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Predicting and Assessing Performance in Canadian Dental Schools:

The Canadian Dental Association Interview, Personality, and a

Behaviourally Anchored Rating Scale

By
Amanda Poole

A Thesis Submitted to
Saint Mary's University, Halifax, Nova Scotia
in Partial Fulfillment of the Requirement for
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Abstract

Predicting and Assessing Performance in Canadian Dental Schools:
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Behaviourally Anchored Rating Scale

By Amanda Poole

Abstract: Using a sample of students from 2 Canadian Dental Schools, this study
continues an examination of the validity of the Canadian Dental Association (CDA)
interview and a measure of personality in the prediction of clinical and academic
performance in dental school. This is the second study to examine the validity of the new
CDA interview and to evaluate the use of a behaviourally anchored rating scale
(Chamberlain et al., in press) as a method for assessing professional behaviour in the
clinic. Results from the personality measure indicated that Conscientiousness adds to the
prediction of both academic and clinical performance in the first three years of dental
training; Openness and Agreeableness predicted second year clinical performance.
Narrow facets also predicted performance criteria. BARS ratings were associated with
Conscientiousness, Neuroticism and narrow facets of these factors. Contrary to previous
research with the new CDA interview, the interview predicted third year clinical
performance; however, it did not add to prediction beyond the DAT.

August 26, 2005

Predicting and Assessing Performance in Canadian Dental Schools: The Canadian Dental Association Interview, Personality, and a Behaviourally Anchored Rating Scale

Annually, dental faculties across Canada must select the most qualified applicants to admit into their dental programs. These decisions can be difficult as most candidates are highly competent and often surpass the minimum requirements for admission (Smithers, Catano, & Cunningham, 2004). To aid admission decisions, most Canadian dental schools use the Dental Admissions Test (DAT), undergraduate Grade Point Averages (GPAs), and the Canadian Dental Association (CDA) interview. As most candidates accepted into dental school graduate and presumably become successful practitioners, dental programs need to ensure that they are admitting students who will become both competent and ethical practitioners (Boyd, Teteruck, & Thompson, 1980). By using valid and reliable predictors of success in dental school, admission committees may increase their ability to select individuals who will be successful while at the same time diminishing costly selection mistakes (Schmidt & Hunter, 1998).

Of the dental school admissions criteria, the DAT and GPA scores tend to assess cognitive abilities whereas the interview assesses noncognitive or behavioural skills. A wealth of research has established the predictive validity of the DAT and GPAs. Both have been found to be predictors of performance in the first and second (preclinical) years of dental school, but not predictors of performance in clinical coursework (Kramer, 1986; Oudshoorn, 2003; Sandow, Jones, Peeh, Courts, & Watson, 2002; Smithers et al., 2004). These results are not surprising considering the first two years of the dental curriculum is generally comprised of didactic coursework where academic related competencies such as time management, organization, reading comprehension, test taking and concentration may be needed for success. In the latter years of the dental program

students engage in clinical interactions with patients where behavioural skills such as verbal communication and empathy might become more critical to performance (Westerman, Grandy, Coombs, & Turner, 1989). Conversely, scant research has examined the role of the admissions criteria in predicting the behavioural skills of dental students (e.g., Chamberlain, Catano, & Cunningham, in press; Smithers et al., 2004). Identifying valid predictors of behavioural skills is important, as it has been suggested that the successful treatment of patients in a clinical setting is attributable to the values and attributes of the dental students expressed in their behaviour towards their patients (Chambers, 1994; Gray, Deem & Straja, 2002; Jones, Courts, Sandow, & Watson, 1997; Simon & Chambers, 1992). The Canadian Dental Association (CDA) interview, recently redesigned, is presumed to assess competencies related to the practice of dentistry; however, its validity has yet to be established (Chamberlain, 2004). Utilizing valid selection tools designed to assess behavioural skills or noncognitive variables, such as personality measures and interviews, could add to the prediction of performance in dental school.

The primary purpose of this study is to continue and extend research aimed at identifying and assessing those variables that may reliably and validly predict success in both the preclinical and clinical components of dental undergraduate programs in Canada. Two recent pilot studies, the first by Smithers et al. (2004) and the second by Chamberlain et al. (in press), explored the possibility of using a valid measure of personality as part of the admissions process. The results from both of these studies suggest that personality is a predictor of performance in dental school and that there is value in using a personality inventory as an admissions requirement. Chamberlain et al.

also developed a behaviourally anchored rating scale (BARS) to assess behaviour that is related to clinical practice, specifically those skills assessed with the new CDA interview (communication, integrity, self control, conscientiousness, judgment and analysis, sensitivity to others, and tact and diplomacy; Tomini & Keown, 1998). Developing tools to evaluate student behaviour in the clinic is beneficial in that they can provide objective assessments of clinical performance. BARS ratings were significantly correlated with personality, first year overall performance, and third year clinical performance. The results of these pilot studies are promising; however, further research is needed to reaffirm and generalize the results concerning the personality inventory and the BARS as a professionalism criterion measure. Additionally, there is a continuing need to assess the validity of the new CDA interview.

Building on these recent pilot studies, the current study will investigate the role of the new CDA interview and personality in predicting dental students' performance in academic and clinical coursework. Smithers et al. (2004) found that there are different predictors for academic and clinical coursework; namely, students' behavioural and interpersonal skills predicted clinical performance and the DAT predicted academic coursework. Other researchers have advocated the separation of GPA into its component parts (e.g., written and verbal) and have suggested that differentiating the performance criterion could lead to different conclusions (Rothstein, Paunonen, Rush, & King, 1994). This distinction was continued by Chamberlain et al. (in press) who asserted that clinical course grades assess clinical skills but may not capture the professional behaviours needed for successful performance as a dentist. As such, they developed the BARS to assess clinical performance in dental school. This is the second study to use the BARS

measure to assess clinical performance. This is also the second study to investigate the validity of the new CDA interview. Chamberlain (2004) attempted to assess the validity of the interview but was unsuccessful due to an insufficient number of senior students to warrant a meaningful analysis. The current study used a sample of dental students from two Canadian dental schools yielding a larger sample that permitted an investigation of the validity of the new CDA interview.

<div align="center">Cognitive Ability and Selection</div>

Cognitive ability, also referred to as intelligence or general mental ability, is a person's ability to reason, solve problems, think abstractly, process information and acquire knowledge (Catano, Wiesner, Hackett, & Methot, 2005). Many believe that cognitive ability is important for academic performance but that it offers no prediction of real world performance; however, this contention is unfounded as cognitive ability has been found to be one of the most valid predictors of job and training performance across a wide range of jobs (Schmidt & Hunter, 2004; Schmidt & Hunter, 1998). Cognitive ability has a mean validity coefficient of .51 for predicting job performance (Schmidt & Hunter, 1998) and ranges from .28 for low complexity jobs to .58 for high complexity jobs (Schmidt, 2002). Cognitive ability is a good predictor of performance because people that are more intelligent acquire job knowledge more rapidly and can acquire more knowledge than people with lower levels of cognitive ability (Schmidt & Hunter, 1992).

Cognitive Ability and Dental Student Selection

Given their increased ability to acquire and store knowledge, those with high cognitive ability should be more successful in academics as many academic programs

require students to acquire a vast amount of knowledge in relatively short time spans

(Schmidt & Hunter, 1998). The relationship between cognitive ability and academic

performance applies to psychology graduate students (Hirschberg & Itkin, 1978),

graduate business students (Rothstein et al., 1994), and undergraduate students (Busato,

Prins, Elshout, & Hamaker, 2000; Farsides & Woodfield, 2003; Ridgell & Lounsbury,

2004). Cognitive ability is a predictor of students' academic performance in medicine

(e.g., Anderson, 1990; Streyffeler, Altmaier, Kuperman, & Patrick, 2005) and dentistry

(e.g., Gray et al, 2002). In academic contexts, traditional cognitive ability tests are

generally replaced with aptitude tests such as the DAT. Cognitive ability tests and

aptitude tests are similar in that cognitive ability tests assess aptitudes and abilities, such

as verbal ability and perceptual skills, which are also assessed by aptitude tests (McCrae,

1987). The CDA instituted the DAT in the late 1960s (Boyd & Teteruck, 1979), and it is

currently one of the admissions tools used by Canadian dental schools to select dental

students. All students applying for admission into dental school in Canada must complete

the DAT or the American equivalent, the Dental Admission Test.

