canadian Federation of Chiropractic Regulatory Boards, and the board members of the Canadian Chiropractic Protective Association. A sampling of scenarios submitted by practicing chiropractors themselves is also a possibility as a source of information to determine which clinical situations might have challenged a practitioner in daily practice. The initial raters suggested the scenarios needed to be more clear and concise as both the raters and the candidates found some scenarios were open to interpretation of either the scenario itself (stations 3 and 5) or terms used within the scenario (stations 2 and 4). The process might also be improved if there were more than six stations as indicated by the decision study, which demonstrated that utilizing 12 stations might improve the generalizability coefficient of the study. Both the raters and the candidates indicated there was adequate time to answer the questions but both groups thought the probing questions could be improved so as to elicit more detailed responses.

As suggested by the initial raters, a more extensive training program for the raters would also benefit the process. It may have been asking too much of the initial raters to be introduced to Kohlberg's Theory of Moral Development and the marking rubric in a two-hour training session in the morning and then have to put the training into action in the afternoon without much practice. The raters expressed a desire to have more training in recognizing synonyms for the anchors that were proposed in the training session as well as having more practice using the rubric reinforced by feedback from the trainer. It may have been helpful to the raters if an information package had been sent prior to the training session in order for the raters to become familiar with Kohlberg's Theory of

Moral Development and the marking rubric to be used. This information package could also have contained information outlining Kohlberg's theory, the anchors used for the marking rubric as well as practice scenarios. With the raters already somewhat familiar with the rating process, the two-hour training session on the day of the study could have been spent answering any questions the raters might have regarding the process and spending more time identifying anchors and the associated rating correlated with the response language potentially used by the candidates.

Another limitation of this study was the small sample size ($n=24$). Utilizing 24 chiropractors acting as candidates and permitting seven minutes for candidate responses at each of the six stations allowed the interview process to be concluded in less than four hours. Realizing the raters would be asked to spend two hours at a training session, an hour break for lunch, almost another four hours for the actual interview process, and then the debriefing session, there was an attempt to keep the total time committed by the raters to approximately eight hours. Increasing the number of candidates would require requesting the raters to extend their time commitment or would require more raters and a larger facility thereby increasing the cost.

There was some difficulty in recruiting practicing chiropractors to act as candidates for the study. Recruitment of participants to act as candidates may have been more successful if the initial contact had been through a letter. Using email to communicate does not assure the most up-to-date address whereas traditional letter mail using the addresses as supplied by the Alberta College and Association of Chiropractors would have assured accurate address information. With the initial contact being through

email and the addresses being somewhat suspect as to their current accuracy, this resulted in a sample of convenience.

Another limitation of this study was the use of a partially-nested design for the initial raters. The use of a partially-nested design for the initial raters was an attempt to quell boredom and keep the raters engaged in the process. Unfortunately this did not bode well for statistical analysis. In future iterations of this study, the design would best serve statistical analysis by being a fully-crossed design as was done with the independent raters.

There were very few difficulties in the administration of the study. The facility presented a slight problem only because there was some confusion as to the exact location of the testing area. Signs were posted throughout the medical school but tradeshow exhibitors were set up in front of the testing area door obscuring the final sign. This necessitated either the administrator or the trainer to stand outside the door to the testing centre in order to direct the participants to the testing area. Comments from both groups reflected a general feeling the process was well organized and the study was valuable for the chiropractic profession.

Future Considerations

As a pilot study, this project was a very valuable learning experience. Determining the non-cognitive attributes of chiropractors will greatly improve the service to patients and help develop the cultural authority of the chiropractic profession. Utilizing a generalizability study to analyze results of the chiropractic judgment vignettes interview to assess the non-cognitive attributes of chiropractors was a very worthwhile

endeavor and served as a starting point for future study in this area. Determining the qualities of a ‚good’ doctor has far reaching benefits from improved patient outcome, patient satisfaction, and fewer regulatory interventions. Defining professionalism and determining which non-cognitive attributes contribute the most to this definition will go a long way in refining the process of testing for these attributes. With each new study that is performed, more information is gleaned on how to make the process more valid and reliable and will eventually result in the desired outcome of training more ‚good’ doctors.