The Dental Aptitude Test

Scores on the DAT, which reflect a unitary measure of achievement and

scholastic aptitude (Boyd et al., 1980), greatly influence selection decisions made by

admissions committees at dental schools across Canada (Ambrose & Teteruck, 1979).

The DAT consists of multiple components; among these, the Survey of Natural Science

Examination, the Reading Comprehension Examination, and the Perceptual Motor

Ability Test (Smithers et al., 2004) can be considered to be proxies for cognitive ability.

The Survey of Natural Sciences Examination assesses knowledge of biology and general

chemistry. The Reading Comprehension Examination requires test-takers to read a 4000

word document related to aspects of dental and clinical sciences followed by 50 questions

regarding the content of the reading. The Perceptual Motor Ability Test contains 90

visual diagrams that incorporate line and angle discrimination, block counting, space

relationship, and object visualization, which assess two and three-dimensional perceptual

ability.

Extensive research has established the validity of the DAT as a predictor of dental

school performance and has generally found that the DAT is a significant predictor of

didactic or preclinical coursework (e.g., Boyd & Teteruck, 1979; Chamberlain et al., in

press; Gray et al., 2002; Kramer, 1986; Oudshoorn, 2003; Thompson, Ahlawat, & Buie,

1979, Smithers et al., 2004). For instance, Thompson et al. (1979) found that the DAT

components were significant predictors of didactic performance in year one of dental

training. Similarly, in a report of an 8-year study involving the DAT, Manhold &

Manhold (1965) found that the academic average component of the DAT was a good

predictor of didactic performance. Furthermore, Kramer (1986) found that the DAT

predicted performance in the first two years of dental training beyond prediction afforded

by undergraduate GPAs.

Although the DAT is associated with didactic performance, the DAT has not

predicted success in clinical coursework (e.g., Chamberlain et al., in press; Manhold &

Manhold, 1965, Gray et al., 2002, Oudshoorn, 2003, Smithers et al., 2004). For example,

the academic average component had no value in predicting clinical coursework or final

class standing (Manhold & Manhold, 1965). More recently, Gray et al. (2002) found that

DAT subtest scores played no role in the prediction of clinical grades in nine courses, and

both Smithers et al. (2004) and Chamberlain et al (in press) found that the DAT was not successful in predicting third and fourth year coursework, which is predominately clinical in nature. The results of Chamberlain et al. (in press) were similar to those of Smithers et al.; however, Chamberlain et al. found the combination of DAT components to be a predictor of clinical performance in the third year of dental training and that high Perceptual Ability scores were associated with favorable ratings of clinical performance as assessed with the BARS. No strong conclusions could be drawn from the results of the Chamberlain et al. study as the analyses were based on small sample sizes and it was the first study using the BARS as a clinical criterion. Based on the past DAT research, I expected that the DAT would be a valid predictor of dental school performance, particularly in the first and second year of dental training, which is predominately didactic in nature.

<div align="center">Interviews and Selection</div>

Interviews are a popular method for selecting employees in job settings (Catano et al., 2005) and for selecting applicants to higher education programs (Edwards, Johnson, & Molider, 1990), in part due to their intuitive appeal to those making selection decisions (McDaniel, Whetzel, Schmidt, & Maurer, 1994). Interviews are often used in the later stages of a selection process to supplement information provided in a résumé or application form (Catano et al., 2005). As such, they are used to assess noncognitive attributes such as interpersonal relations, personality variables, teamwork, and leadership skills (Latham & Skarlicki, 1995; Motowildo et al., 1992) along with job knowledge and cognitive ability (Huffcutt, Roth, & McDaniel, 1996).

Selection interviews can be either structured or unstructured. In structured interviews, candidates are asked the same set of predetermined questions whereas unstructured interviews involve questions that are generally not predetermined (Eder & Harris, 1999). Structured interview questions are constructed based on knowledge obtained from a job analysis (Campion, Palmer, & Campion, 1997) and, as a result, they are more costly to construct and to use; however, they are also more valid. Meta-analytic studies show that structured interviews have higher validity than unstructured interviews (e.g., McDaniel et al., 1994; Wiesner & Cronshaw, 1988) and predict both job performance (McDaniel et al., 1994; Wiesner & Cronshaw, 1988) and academic performance (Day & Carroll, 2003). The average validity of the structured interview is .51 (Schmidt & Hunter, 1998). The structured interview has incremental validity above tests of cognitive ability (Campion, Campion, & Hudson, 1994; Cortina, Goldstein, Payne, Davison, & Gilliland, 2000; Schmidt & Hunter, 1998) and tests of conscientiousness (Cortina et al., 2000) in predicting job performance. Structured interviews have acceptable reliability, which is moderated by the use of standardized questions and whether scores are combined mechanically rather than subjectively (Conway, Jako, & Goodman, 1995).

The validity of the structured interview also depends on the types of questions used. Validity of the interview is higher when the interview questions are related to the content of the target job (McDaniel, et al., 1994). Two common types of structured interviews are the situational interview (SI: Latham, Saari, Pursell, & Campion, 1980) and the patterned behaviour description interview (PDBI: Janz, 1982). These two interviews are similar in that they both tend to use a scoring key to rate responses;

however, SI questions ask interviewees what they would do in a hypothetical situation

(Latham, & Sue-Chan, 1999) and the PBDI questions ask interviewees about past

behaviour with the assumption that past behaviour is the best predictor of future

behaviour (Janz, 1989). Essentially, the distinction is that SI questions are future-oriented

whereas PBDI questions are past-oriented. Both types of interviews have acceptable

interrater reliabilities when descriptively-anchored rating scales are used to rate

interviewees' responses.

Comparative validity data for the SI and PBDI is mixed. In some studies the SI

has higher predictive validity than the PBDI (Latham & Skarlicki, 1995) while in others

the PBDI is a better predictor of performance (Pulakos & Schmitt, 1995), particularly for

higher-level jobs (Huffcutt, Weekley, Wiesner, Degroot, & Jones, 2001) and if questions

are accompanied by a descriptively-anchored rating scale (Taylor & Small, 2002). The SI

is less susceptible to anchoring effects, a heuristic used by interviewers that can bias the

interview ratings, than the PBDI (Katoaka, Latham, & White, 1997). Yet, the SI and

PBDI are relatively equal in their ability to predict performance; both types of interviews

demonstrate incremental validity above cognitive ability tests (Campion et al., 1994; Day

& Carroll, 2003). In fact, SI and PBDI questions are highly correlated (Conway &

Peneno, 1999). Based on their results and the inconsistencies in the literature, Conway

and Peneno (1994) suggested that interviews should include a mixture of SI and PBDI

questions.

Interviews and Dental Student Selection

The interview is a common selection tool used in both medical and dental school

admissions (Gafini, Moshinsky, & Kapitulnik, 2003). Dental schools generally use

interviews to assess their applicants' noncognitive competencies (Graham & Boyd, 1982); thus, supplementing the information provided by the application, DAT scores, and undergraduate GPAs. In 1980, the Dental Admissions Test Committee of the CDA created a selection interview that was designed to assess eight characteristics: motivation, self-appraisal, maturity, ability to relate, adaptability, ethics, sense of responsibility, and the interviewer's overall reaction to the candidate. In a factor analysis, the characteristics loaded on one factor that was defined as personality. The interview did not include a scoring key; however, guidelines were available to help interviewers evaluate candidates in the form of a five-point scale was used to indicate the presence or absence of each of the eight characteristics. A panel of two to three interviewers conducted the interviews and the inter-rater reliability ranged from .83 to .87. Additionally, there was a checklist of observations such as personal appearance, articulateness, shyness, aggressiveness, self-confidence, and assertiveness included to investigate bias and other characteristics of the interview (Graham & Boyd, 1982).

The CDA used the original interview into the mid 1990's, without extensively examining its predictive validity. Most recently, Smithers et al. (2004) found that the original interview was negatively associated with students' performance in the first year of dental training, did not predict academic performance, and may have led to poor selection decisions. Essentially, the interview had weak criterion related validity. However, the interview modestly predicted performance in third year clinical courses and correlated with Openness to Experience, a personality characteristic described as intellectual curiosity, the preference for novelty, and the experience of more

differentiated, deeper emotions. This result is interesting in that Openness to Experience

may be related to success in the clinical components of dental training.

New Canadian Dental Association Interview

Structured interviews based on job analyses have higher predictive validities than

interviews not based on job analysis (McDaniel et al., 1994; Wiesner & Cronshaw,

1998). In 1998, the CDA contracted with Organizational Studies Inc to conduct a job

analysis that identified eight competencies that were essential for success in dentistry

(Tomini & Keown, 1998). These competencies were communication, conscientiousness,

integrity, judgment and analysis, self-control, sensitivity to others, tact and diplomacy,

and continuous learning. The results of the job analysis by Tomini and Keown (1998)

were replicated in 2000 by a graduate class at Saint Mary's University in Halifax, Nova

Scotia, Canada. Their job analysis involved the use of focus groups to develop critical

incidents that described successful or unsuccessful behaviours for the first seven

competencies identified by Tomini and Keown (See Appendix A for a definition of the

seven competencies). The eighth competency, continuous learning, was deemed relevant

to practitioners but not student applicants. The critical incidents were used to develop a

new interview protocol consisting of both SI and PBDI questions and scoring keys for

each competency (Chamberlain, 2004). A panel of two trained interviewers, usually

faculty members and dental practitioners, select seven questions from a pool of 14

questions, which is composed of seven PBDI and seven SI items, to ask at each

interview. This variability in the interview protocol was introduced to reduce the chance

of subsequent candidates knowing the exact questions being asked during the interview.

Each question is scored on a 5-point scale with behavioural anchors yielding 35 as the

highest possible score an interviewee can receive on the interview. Only the total interview score is used as part of the admissions process. Previous research has demonstrated that the new interview has acceptable inter-rater reliability of .80 (Cunningham, Smithers, Catano, & Chamberlain, 2002).

To date, Canadian dental schools have used the new interview in four admissions cycles. Although the inter-rater reliability of the new interview is established (Cunningham et al., 2002), its ability to predict dental students' academic and/or clinical performance remains to be determined. Chamberlain (2004) attempted to assess the validity of the interview but was unsuccessful; an insufficient number of senior students participated in her study to make the results meaningful. Therefore, another objective of this research is to assess the validity of the new CDA interview with respect to both academic and clinical criteria. The current study will also examine whether the new CDA interview demonstrates incremental prediction of dental school performance over the DAT by recruiting a larger sample that includes students from dental schools across Canada.

Personality and Selection

Although cognitive ability has been shown to be one of the best predictors of performance across a wide range of jobs and settings (Schmidt & Hunter, 1998), it does not account for all of the variability in a performance criterion (Goldstein, Zedeck, & Goldstein, 2002). For example, a conscientiousness test can account for an additional 18 percent of the variance in performance over and above that accounted for by a test of cognitive ability (Schmidt & Hunter, 1998). Furthermore, noncognitive factors are associated with job-related performance such that intellectually able individuals can fail

at a job when their personality traits are not congruent with the task requirements

(Goldberg, 1993). These findings, along with the mixed results concerning the ability of

the DAT to predict clinical performance and the lack of research on the predictive ability

of the new CDA interview suggest that there is potentially a need to identify non-

cognitive variables that can predict performance in the clinical years of dental training.

As such, selection tools, such as personality measures that are designed to assess

behavioural skills, may add to prediction of performance in dental school.

Personality, defined as pervasive consistencies in thoughts, feelings, and

behaviours (Costa & McCrae, 1992), had its beginnings as a personnel selection tool in

the First World War where personality measures were designed to select recruits (Landy,

1997). The use of personality measures as selection tools continued into the 1960s but

was somewhat halted by Guion and Gottier's (1965) review of the validity of personality

measures in personnel selection. Guion and Gottier stated, "it is difficult in the face of

this summary to advocate, with a clear conscience, the use of personality measures in

most situations as a basis for making employment decisions" (p.160). Viewed as

respected sources, this review placed personality assessment in poor regard until the early

1990s when interest in personality assessment was revived. The resurgence was partly

due to the publication of two key meta-analyses that showed that personality was useful

in the prediction of job performance and had a place in personnel selection research

(Barrick & Mount, 1991; Tett et al., 1991). Another reason for newfound interest in

personality assessment was the emergence of the Five-Factor Model of personality,

which provided the first accepted taxonomy of personality (Costa, 1996; Goldberg,

1993). Since its resurgence as an accepted personnel selection tool, personality has been

shown to be a successful predictor of various performance criteria in a variety of job

(e.g., Barrick & Mount, 1991; Barrick, Mount, & Strauss, 1993; Schmidt & Hunter,

1998; Tett et al., 1991) and academic settings (e.g., Busato et al., 2000; Farsides &

Woodfield, 2003; Goff & Ackerman, 1992; Hirschberg & Itkin, 1978; Paunonen &

Ashton, 2001; Rothstein et al., 1994).

The Five-Factor Model of Personality

The Five-Factor Model of personality, also referred to as the "Big Five", consists

of five orthogonal factors that are presumed to account for most of the common variance

in virtually all personality traits (Costa, 1996). The five factors include: Neuroticism –

the tendency to experience negative affect, such as anxiety, depression, and hostility;

Extraversion – the quantity and intensity of interpersonal interaction; Openness to

Experience – the proactive seeking and appreciation of new experiences; Agreeableness –

the quality of one's personal interactions along a continuum from compassion to

antagonism; and Conscientiousness – the amount of persistence, organization, and

motivation in goal directed behaviours. The "Big Five" has gained popularity as a strong

framework for categorizing personality traits and in general, there is consensus among

personality researchers that the model provides a comprehensive description of

personality (Digman, 1990; Goldberg, 1993). A variety of instruments have been

developed or modified to assess the "Big Five" (e.g., Goldberg, 1990; for a review see

Widiger & Trull, 1997) where one of the more popular measures is Costa and McCrae's

(1992) NEO Personality Inventory. Along with the five broad factors, Costa and

McCrae's inventory contains 30 specific or narrow traits (6 per factor) that define each

factor. Brief descriptions of the factors and the narrow facets are presented in Table 1.

Table 1.

Descriptions of the Narrow Facets of the Big Five Personality Dimensions

Neuroticism

Anxiety: Apprehensive, fearful, prone to worry
    Angry Hostility: Angry, frustrated
    Depression: Feelings of guilt and sadness
    Self-Consciousness: Uneasy around others, sensitive to ridicule
    Impulsiveness: Inability to control cravings and urges
    Vulnerability: Inability to cope with stress, dependent, panicky

Extraversion

Warmth: Affectionate, friendly, ability to form close attachments
    Gregariousness: Enjoys company of others, enjoys social situations
    Assertiveness: Dominant, forceful, socially ascendant
    Activity: Rapid tempo, vigorous movement
    Excitement Seeking: Craves excitement and stimulation, likes noisy environment
    Positive Emotions: Laughs easily, cheerful, optimistic

Openness to Experience

Fantasy: Vivid imagination, active fantasy life, daydreamer
    Aesthetics: Deep appreciation for art and beauty, moved by poetry, music
    Feelings: Experiences deeper, more differentiated emotional states
    Actions: Prefer novelty and variety to familiarity and routine
    Ideas: Intellectually curious, enjoys philosophical arguments
    Values: Readiness to reexamine social, political, and religious values

Conscientiousness

Competence: Capable, well prepared, sensible
    Order: Neat, tidy, well organized
    Dutifulness: Adhere to strictly ethical principles
    Achievement Striving: High aspirations, diligent, sense of direction
    Self-discipline: Motivated
    Deliberation: Thinks carefully before acting, deliberate, cautious