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www.cmcc.ca/Page.aspx?pid=313#CP3303
108. Course CP 3304. Chiropractic Practice: Business and Law. Canadian Memorial Chiropractic College. <http://www.cmcc.ca/Page.aspx?pid=313#CP3304>
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APPENDIX 1

Intervention Protocol/Instrumentation

A. NEO-FFI = NEO-Five Factor Inventory

The NEO-FFI is a shortened version of the NEO-Personality Inventory – Revised (NEO PI-R) but retains its validity and reliability. The NEO-FFI scales show correlations of .88 to .94 with the NEO PI-R domain scales. Internal consistency values range from .76 to .90.

The NEO-FFI has 60 questions rated on a 5-point scale and can be completed in 10-15 minutes and raw scores can be calculated in 2 minutes. It measures five personality domains:

Neuroticism

High - anxiety, hostility, depression, self-consciousness, impulsiveness, vulnerability

Low - calm, even-tempered, relaxed, composed, confident

Extraversion

High – warmth, gregariousness, assertiveness, activity, excitement seeking, positive emotions (upbeat, energetic)

Low – reserved, independent, even-paced, less exuberant, serious

Openness to experience

High – active imagination, artistic, attention to inner feelings, preference for variety, intellectual curiosity

Low – narrower scope of interests, conventional in thought, conservative, cautious in thought

Agreeableness

High – Trust, straightforwardness, altruism, compliance, modesty, tender-mindedness,
cooperative

Low – skeptical, ego-centric, competitive, headstrong

Conscientiousness

High – competence, dutifulness, achievement striving, self discipline, deliberation

Low – Easy going, sometimes careless, spontaneous (not planned), absent minded,
distractible

The NEO-FFI offers two observer-rating versions of the instrument: Form R (Adult men) and Form R (Adult women).

Table 16: Schedule for Writing the NEO-FFI

Group	Candidate numbers	NEO-FFI writing time
One	1-6	1 pm
Two	7-12	2 pm
Three	13-18	3 pm
Four	19-24	4 pm

B. Six Chiropractic Judgment Vignettes
(see next section)

(Place RATER label here)

(Place CANDIDATE label here)

Station 1

A patient confides to her chiropractor that she has recently lost her job and therefore no longer has healthcare benefits. This is making it financially difficult for her to continue with chiropractic care.

Probing questions:

1. If the chiropractor knew that she depended on continued care to remain active, how do you think the chiropractor should handle this situation?
2. How should the chiropractor respond if she offered to barter her interior decorating services for chiropractic services?
3. If she told the chiropractor she also has to send money regularly to support her elderly parents, how should the he respond?

Stages	Stage one Punishment-avoidance and obedience	Stage two Exchange of favours	Stage three Good boy/good girl	Stage four Law and order Maintain society	Stage five “good society”
Anchors	<ul style="list-style-type: none"> -it’s all about me. -rules are rules, need to obey the law. -if caught, disobeying will result in punishment sanctioned by authorities/ institutions. -balance adherence to practice expectations based on avoidance of punishment. 	<ul style="list-style-type: none"> -me and her/him. -recognize that different people have differing viewpoints. -may help others -"You scratch my back, I'll scratch yours." - punishment is simply a risk that one naturally wants to avoid. 	<ul style="list-style-type: none"> -believe that people should live up to the expectations of the family and community and behave in "good" ways. -intentions are good, focus on meeting the needs of the patient/client. -considers issues of trust, concern, empathy when passing judgment -actions will depend on the outcome for relationships 	<ul style="list-style-type: none"> -considers ‘my community’ -performs one’s duties to maintain a social order. -obeying the rules set by the authorities within the context of societal expectations -think from a full-fledged member-of-society perspective -places needs of society above self 	<ul style="list-style-type: none"> -considers ‘my country’ or ‘my organization’ -rules are agreed upon to benefit society, but not to the detriment of an individual’s right to life and liberty. -rules are flexible: considering the rights and values that a society ought to uphold
Scale	1	2	3	4	5
Frequency					
Comments					

Station 2

(Place RATER label here)

(Place CANDIDATE label here)

A patient, who on a number of occasions could be perceived as acting provocatively, asks a chiropractor if he would like to see her socially. Both the chiropractor and the patient are unmarried and the chiropractor is interested in pursuing a personal relationship.

Probing questions:

1. How should the chiropractor handle this situation?
2. How should the chiropractor respond if the patient refuses to end the professional relationship yet wishes to pursue the personal relationship?
3. What role should the professional association have in making the distinction between a chiropractor’s personal and professional relationships?