Agreeableness

Trust: Believe others are honest, well intentioned
    Straightforwardness: Frank, sincere, ingenious
    Altruism: Genuine concern for others, considerate, helpful
    Compliance: Control of aggression, forgiving
    Modesty: Humble, self-effacing
    Tender-mindedness: Sympathetic

Personality and Dental Student Selection

Personality may also play a role in predicting the performance of dental students since

factors other than academic potential may be critical for success in dental training

(Barkley, 1979; Boyd, Graham, & Teteruck, 1979; Boozer, Lee, Rayson, Weinberg, 1984). Anecdotally, in some cases top performing science students who were excellent at coursework were not effective interpersonally in the clinic (Barkley, 1979). To address this, Barkley (1979) suggested that rather than selecting students with high science scores and attempting to make them more sensitive to people, dental admission committees should select students who are sensitive to others and who also have high science scores, as these students ultimately will make a better dentist. Students with excellent pre-dental academic records who fail in dental school highlight the need for modification or improvement to the existing admissions system (Mace & Tira, 1999). As such, adding a personality inventory to the current admissions process may improve admission decisions by supplementing the information obtained from the other admissions criteria. Historically, researchers have been interested in the relationship between personality and dental student performance. In fact, in 1974 the CDA introduced a personality inventory into the Dental Admissions testing program but later abandoned the measure for various reasons (Boyd et al., 1979). Research from this program showed that personality and dental school performance were linked such that applicants who were admitted into a dental program were more enthusiastic, trusting, imaginative, forthright, and confident than applicants who were not admitted into the program (Thompson et al., 1979).

Despite past interest in the personality of dental students, and the recent support for the use of personality tests in predicting both job (e.g., Tett et al., 1991; Tett, Jackson, Rothstein, & Reddon, 1999) and academic performance (e.g., Rothstein et al., 1994; Shen & Comrey, 1997), personality is not normally assessed in the dental school admissions process. Recently, Gafini et al. (2003) argued that valid measures of personality and

motivation should be used in the prediction of performance in dental school. Medical

educators have also suggested that there is a need for methods to evaluate personal

qualities (Taylor, 1990). The addition of a personality assessment in medical admissions

significantly improved the prediction of medical academic success (Ferguson, Sanders,

O'Hehir & James, 2000; Powis, 1994; Shen & Comrey, 1997). However, this research

yielded mixed results concerning which traits are important for success. Recently,

Lievens, Ones, and Dilchert (2005) reported in a seven-year, longitudinal study that some

personality scores increased in their ability to predict medical students' grade point

averages throughout medical training. Lievens et al. concluded that relying on early

grades to validate the utility of personality measures for predicting academic performance

might underestimate the true predictive value of personality variables. As medical

training is similar to dental training, personality might also have value in predicting later

academic performance where clinical interactions increasingly play a role in the

curriculum.

The Five-Factor Model of Personality and Dental Student Selection

Previous studies on the relationship between personality and performance in

dental school have generally not used measures based on the Five-Factor Model of

personality (e.g., Boyd et al., 1979; Thompson et al., 1979; Westerman et al., 1989). The

Five-Factor Model is related to performance in various academic disciplines (e.g.,

Ferguson et al., 2000; Rothstein et al., 1994); thus, it is probable that these factors could

be useful in predicting performance in dental school.

Conscientiousness is comprised of traits such as organization, persistence, and

purposefulness (Costa & McCrae, 1992) and has the highest validity of the Big Five

factors for predicting overall job performance in almost every occupational field (e.g.,

Barrick & Mount, 1991, Hurtz & Donovan, 2000; Tett et al., 1991). Those higher in

conscientiousness have greater performance because they develop higher levels of job

knowledge through exerting greater effort and spending more time 'on task' (Schmidt &

Hunter, 1992). This assertion may also apply to academic settings whereby highly

conscientious students might be more successful academically than less conscientious

students because they are more likely to set and achieve goals (Barrick et al., 1993).

Research with undergraduate samples shows that Conscientiousness is a predictor of

students' GPA (Busato et al., 2000; Duff, Boyle, Dunleavy, & Ferguson, 2004; Goff &

Ackerman, 1992), overall final exam marks (Chamorro-Premuzic & Furnham, 2003a;

2003b), and personality theory course grades (Paunonen and Ashton, 2001). At the

graduate level, conscientiousness is a consistent predictor of psychology graduate student

success (Hirschberg & Itkin, 1978). However, Rothstein et al. (1994) reported that

Conscientiousness was not a significant predictor of classroom participation grades.

Conscientiousness is also related to success in medical training (Ferguson, James, &

Madeley, 2002; Ferguson, James, O'Hehir, & Sanders, 2003; Lievens, Coetsier, De

Fruyt, & Maeseneer, 2002). Notably, Lievens et al. (2005) found that Conscientiousness

and its facets of Self-discipline, Achievement Striving, and Competence was an

increasing asset for medical students as the factor and traits scores increased in their

validity to predict academic success. Differences in results across studies may be due the

samples used but also might be due to the use of different criteria for academic

performance, such as course grades (e.g., Goff & Ackerman, 1992) and class

participation (Rothstein et al., 1994).

Dental work is often repetitive in nature involving the need for determination, deliberation, caution and reliability (McDaniel, Siler, & Isenberg, 2001); traits similar to those associated with Conscientiousness. Thus, it is probable that conscientiousness is related to performance in dental school. Surprisingly, Smithers et al. (2004) did not find support for the relationship between Conscientiousness and performance in dental school. In light of this finding, Smithers et al. suggested that highly conscientious individuals might not perform well in occupations that do not permit long periods of deliberation in decision-making. Dental training may require quick decision-making thus; highly conscientious students would not outperform less conscientious students. Conversely, Chamberlain et al. (in press) found that Conscientiousness was a good predictor of performance in first, second, and third year clinical and didactic coursework. Moreover, narrow facets of Conscientiousness emerged as more impressive predictors of dental school performance than the broad factor itself. Specifically, Competence predicted academic and clinical coursework in the first three years of dental school and a measure of professionalism; Dutifulness predicted Year 2 and Year 3 academic performance and professionalism; and Deliberation predicted Year 3 academic performance and ratings of professionalism. Additionally, Evans and Dirks (2001) found that Conscientiousness and its Dutifulness and Deliberation facets were significant predictors of at least one laboratory course grade of dental technology students. Inconsistencies in the results of Smithers et al. and Evans and Dirks might be due to the use of different criterion measures in the studies: weighted clinical and didactic GPAs and laboratory course grades, respectively. Given these contradictory findings, further research is warranted to validate the results, especially those of Chamberlain et al. (in press).

Agreeableness is associated with traits such as sincerity, compassion, honesty, forgiveness (Costa & McCrae, 1992). Research in academic settings has yielded mixed results concerning the relationship between academic success and Agreeableness. For instance, Farsides and Woodfield (2003) found that Agreeableness was positively correlated with undergraduate final grades whereas Rothstein et al. (1994) showed that agreeableness was negatively correlated with in-class performance and overall GPA. However, Rothstein et al. (1994) also found no relationship between agreeableness and the written component of GPA scores of graduate business students and Busato et al. (2000) found no significant correlation between agreeableness and psychology undergraduate examination scores or 'study points' earned for each undergraduate year of study. In medical school, Agreeableness and its facets of altruism, straightforwardness, trust, and tender-mindedness increase in predictive validity over the course of medical training (Lievens et al., 2005).

Results with dental students concerning the role of agreeableness as a predictor of performance have also been mixed. Evans and Dirks (2001) found that Agreeableness and its facets of Trust and Straightforwardness were positively associated with at least one laboratory grade. Chamberlain et al. (in press) also reported significant positive correlations between Agreeableness and its facets of Trust, Straightforwardness, and Modesty and first year academic performance. Additionally, Chamberlain et al. found that Straightforwardness and Modesty predicted second year coursework and Trust predicted a measure of professionalism. Conversely, Smithers et al. (2004) did not find a significant relationship between the broad factor and any performance criteria but, consistent with the other two studies, they did find support for Straightforwardness as a

predictor of second year coursework. In contradiction to these results, Smithers et al. also

found that Compliance and Tender Mindedness were negatively related to Year 3

coursework. Again, inconsistencies across results might be due to the use of different

criterion measures, but differences might also be attributable to the small sample sizes in

each study that could result in sampling error (Chamberlain et al., in press).

Openness to Experience is characterized by the active seeking and appreciation of

new experiences and has been associated with general knowledge (Goff & Ackerman,

1992) as well as creativity (McCrae, 1987). Research in academic settings has shown that

Openness to Experience is positively correlated with classroom participation grades

(Rothstein et al., 1994), and undergraduate students' final grades (e.g., Blickle, 1996;

Farsides & Woodfield, 2003). Yet, some researchers have not found a significant

relationship between Openness to Experience and academic performance (e.g., Chamoro-

Premuzic & Furnham, 2003a; Busato et al., 2000; Paunonen and Ashton, 2001). Lievens

et al. (2005) found that Openness to Experience did not predict performance in the first

year of medical school; however, the validity of the factor increased to the range of .30 to

.40 for predicting success in the later years of medical training. Additionally, the facets of

Aesthetics, Feelings, and Ideas predicted performance criteria. Given the association

between Openness to Experience and creativity (McCrae, 1987), this factor may not be

related to success in dental school. The dental setting is rather controlled and does not

provide much opportunity for creativity or intellectual curiosity. The characteristics of

Openness to Experience may be more beneficial for "humanistic" as opposed to

"scientific" programs (McCrae & Costa, 1997).

Evans and Dirks (2001) did not find any relationship between Openness to Experience and dental laboratory course grades. Smithers et al. (2004) reported a negative relationship between Openness to Experience and Year 2 and Year 3 academic performance and Year 3 clinical performance. Additionally, the facets of Fantasy, Openness to Ideas, and Aesthetics were negatively related to performance; students who were less imaginative, less open to ideas, and less interested in aesthetics were more successful in their dental training. Conversely, Chamberlain et al. (in press) found that Openness to Experience did not predict any criterion measures; however, actions predicted Year 1 performance and Ideas predicted ratings of professional behaviour. Differences between the results of Smithers et al. and Chamberlain et al. may reflect the composition of the dental student samples in each study. Chamberlain et al. concluded that their results were more in line with the expectation that students in professional programs of study should be more intellectually curious. More research is needed to ascertain the relationship between Openness to Experience and performance in dental school.

Extraversion is characterized by an increased quantity and intensity of interpersonal interaction (Costa & McCrae, 1992). Research in academic settings has been mixed concerning the role of Extraversion in predicting academic success. For instance, Extraversion was negatively related to undergraduate students' GPAs (Goff and Ackerman, 1992) and negatively related to undergraduate examination scores (Busato et al. 2000; Chamorro-Premuzic, & Furnham, 2003a). However, with a sample of master's business administration students, Rothstein et al. (1994) showed that Extraversion was significantly and positively correlated with classroom participation grades. Again,

differences in results across studies might be attributable to the criterion used. That is, Extraversion might be crucial to classroom participation grades where verbal performance and expressiveness are implicated whereas Extraversion may hinder performance in written work because highly extraverted individuals tend to seek social stimulation, which could interfere with studying. Interestingly, Lievens et al. (2005) found that the validity for Extraversion had the greatest increase of the other personality factors where validity changed from -.11 to .31 between year 1 and year 7. Thus, Extraverted individuals received lower GPAs early in medical training but later in the program, Extraversion became an asset to students.

Extraversion might be important for predicting performance in dental school, particularly performance in clinical coursework where there is increased patient interaction. Using the Big Five factors to predict dental technology students' grades in three laboratory courses where psychomotor skills are important, Evans and Dirks reported that two facets of Extraversion – Warmth and Excitement-seeking were positively correlated with at least one grade. Smithers et al. (2004) found that Positive Emotions was positively related to third year clinical performance. Conversely, Chamberlain et al. (in press) did not find any associations between Extraversion nor any of its facets and performance in dental school. Further research is needed to address these inconsistent results.

Neuroticism is associated with a tendency to experience anxiety, depression, and hostility and its absence is often referred to as Emotional Stability; that is, it reflects a calm, relaxed approach to situations, events, or people (Costa & McCrae, 1992). Thus, high Neuroticism may impair academic performance. Some research in educational

settings supports this contention as Neuroticism has been negatively related to undergraduate GPA (Duff et al., 2004), undergraduate students' overall final exam marks and final-year project grades (Chamorro-Premuzic & Furnham; 2003a; 2003b), and psychology course grades (Ridgell & Lounsbury, 2004). However, Busato et al. (2000) showed that Neuroticism was not related to undergraduate psychology performance, Lievens et al. (2005) did not find a relationship between neuroticism and medical students' performance, and Rothstein et al. (1994) found mixed results at the graduate level.

In dental school settings, both Evans and Dirks (1994), and Smithers et al. (2004) did not find any relationships between Neuroticism or its facets and their performance criteria. Chamberlain et al. (in press) also found that the broad factor did not predict dental school performance, however the facets Depression and Angry Hostility were negatively correlated with first year coursework; that is, students who were low in these two facets preformed better in their first year of dental school. Depression was also negatively related to Year 3 clinical coursework. Notably, Neuroticism and its facets of Angry Hostility, Depression, Self-Consciousness, and Impulsiveness all significantly predicted faculty ratings of professional behaviour on a BARS assessment of their clinical performance. Essentially, students who were more emotionally stable or lacked Neuroticism were perceived as exhibiting a higher degree of professionalism in a clinic setting. Thus, emotional stability may be an important predictor of professional behaviour in clinical interactions.

Overall, the literature in academic settings in general, and dentistry in particular, shows a mixed view of the relationship between personality and academic performance.

Differences in results might be due to the use of different samples from different disciplines. It is also plausible that difference in results is due to the use of different performance criteria. Personality researchers are increasingly asserting that personality assessments can be of value only if they are meaningfully attached to occupational criteria (Costa, 1996). That is, personality traits may predict different types of performance criteria across disciplines. For example, Chamberlain et al. (in press) found that Neuroticism was predictive of professional behaviour but not academic performance in dental school. Nonetheless, the contradictory findings concerning the role of personality in predicting success in dental training highlights the need for additional research. The current study continues the research of Smithers et al. (2004) and Chamberlain et al. (in press) by examining the validity of the Big Five factors of personality in predicting both academic and clinical performance in two Canadian dental schools. Explicating the relationship between personality variables and student performance could provide support for the use of personality assessment in the admissions process, which could result in improvements to the current selection process.

Narrow Facets of Personality and Prediction

An ongoing issue in personality assessment is the debate on whether broad, heterogeneous personality factors, compared to their narrower, homogeneous facets, are more advantageous in predicting performance. This trade-off between broad factors and narrow facets is referred to as the band width-fidelity debate (see Ones & Viswesvaran, 1996; Paunonen, Rothstein, & Jackson, 1999). On one side of this debate, researchers argue that broad factors of personality offer better prediction of performance (Ones and Viswesvaran, 1996). An advantage using broad factors in prediction is that they provide

an organization of narrow facets into five manageable factors (Tett, Guterman, Bleier, and Murphy, 2000).

On the other side of the debate, some researchers suggest that selection should use a bottom-up approach, this is, focus on narrower personality facets with theoretical links to the performance dimensions under investigation (e.g., Costa, 1996; Hurtz & Donovan, 2000; Schneider, Hough, & Dunnette, 1996). Moreover, narrow facets of the Big Five factors might offer better prediction of performance than the broad factors (Paunonen, 2003; Paunonen & Ashton, 1999; Paunonen et al., 1999). Also, facets may offer a more powerful analysis of construct validity and yield important information about the effects of specific important constructs (Tett et al., 2000). Examining the predictive validity of narrow traits might add to the prediction of performance as different narrow trait scores can yield the same factor score (Chamorro-Premuzic & Furnham, 2003b).