Stages	Stage one Punishment-avoidance and obedience	Stage two Exchange of favours	Stage three Good boy/good girl	Stage four Law and order Maintain society	Stage five “good society”
Anchors	-it’s all about me. -rules are rules, need to obey the law. -if caught, disobeying will result in punishment sanctioned by authorities/ institutions. -balance adherence to practice expectations based on avoidance of punishment.	-me and her/him. -recognize that different people have differing viewpoints. -may help others -"You scratch my back, I'll scratch yours." - punishment is simply a risk that one naturally wants to avoid.	-believe that people should live up to the expectations of the family and community and behave in "good" ways. -intentions are good, focus on meeting the needs of the patient/client. -considers issues of trust, concern, empathy when passing judgment -actions will depend on the outcome for relationships	-considers ‘my community’ -performs one’s duties to maintain a social order. -obeying the rules set by the authorities within the context of societal expectations -think from a full-fledged member-of-society perspective -places needs of society above self	-considers ‘my country’ or ‘my organization’ -rules are agreed upon to benefit society, but not to the detriment of an individual’s right to life and liberty. -rules are flexible: considering the rights and values that a society ought to uphold
Scale	1	2	3	4	5
Frequency					
Comments					

Station 3

(Place RATER label here)

(Place CANDIDATE label here)

A chiropractor treats a family that has a large number of children. One of the children needs frequent care and the family is of minimal financial means. The father suggests the chiropractor use another child's name for insurance reimbursement purposes when the one child runs out of insurance coverage.

Probing questions:

1. What should the chiropractor say to the father about the limitations of insurance coverage for chiropractic services?
2. How should the chiropractor respond if the father asks about whether or not the chiropractor could alter her fees?
3. What are some of the other potential options or solutions that the chiropractor could suggest to this situation?

Stages	Stage one Punishment- avoidance and obedience	Stage two Exchange of favours	Stage three Good boy/good girl	Stage four Law and order Maintain society	Stage five "good society"
Anchors	-it's all about me. -rules are rules, need to obey the law. -if caught, disobeying will result in punishment sanctioned by authorities/ institutions. -balance adherence to practice expectations based on avoidance of punishment.	-me and her/him. -recognize that different people have differing viewpoints. -may help others -"You scratch my back, I'll scratch yours." - punishment is simply a risk that one naturally wants to avoid.	-believe that people should live up to the expectations of the family and community and behave in "good" ways. -intentions are good, focus on meeting the needs of the patient/client. -considers issues of trust, concern, empathy when passing judgment -actions will depend on the outcome for relationships	-considers 'my community' -performs one's duties to maintain a social order. -obeying the rules set by the authorities within the context of societal expectations -think from a full-fledged member-of-society perspective -places needs of society above self	-considers 'my country' or 'my organization' -rules are agreed upon to benefit society, but not to the detriment of an individual's right to life and liberty. -rules are flexible: considering the rights and values that a society ought to uphold
Scale	1	2	3	4	5
Frequency					
Comments					

(Place RATER label here)

(Place CANDIDATE label here)

Station 4

A patient who has a newborn asks her chiropractor about immunizations. The patient states she has heard that immunizations are potentially poisonous to a newborn and should be avoided as long as possible.

Probing questions:

1. How should the chiropractor comment as to when immunization is not advisable for newborns or infants?
2. How should the chiropractor inform the patient about the importance and function of immunization with newborns?
3. What recommendation should the chiropractor make about the risks and benefits of both immunization and non-immunization?

Stages	Stage one Punishment-avoidance and obedience	Stage two Exchange of favours	Stage three Good boy/good girl	Stage four Law and order Maintain society	Stage five “good society”
Anchors	<ul style="list-style-type: none"> -it’s all about me. -rules are rules, need to obey the law. -if caught, disobeying will result in punishment sanctioned by authorities/institutions. -balance adherence to practice expectations based on avoidance of punishment. 	<ul style="list-style-type: none"> -me and her/him. -recognize that different people have differing viewpoints. -may help others -"You scratch my back, I'll scratch yours." - punishment is simply a risk that one naturally wants to avoid. 	<ul style="list-style-type: none"> -believe that people should live up to the expectations of the family and community and behave in "good" ways. -intentions are good, focus on meeting the needs of the patient/client. -considers issues of trust, concern, empathy when passing judgment -actions will depend on the outcome for relationships 	<ul style="list-style-type: none"> -considers ‘my community’ -performs one’s duties to maintain a social order. -obeying the rules set by the authorities within the context of societal expectations -think from a full-fledged member-of-society perspective -places needs of society above self 	<ul style="list-style-type: none"> -considers ‘my country’ or ‘my organization’ -rules are agreed upon to benefit society, but not to the detriment of an individual’s right to life and liberty. -rules are flexible: considering the rights and values that a society ought to uphold
Scale	1	2	3	4	5
Frequency					
Comments					

Station 5

(Place RATER label here)

(Place CANDIDATE label here)

After assessing a new patient, a chiropractor tells her chiropractic intern that she feels that the patient could be treated and released from care with the problem resolved in a total of six treatments. However, the intern notes that the chiropractor books this new patient as she would book any new patient for 3x/week for 3 weeks, 2x/week for five weeks and then once a week for six weeks.

Probing questions:

1. How should the chiropractor clarify the new patient bookings to the intern as a suggested treatment plan?
2. How should the chiropractor clarify her thinking that more treatments rather than fewer treatments are more beneficial for the patient?
3. How do you think the chiropractor and intern should monitor the progress of this case?
4. How should the intern respond if the patient consults with him privately for a second opinion on the proposed treatment plan?

Stages	Stage one Punishment-avoidance and obedience	Stage two Exchange of favours	Stage three Good boy/good girl	Stage four Law and order Maintain society	Stage five “good society”
Anchors	-it’s all about me. -rules are rules, need to obey the law. -if caught, disobeying will result in punishment sanctioned by authorities/institutions. -balance adherence to practice expectations based on avoidance of punishment.	-me and her/him. -recognize that different people have differing viewpoints. -may help others -"You scratch my back, I'll scratch yours." - punishment is simply a risk that one naturally wants to avoid.	-believe that people should live up to the expectations of the family and community and behave in "good" ways. -intentions are good, focus on meeting the needs of the patient/client. -considers issues of trust, concern, empathy when passing judgment -actions will depend on the outcome for relationships	-considers ‘my community’ -performs one’s duties to maintain a social order. -obeying the rules set by the authorities within the context of societal expectations -think from a full-fledged member-of-society perspective -places needs of society above self	-considers ‘my country’ or ‘my organization’ -rules are agreed upon to benefit society, but not to the detriment of an individual’s right to life and liberty. -rules are flexible: considering the rights and values that a society ought to uphold
Scale	1	2	3	4	5
Frequency					
Comments					

Station 6

(Place RATER label here)

(Place CANDIDATE label here)

A chiropractor is made aware of a colleague who may be abusing alcohol and/or drugs and still treats patients while impaired. The chiropractor knows that the colleague is under a lot of stress due to a recent divorce and that the alcohol abuse is probably a temporary setback.

Probing questions:

1. Should the chiropractor report the colleague’s suspected use of alcohol/drugs while treating patients to the registrar?
2. What should the chiropractor say to his colleague about practicing while impaired?
3. Although the chiropractor is a non-drinking alcoholic and feels he can help rehabilitate his colleague, what other options or solutions should he consider that would benefit his fellow colleague?

Stages	Stage one Punishment-avoidance and obedience	Stage two Exchange of favours	Stage three Good boy/good girl	Stage four Law and order Maintain society	Stage five “good society”
Anchors	<ul style="list-style-type: none"> -it’s all about me. -rules are rules, need to obey the law. -if caught, disobeying will result in punishment sanctioned by authorities/institutions. -balance adherence to practice expectations based on avoidance of punishment. 	<ul style="list-style-type: none"> -me and her/him. -recognize that different people have differing viewpoints. -may help others -"You scratch my back, I'll scratch yours." - punishment is simply a risk that one naturally wants to avoid. 	<ul style="list-style-type: none"> -believe that people should live up to the expectations of the family and community and behave in "good" ways. -intentions are good, focus on meeting the needs of the patient/client. -considers issues of trust, concern, empathy when passing judgment -actions will depend on the outcome for relationships 	<ul style="list-style-type: none"> -considers ‘my community’ -performs one’s duties to maintain a social order. -obeying the rules set by the authorities within the context of societal expectations -think from a full-fledged member-of-society perspective -places needs of society above self 	<ul style="list-style-type: none"> -considers ‘my country’ or ‘my organization’ -rules are agreed upon to benefit society, but not to the detriment of an individual’s right to life and liberty. -rules are flexible: considering the rights and values that a society ought to uphold
Scale	1	2	3	4	5
Frequency					
Comments					