There is some support for this last position. For instance, Rothstein et al. (1994) reported that Exhibition, a narrow facet of Extraversion, had a validity of .33 in predicting class participation grades compared to the correlation of .19 reported for the broad factor itself. Paunonen and Ashton (2001) compared the predictive validity of two broad Big Five factors, Conscientiousness and Openness to Experience, and their narrow traits of need for Achievement and Understanding, respectively. They found that the lower level traits were better predictors of undergraduate psychology course grades than their respective broad factors. Paunonen and Ashton concluded that aggregating narrow facet measures under the same broad factor into a factor score could be counterproductive in that facets that do not predict the criterion could dilute the components of variance in the facets that do predict the criterion. In essence, important criterion variance afforded

by the narrow facets can be diluted when broad personality factors are sued to predict performance (Paunonen, 2003).

The research conducted by Evans ad Dirks (2001), Smithers et al. (2004) and Chamberlain (in press) provided support for the use of both broad factors and narrow facets. Moreover, Lievens et al. 2005 found that factor and facet scores for Extraversion, Agreeableness, and Conscientiousness increased in validity over the course of medical training. Based on the results of these studies, both broad factors and narrow facet should be assessed in research examining the utility of personality in predicting dental school performance. As such, the current study investigated the role of narrow personality facets and broad personality factors in the prediction of dental students' success.

Professional Behaviour and Dental Training

As previously noted, the new CDA interview was related to seven competencies that had been identified through a job analysis as being essential for success in dentistry. Notably, the CDA competencies overlap with factors identified as being associated with professionalism in medicine, which include altruism, accountability, excellence, duty, self-assessment, communication, maturity, reliability, honesty, and integrity (Gibson, Coldwell, & Kiewit, 2000; Miller, Frank, Franks, & Getto, 1989; Phelan, Obenshain, & Galey, 1993). Medical educators have noted the importance of teaching and assessing professional behaviour in the medical setting but, until recently, professionalism has not been actively taught or reliably assessed in medical school (Cohen, 2001). As clinical interaction is part of both medicine and dentistry, it can be presumed that the factors that comprise professionalism in medicine will be similar to those that comprise professionalism in dentistry.

Assessing Professionalism in Dental School

Developing professionalism among graduates is an increasing concern for professional programs (Chamberlain et al., in press, Cohen, 2001). The values and attributes that dental students express in their behaviour toward their patients are critical for success in clinical interactions (Chambers, 1994; Gray et al., 2002; Jones et al., 1997; Simon & Chambers, 1992). Furthermore, anecdotal evidence suggests that many of the academic difficulties that dental students experience in clinical courses are rooted in behavioural issues (Ryding, 2003). These assertions highlight the need for a way to assess the professional behaviour of dental students in their clinical interactions. Clinical grades assess performance and knowledge of clinical skills but may not capture the desired professional behaviours or components of professionalism. To address the potential inadequacy of course grades to provide a proper assessment of behavioural skills, Chamberlain et al. (in press) developed a BARS based on the professional competencies that are assessed by the new CDA interview.

A BARS (Smith & Kendall, 1963) is a rating scale that uses descriptions of behaviours to anchor the numerical values on the scale. The development of a BARS is rooted in job analysis yielding behavioural anchors that reflect important work-related performance factors as identified by subject matter experts for the occupation being rated (Catano et al., 2005; Whetzel & Wheaton, 1997). An advantage of a BARS is that, in developing the measure, an organization will arrive at precise and established definitions of performance in specific dimensions of a job (Landy & Farr, 1980). Additionally, as members of an organization are involved in the development of a BARS instrument, the resulting performance appraisal generally has greater acceptance in the workplace and is

perceived as fair (Dipboye & de Pontbriand, 1981). Unlike course grades, the ratings on

the BARS are based on actual behaviours and not general impressions of performance

(Whetzel & Wheaton, 1997). As such, a BARS provide a more standardized measure of

professional behaviour in the clinic. A BARS is recognized as one of the best rating

scales because it integrates performance criteria directly to the performance appraisal

measure (Catano et al., 2005).

The BARS developed by Chamberlain et al. (in press) provided an assessment of

student professional behaviours in the clinical setting and faculty that used the measure

found that it allowed them to assess aspects of student performance that was not captured

by course grades. BARS ratings were significantly correlated with first year overall

performance, third year clinical performance, and the Perceptual Ability component of

the DAT. In terms of personality, Conscientiousness was positively correlated and

Neuroticism was negatively correlated with BARS ratings but only Conscientiousness

emerged as a significant predictor accounting for an additional 7 percent of the variance

beyond Perceptual Ability (entered as a control variable). Nine narrow personality facets

were significantly correlated with BARS ratings and of these, the Deliberation facet from

Conscientiousness and the Ideas facet from Openness to Experience were significant

predictors of professionalism. Interestingly, the narrow facets explained almost three

times more variance than the broad personality factors. Although the BARS was based on

the competencies assessed by the CDA interview, the interview did not correlate with the

BARS ratings. This unexpected result, again, was most likely due to the small sample

size, which may have resulted in reduced power to detect an effect.

Overall, Chamberlain et al.'s (in press) results suggested that the BARS were an acceptable alternative measure for assessing dental school performance. Chamberlain et al. concluded that the results were promising; however, as their study was the first to use the criterion further research is needed to validate the BARS as a professionalism criterion. As such, the current study will be the second to use the newly developed BARS assessment instrument. BARS ratings of dental students in the clinic will be collected to test the validity of the assessment tool and to reaffirm the previous results concerning personality. Moreover, a further assessment of the BARS is needed to establish the reliability and validity of the new CDA interview. It was expected that with a larger sample size, there will be increased power to detect an effect and the interview will be significantly correlated with BARS ratings. Additionally, it is anticipated that the relationship between personality and BARS ratings will be similar to those found by Chamberlain et al.

Summary

Overall, this study will help to develop a process that will correlate the standard items used for admissions (DAT, GPAs, SI), as well as a personality inventory and the BARS, with the subsequent performance scores of dental students in preclinical and clinical courses. In addition, this study can aid the development of a comprehensive database that tracks student performance. This database would also allow for an ongoing assessment of the reliability and predictive validity of the admissions criteria with respect to preclinical and clinical performance in dental school and to performance on the National Dental Examining Board of Canada (NDEB) certification exams. The ability to monitor these linkages would allow identification of those selection criteria that are not

performing as well as expected and the opportunity to improve selection practices. The inclusion of personality inventory data might also help in expanding the choices of selection criteria and improve the selection of those candidates who will be successful practitioners. The creation of a longitudinal database would put Canadian dental schools at the forefront in developing admissions procedures that are not only valid and reliable but also current with best practices and focused on success in dental school.

Using a sample of dental students from two dental schools in Canada, the main objectives of this study were to:

1. Assess the validity of the new CDA interview in predicting dental students' academic and clinical performance throughout dental training.

2. Generalize and reaffirm the results concerning the validity of the Five-Factor Model of personality as a predictor of students' academic and clinical performance throughout dental training.

3. Generalize and reaffirm the results concerning the validity of the narrow facets of the Big-Five personality traits as predictors of students' academic and clinical performance throughout dental training.

4. Reaffirm the efficacy of the BARS and assess its validity as a professionalism criterion in the dental clinic setting.

5. Assess the incremental validity of the of the new CDA interview and the Five-Factor Model of personality over the DAT in the prediction of students' academic and clinical performance as measured by course grades and BARS ratings of professional behaviour in the clinic.