APPENDIX 2

Schedule for the Chiropractic Judgment Vignettes (CJV) interview

Session One

Time	Rater	1	2	3	4	5	6
	Station	1	2	3	4	5	6
1:30	Candidate	1	2	3	4	5	6
1:37		6	1	2	3	4	5
1:44		5	6	1	2	3	4
1:51		4	5	6	1	2	3
1:58		3	4	5	6	1	2
2:05		2	3	4	5	6	1

Session Two

Time	Rater	6	1	2	3	4	5
	Station	1	2	3	4	5	6
2:30	Candidate	7	8	9	10	11	12
2:37		12	7	8	9	10	11
2:44		11	12	7	8	9	10
2:51		10	11	12	7	8	9
2:58		9	10	11	12	7	8
3:05		8	9	10	11	12	7

Session Three

Time	Rater	5	6	1	2	3	4
	Station	1	2	3	4	5	6
3:30	Candidate	13	14	15	16	17	18
3:37		18	13	14	15	16	17
3:44		17	18	13	14	15	16
3:51		16	17	18	13	14	15
3:58		15	16	17	18	13	14
4:05		14	15	16	17	18	13

Session Four

Time	Rater	4	5	6	1	2	3
	Station	1	2	3	4	5	6
4:30	Candidate	19	20	21	22	23	24
4:37		24	19	20	21	22	23
4:44		23	24	19	20	21	22
4:51		22	23	24	19	20	21
4:58		21	22	23	24	19	20
5:05		20	21	22	23	24	19

APPENDIX 3

Forms requiring signatures of candidates and/or raters:
(Please see attached documents.)

1. **Consent Letter (candidate)**
2. **Acknowledgement of participation (candidate)**
3. **Acknowledgment of participation (rater)**

1. Consent Letter

Faculty of Medicine
University of Calgary

Research Project Title: Using Chiropractic Judgment Vignettes Interview to Assess Chiropractors' Non-cognitive Attributes: A Generalizability Study

Sponsor: none

Principle Investigator: Dr. Tyrone Donnon

Co-Investigator: Dr. Lori Darroch

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, please ask. Take the time to read this carefully and to understand any accompanying information. You will receive a copy of this form.

Background

The chiropractic profession in Alberta must comply with the requirements as set out in the new Health Professions Act which dictates that, in order to maintain the right to self-regulate, the profession must ensure that all members are competent to continue practicing. The Alberta Health Professions Act defines competence as the practitioner having the appropriate level of knowledge, skills, attitudes and judgments. Evaluation of skills and knowledge is currently achieved through self-study, chart abstraction and practice visits, if necessary. There currently is no instrument that measures the attitudes and judgements.

What is the purpose of this study?

This study will use generalizability theory to determine the error source in the instrument that may prove to be useful in determining the attitudes and judgments of chiropractors in compliance with the Alberta Health Professions Act.

What would I Have to Do?

As one of twenty four participants in this study, you will be asked to complete a short personality questionnaire and then comment of six scenarios, each of which may reflect

a dilemma that might be encountered in daily chiropractic practice. Your comments will be assessed according to Kohlberg's stages of moral development.

What Are the Risks?

There are no greater risks participating in this study than there are experiencing everyday life.

Will I Benefit if I Take Part?

As a member of the chiropractic profession, your participation in this study may be instrumental in developing an instrument that may be used to assess the moral competence of chiropractors. The utility of such a tool would be to improve the attitudes and judgments of practicing chiropractors which in turn would enhance public trust. The enhancement of public trust would be of benefit to all chiropractors.

Do I Have to Participate?

Your participation in this study is strictly voluntary. You can refuse to participate or withdraw at any time during the course of the study without retribution.

What Else Does My Participation Involve?

If you wish, you may take part in an open discussion of your experience in this study. This debriefing session will be helpful in improving the assessment process but is not a requirement.

Will I be Paid for Participating, or Do I Have to Pay for Anything?

You will be paid \$50 for your participation. You may be required to pay for parking should you choose to use the parking facilities at the University of Calgary Medical School.

Will My Records Be Kept Private?

The data will be gathered and processed in such a way to ensure confidentiality and complete anonymity. All data collected for this study will be kept in a secure, electronic password protected file which will only be accessible by the investigators. Dr. Donnon will be the only one privileged to the identity of the participants.