Method

Participants

The Faculties of Dentistry at Laval University, McGill University, University of Alberta, University of British Columbia, University of Manitoba, University of Montreal, University of Saskatchewan, University of Toronto, and University of Western Ontario were invited to participate in this study through initial contact to the dean of admissions at each school by Dr. Cunningham, the principal investigator at Dalhousie University. Dalhousie University participated in a previous pilot study thus; an invitation to participate was unnecessary. Each of the schools, except Laval University, McGill University, and University of Montreal agreed to participate in the study and ethics protocols were submitted to each institution's Research Ethics Board (REB). The contact at each dental school served as the principal investigator at that institution. Ethics approval was obtained at Dalhousie University for a previous pilot study thus, a request to continue the study and revised documentation were submitted to that institutions' REB. Ethics approval was obtained for the Faculties of Dentistry at University of British Columbia and University of Saskatchewan; however, due to logistic reasons only the data from the University of Saskatchewan was obtained in time for inclusion in the current study. The ethics approval process was in progress for the remaining schools but approval was not awarded in time for their inclusion in the current study.

Participation in this study was voluntary and participants were assured that any information obtained through the course of the study would remain confidential. Participants signed a consent form that clearly outlined the purpose of the study and they were informed that they could terminate participation at any time with no penalty (See Appendix B). The descriptive statistics for year of study by dental program are presented

in Table 2. In total, there were 147 participants; 52 percent were women and 48 percent

were men. Participants ranged in age from 20-34 years, with a mean age of 24.18 years

(SD = 2.44).

Table 2

Stratification of Student Sample by Year of Study and Dental School

School	First Year	Second Year	Third Year	Fourth Year
	n	n	n	n
Dalhousie University	123	87	53	28
University of Saskatchewan	24	24	14	0
Total	147	111	67	28

Measures

Predictor Measures

Dental Aptitude Test. Students' scores from the Reading Comprehension

Examination, the Perceptual Motor Ability Test, and the Survey of Natural Science

Examination were obtained from students' records. These DAT components were used

because they are proxies to cognitive ability. The DAT is a standardized test taken by all

students as part of the admission process. Some students in the current study were from

the United States and as such, Dental Admissions Test scores, the American equivalent to

the DAT, were used for those students.

Interview. Interview scores were obtained from student records at each institution.

In each dental program, the top 35 percent of applicants are invited for an interview

whereby undergraduate grade point averages (GPAs) and DAT scores are used to make

the cutoff. The new CDA structured interview assesses seven competencies that have

previously been linked to dental success: self-control, sensitivity to others, tact and

diplomacy, integrity, judgment and analysis, conscientiousness, and communication. This

new interview has been used in four admission cycles at Dalhousie University and three

admissions cycles at the University of Saskatchewan. For the interview, interviewers

select 7 questions from a pool of 14 to ask each interviewee where each question assesses

one of the aforementioned competencies. Interview responses are rated on a 5-point scale

yielding 35 as the highest possible total score (5 possible points per question). Interview

scores awarded by the first and second interviewers were summed to create a total

interview score for each student. Thus, the highest possible total interview score a student

could receive was 70 (35 possible points awarded by each interviewer). High scores on

the interview are indicative of more favorable applicant responses to the interview

questions.

All interviewers were provided with a half-day training workshop pertaining to

the administration of the interview. Pairs of dentists conducted each interview and

pairings were not consistent throughout the interview process. To assess the inter-rater

reliability for the two interviewer ratings, the correlation between the ratings provided by

the first and second interviewers was computed. The correlation was .65 ($p < .01$), which

indicates an acceptable level of inter-rater reliability.

Personality. Personality was assessed using Costa and McCrae's (1992) NEO-PI-

R, Form S. The inventory assesses the Big Five factors of personality (Neuroticism,

Extroversion Openness to Experience, Agreeableness, and Conscientiousness) and the six

narrow facets for each of the broad factors. Brief descriptions of these narrow facets for

each of the broad personality factors are presented in Table 1. The NEO-PI-R consists of

240 items rated on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5

(strongly agree). High scores on any one of the factors or facets indicate a high degree of

that personality factor or facet.

The reliability of this personality inventory ranges from .86 to .95 (Costa &

McCrae, 1992). In the current study, Cronbach's Alpha Coefficients for the Big Five

personality factors were: .91 for the Neuroticism scale, .86 for the Extraversion scale, .89

for the Openness to Experience Scale, .89 for the Agreeableness scale, and .88 for the

Conscientiousness scale. These coefficients indicate that each scale had acceptable

reliability. Evidence for construct validity of the NEO-PI-R has been provided by Catell,

Cattell, and Cattell (1993) who showed that the factors are highly correlated with the 16

Personality Factor Inventory.

Criterion Measures

Year 1 Performance. A GPA was calculated for each student from all courses

taken during the first year of dental training. The GPA was a composite of the grades in

each course weighted by the value of the course divided by the total number of credit

units for that year. This method for calculating GPAs was used for all subsequent

performance criteria. Participants' grades were obtained from student records at each

institution. The first year of dental programs includes basic courses in health sciences

(e.g., Gross Anatomy, Physiology, Histology, and Biology) and pre-clinical courses

related to dentistry (e.g., Cariology, Peridontology, and Patient Care). Preclinical courses

may include a laboratory component and a didactic component.

Year 2 Clinical Performance. A GPA was computed for each student for all second year courses designated as clinical. The GPA was computed in the same manner as that for Year 1 performance, using the credit units for second year clinical courses. Clinical courses were defined by examining the composition of the final grade for each course in the second year of each dental program. That is, if more than 50 percent of the final grade came from direct clinical activities (i.e., patient treatment) the course was defined as clinical. Clinical courses may also include a didactic component. Courses were designated as clinical by faculty at each participating dental school that had knowledge of the content of each second year course in their program. Second year clinical courses included foundation courses directly related to dentistry (e.g., Clinical Patient Care). Participants' grades were obtained from student records at each institution.

Year 2 Academic Performance. A weighted GPA was computed for each student for all second year courses designated as didactic. That is, if more than 50 percent of the final grade came from non-clinical activities (i.e., lecture, seminar, or presentations) the courses was defined as didactic. Courses were designated as didactic by faculty at each participating dental school. Second year didactic courses included basic health sciences courses (e.g., Growth and Development and Pharmacology) and pre-clinical courses related to dentistry (e.g., Removable Prosthodontics and Pediatric Dentistry). Participants' grades were obtained from student records at each institution.

Year 3 Clinical Performance. A weighted GPA was computed for each student for all third year courses designated as clinical. Clinical designation was achieved by utilizing the method for categorizing second year courses (see above). Third year clinical courses include foundation courses related to dentistry such as Clinical Comprehensive

Patient Care and Clinical Oral Diagnosis and Treatment Planning. Clinical courses may or may not include a didactic component. Participants' grades were obtained from student records at each institution.

Year 3 Academic Performance. A weighted GPA was computed for each student for all third year courses designated as didactic. Didactic designation was achieved by utilizing the method for categorizing second year courses (see above). Year 3 didactic courses are directly related to dentistry and include courses such as Evidence Based Dentistry, and Implant Dentistry. Participants' grades were obtained from student records at each institution.

Year 4 Clinical Performance. A weighted GPA was computed for each student for all fourth year courses designated as clinical. Clinical designation was achieved utilizing the method for categorizing second year courses (see above). Fourth year clinical courses include courses such as Periodontology and Endodontics. Clinical courses may or may not include a didactic component. Participants' grades were obtained from student records at each institution.

Year 4 Academic Performance. A weighted GPA was computed for each student for all courses designated as didactic. Didactic designation was achieved utilizing the method for categorizing second year courses (see above). Year 4 didactic courses are directly related to dentistry and include courses such as Pediatric Dentistry, Clinical Epidemiology, and Orthodontics . Participants' grades were obtained from student records at each institution.

Professional Behaviour Criterion. Professional behaviour in the clinical setting was assessed using a BARS designed to assess competencies identified as needed for

success in dentistry (Chamberlain et al., in press)). Specifically, the BARS rates the competencies on which the new CDA interview is based, which include: sensitivity to others, self-control, tact and diplomacy, integrity, judgment and analysis, conscientiousness, and communication. Each competency has a rating scale that consists of behavioural anchors that correspond to a scale ranging from 1 (very ineffective behaviour) to 5 (very effective behaviour) yielding a lowest possible total score of 7 and a highest possible total score of 35. BARS ratings were only collected for students in second, third and fourth year at Dalhousie University; this data was added to the data collected in the previous study by Chamberlain et al. (2004). Clinical faculty at the dental school assessed each student participant they had supervised in the clinic. Ratings in years 2, 3, and 4 clinical courses were collected as part of the course evaluation. Faculty had previously received training about the proper use of the BARS. Each student received assessments from at least two faculty members and an average BARS rating was computed for each student. In the present study, there were 164 average BARS ratings and they ranged from 20 to 35 ($M = 28.79$, $SD = 3.22$). To assess the inter-rater reliability for the BARS ratings, the correlation between the two BARS ratings was computed. The correlation was -.05 ($p > .05$), which indicates an unacceptable level of inter-rater reliability.