If I Suffer a Research –related Injury, Will I Be Compensated?

In the event you suffer an injury as a result of your participating in this study, you will not receive compensation from the University of Calgary; nothing in this consent form alters your right to seek damages.

Agreement to Participate

Your decision to review, complete and return this question and answer form will be interpreted as your agreement to participate. In no way does this waive your legal rights nor release the investigators or the involved institution from their legal and professional responsibilities. You are free to withdraw from the study at any time.

Signatures

Your signature on this form indicates that you have understood to your satisfaction regarding your participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the investigators or the involved institution from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardizing your position or state of well being. If you have further questions concerning matters related to this research, please contact:

Dr. Tyrone Donnon (403) 220-9682

Dr. Lori Darroch (403) [REDACTED]

If you have any questions concerning rights as a possible participant in this research, please contact the Associate Director, Internal Awards, research Services, University of Calgary at (403) 220-3782.

Participant's Name

Signature and Date

Investigator's/Delegate's Name

Signature and Date

Witness's Name

Signature and Date

The University of Calgary Conjoint Health Research Ethics Board has approved this study. A signed copy of this consent form has been given to you to keep for your records and reference.

2. Acknowledgement of participation – Candidate**Acknowledgment of Participation**

I hereby acknowledge that I was a participant in the following study:

Title: Using Chiropractic Judgment Vignettes Interview to Assess
Chiropractors' Non-cognitive Attributes: A
Generalizability Study

Date: Saturday, April 25, 2009

Location: Medical Skills Testing Centre
University of Calgary Medical School

Purpose of Study: To fulfill requirements for a Master of Science degree

Principle Investigator: Dr. Tyrone Donnon

Student: Dr. Lori Darroch

I have **accepted** the honorarium of \$50 for participation in this study.

I have **waived** the honorarium of \$50 for participation in this study.

Participant's name (please print): _____

Years of practice: _____

Chiropractic College: _____

Signature: _____

3. Acknowledgment of Participation - Rater**Acknowledgment of Participation**

I hereby acknowledge that I was a participant in the following study:

Title: Using Chiropractic Judgment Vignettes Interview to Assess
Chiropractors' Non-cognitive Attributes: A
Generalizability Study

Date: Saturday, April 25, 2009

Location: Medical Skills Testing Centre
University of Calgary Medical School

Purpose of Study: To fulfill requirements for a Master of Science degree

Principle Investigator: Dr. Tyrone Donnon

Student: Dr. Lori Darroch

I have **accepted** the honorarium of \$300 for participation in this study.

I have **waived** the honorarium of \$300 for participation in this study.

Participant's name (please print): _____

Signature: _____

APPENDIX 4

Candidate feedback:

How can we make this better?

(Please circle a response to each statement.)

The process was stressful.

1	2	3	4	5
Strongly disagree	disagree	neutral	agree	strongly agree

The content of the vignettes is realistic.

1	2	3	4	5
Strongly disagree	disagree	neutral	agree	strongly agree

The questions asked by the interviewer allowed for a more detailed response to the vignettes.

1	2	3	4	5
Strongly disagree	disagree	neutral	agree	strongly agree

The amount of time allowed to respond to the vignettes was adequate.

1	2	3	4	5
Strongly disagree	disagree	neutral	agree	strongly agree

The amount of time to move to a new station is adequate.

1	2	3	4	5
Strongly disagree	disagree	neutral	agree	strongly agree

Please finish the following statements:

The strength of this process is _____

This process could be improved by _____

Anything else? _____

Thank you.

Candidate feedback comments

The strength of this process is:

Vignettes were realistic to actual practice

Very easy questions; very realistic vignettes

The utility of the realistic scenarios, open-ended answers, mimicking the OSCE process

Realistic scenarios

Acceptable. Some scenarios were difficult to put myself into

Very realistic scenarios. Could see them happening in a clinic setting

A great place to rant about the inconsistencies of the College. Allows for your opinion on the subject; no right or wrong

The scenarios are realistic. Very interesting project. I hope it turns out to be a valuable study.

Very realistic and morally challenging questions. However, if using this alone, a chiro could very easily 'deceive' the interviewers in telling them what they want to hear.

The vignettes were realistic. They all made me think of the true clinical experience.

Get a variety of views of typical clinical scenarios, can look for trends

The structure and organization of the questions and interview process

Interviewers were neutral, realistic situations

Very professional setting and interesting vignettes

Well organized, interesting vignettes

Well thought out

The open-ended nature of the vignettes allows for expression of one's opinion.

Thoughtfulness

Pertinent questions

Good snacks beforehand

No allowing extra detail by the interviewers i.e. let us answer without any help

The realistic nature of the vignettes

The debriefing was helpful in providing clarity of the process

The process could be improved by:

More questions from interviewer

Seems OK for now

Unknown-went smooth for me

Making questions gender specific; issues that affect female doctors is (sic) different than male (e.g. the pt coming on to the chiropractor)

I knew all the examiners-it would probably help for grading if I didn't. It would benefit the scenarios if they were changed to first person (easier to respond)

Not being able to see the marking sheets

Vignettes could be more specific in two cases. i.e. #4 (5)-problem resolved – what does this mean? #2 association – is that association or college?

Having a tighter time frame in order to answer the questions

Nothing comes to mind

More stations – wider variety of vignettes

Should have asked a question/vignettes about a colleague falsely billing AHCIP

Increasing the level of moral dilemmas in the vignettes.

Vignette #5 was confusing. “the intern noted” – I initially thought this meant the intern made a note of the file.

Anything else?

Good luck with the research

Some of the scenarios were inflammatory which actually made me want to say less regarding the subject.

Not being able to see the marking sheet

It was great!

Glad to help

I found the vignettes to be not all that morally challenging – perhaps more difficult situations would discriminate to a better degree.

The rater's individual personalities do influence the way one answers the question

An example of a vignette and questions before entering the rooms might be helpful

It was nice to help someone who has given much to the profession

Verbal comments during debrief:

Stn 1 and 3 are too similar

Stn 2 – change 'association' to regulatory board

Stn 3 – first question not appropriate; make it specific to the scenario

Stn 4 – define 'resolved', change 'intern' to 'associate'

Change the amount of time at each station to five minutes from seven minutes

Some felt the scenarios were sexist

APPENDIX 5

Rater feedback:**How can we make this better?****(Please circle a response to each statement.)****The training session was good preparation for rating the candidates.**

1	2	3	4	5
Strongly disagree	disagree	neutral	agree	strongly agree

The content of the vignettes is realistic.

1	2	3	4	5
Strongly disagree	disagree	neutral	agree	strongly agree

The probing questions allowed for a more detailed response to the vignettes.

1	2	3	4	5
Strongly disagree	disagree	neutral	agree	strongly agree

The amount of time allowed to respond to the vignettes was adequate.

1	2	3	4	5
Strongly disagree	disagree	neutral	agree	strongly agree

The amount of time to rate each candidate was adequate.

1	2	3	4	5
Strongly disagree	disagree	neutral	agree	strongly agree

Please finish the following statements:

The strength of this process is _____

This process could be improved by _____

Anything else? _____

Thank you.

Rater feedback comments

The strength of this process is:

Use of qualitative data collection methods

Open-ended responses yield lots of insight

It prompts the candidates to analyze and critique themselves regarding moral/ethical situations common to the profession

Attempting to standardize the interview process and grading. But difficult if the candidate didn't understand the vignette

The ability of the candidate to express themselves and correct any misperceptions vis-a-vis their responses

The process could be improved by:

Encouraging more of a response of why/why so you think that? Candidate's answers were „simple' answers to questions. A way to encourage them to voice their thoughts and processes may allow for more comprehensive analysis.

Would be nice to have a minute w/o candidates to work on scoring; candidates rarely went above a „3' – perhaps briefing them to give more sociologically oriented answers?

Some probing questions didn't encourage a detailed response to help score the station. (I wanted to ask “Why do you feel/think that way?) i.e. prompt the candidates

More repetition and experience in using the rubric to various vignettes.

Wording of the vignette was slightly confusing for Stn 5. Tweaking it would make it more clear. Expanding some vignettes would make them work better (Stn 3).

Stronger, more pertinent examples in the train session. Not that they were inadequate but I would have liked to feel a bit better prepared.

Anything else?

I've done more structured interviews, scenarios and semi-structured interviews before – this was tougher than either particularly in trying to score the candidates.

Great learning experience.

Further testing could be refined by editing the vignettes with further information or clarification.

I try not to be leading or to clarify but to be neutral.

I'm honoured to be part of this very important process.