Procedure

Collection of Personality, Admissions, and Performance Data

Following ethics approval, all students currently enrolled in the Doctor of Dental Surgery/Medical Dentistry programs in the Faculty of Dentistry at the University of Saskatchewan were invited to participate in this study. Students in years two, three, and

four of the dental program at Dalhousie University had already agreed to participate in this research as part of a previous pilot study, therefore it was only necessary to recruit students currently enrolled in year one of the program.

Students were recruited via three modes: an email, a reminder poster, and an information meeting. The email introduced and explained the nature of the study and invited the students to attend an information meeting. A few days before the meeting, reminder notices were posted in the student lounge of each dental school. The meeting consisted of a presentation outlining the details of the project including participation requirements and participation was solicited. Participating students completed Costa and McCrae's (1992) NEO Personality Inventory, Form S. Testing took approximately one hour. Participating students consented to the collection of demographic data (i.e., age, gender, and year of study), admissions data (i.e., DAT and interview scores), and performance data (i.e., grades for courses throughout their dental training, and National Dental Examining Board (NDEB) examination scores) from their student records.

Collection of Behaviour Anchored Rating Scale Data

Through the consent process, students also consented to allow clinical faculty members to provide ratings of their clinical performance using the BARS. Due to time constraints, BARS ratings were only collected for the participants at Dalhousie University. Ratings for students in third and fourth year clinical coursework were collected as part of their course evaluation and ratings for second year students were collected for the current research. Faculty members who have clinical as well as didactic teaching responsibilities were provided training on how to apply the rating scale and were asked to choose the students with whom they have the most contact with in a teaching

situation and rate their behaviour using the BARS. Each rating took approximately 5 to 15 minutes per student with most of the students receiving assessments from two faculty members.

Results

The results are presented in two sections. The first section reports the results for the prediction of dental school performance using the DAT, the interview and the personality inventory. The second section reports the results concerning the prediction of professional behaviour in the clinic as assessed with the BARS.

Prediction of Dental School Performance

Data Screening

Statistical Package for the Social Sciences (SPSS) for Windows version 11.5 was used for all data analyses. Prior to conducting any analyses, the data were checked for accuracy of data entry, outliers, and missing values. All missing data were treated using listwise deletion, which removes from the analysis any case missing a value. Before conducting the hierarchical regression analyses, the data were further examined for violations of the assumptions of normality, linearity, homoskedasticity, independence of residuals, and multicollinearity; all of the assumptions were met. Table 3 presents the correlations between all predictor, criterion, and control variables along with means and standard deviations for each variable.

Dental Aptitude Test

The DAT Academic Average scores correlated with both Reading Comprehension ($r = .55, p < .01$) and Perceptual Ability ($r = .37, p < .01$) scores. Students who achieved high scores on the Academic Average component of the DAT

Table 3 Correlations Among Criterion, Predictor, and Control Variables

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Criterion Variables																					
1. Year 1	3.48	.39	-																		
2. Year 2 Clinical	3.63	.33	.55**^{e}	-																		
3. Year 2 Academic	3.40	.33	.83**^{f}	.30**^{e}	-																	
4. Year 3 Clinical	3.54	.34	.75**^{d}	.65**^{c}	.80**^{d}	-																
5. Year 3 Academic	3.47	.33	.73**^{d}	.55**^{c}	.80**^{d}	.74**^{d}	-															
6. Year 4 Clinical	3.58	.28	.59**^{b}	.76**^{b}	.52**^{b}	.60**^{b}	.47*^{b}	-														
7. Year 4 Academic	3.40	.23	.59**^{b}	.58**^{b}	.61**^{b}	.62**^{b}	.63**^{b}	.33^b	-													
DAT Measures																					
8. Academic Average	17.95	1.96	.37**^{g}	.06^e	.41**^{f}	.34**^{d}	.32*^{d}	.27^b	.48*^{b}	-												
9. Perceptual Ability	17.27	2.61	.17^g	.32**^{e}	.23**^{f}	.16^d	.13^d	.39*^{b}	.11^b	-.37**^{g}	-											
10. Reading Comp.	18.89	2.91	.09^g	-.04^e	.10^f	.17^d	.07^d	.40*^{b}	.51**^{b}	.55**^{g}	-.07^g	-										
Interview																					
11. Interview Total	58.05	5.78	.01^g	-.02^e	.09^f	.28*^{c}	.16^c	-.21^a	-.23^a	-.05^g	-.03^g	-.01^g	-									
Personality																					
12. Conscientiousness	122.36	17.31	.14^h	.33**^{e}	.21*^{f}	.25*^{d}	.29*^{d}	.16^b	.10^b	.02^g	.09^g	-.06^g	-.08^g	**.88**								
13. Agreeableness	121.32	18.92	.02^h	.19*^{e}	.05^f	.05^d	.10^d	.03^b	.03^b	.04^g	.05^g	-.11^g	-.11^g	.34**^{h}	**.89**							
14. Extraversion	120.64	15.85	-.12^h	.02^e	-.05^f	-.00^d	.10^d	.05^b	.01^b	-.02^g	-.05^g	-.01^g	.15^g	.22**^{h}	.16*^{h}	**.86**						
15. Openness	114.51	19.48	-.00^h	-.14^e	.08^f	.03^d	.14^d	.16^b	.11^b	.26**^{g}	.19*^{g}	.13^g	.13^g	.14^h	.26**^{h}	.45**^{h}	**.89**					
16. Neuroticism	78.13	21.16	-.10^h	-.20*^{e}	-.05^f	-.17^d	-.10^d	-.05^b	.33^b	.05^g	-.18*^{g}	.09^g	.03^g	-.17*^{h}	-.15^h	-.03^h	.15^h	**.91**				
Control Variables																					
17. Age	24.18	2.44	-.27**^{h}	-.09^e	-.20*^{f}	-.09^d	-.13^d	.10^b	-.19^b	.04^g	.09^g	.03^g	-.01^g	.09^h	.04^h	-.14^h	.10^h	.01^h	-			
18. Gender			.10^h	-.05^e	.13^f	.14^d	.03^d	-.03^b	.33^b	.01^g	-.24**^{g}	.11^g	.16^g	-.10^h	.06^h	.02^h	.01^h	.38**^{h}	-.22**^{h}	-		
19. Dental School			.40**^{h}	-.57**^{e}	.43**^{f}	.63**^{d}	.34**^{d}			.08^g	-.16^g	.06^g	.19*^{g}	-.13^h	-.05^h	-.03^h	.10^h	-.06^h	-.06^h	.20*^{h}	-

Note: $^+p < .07$ *$p < .05$, **$p < .01$, Two-tailed test

Note: Cronbach Alphas for personality factors are reported in bold on the diagonal.

Note: No correlation between Year 4 performance and dental school because Year 4 students came from only one school

Listwise n: ^{a}n = 18. ^{b}n = 27 - 28. ^{c}n = 53 - 56. ^{d}n = 61 - 67. ^{e}n = 86 - 97. ^{f}n = 100 -111. ^{g}n = 129 - 140. ^{h}n = 143 - 147

also received higher scores on both the Reading Comprehension and Perceptual Ability components. Perceptual Ability and Reading Comprehension components were not significantly correlated.

The three DAT components were also correlated with the criterion variables. The Academic Average component was correlated with Year 1 performance ($r = .37, p < .01$); students who had higher scores on the Academic Average component of the DAT performed at a higher level in the first year of dental training compared to students with lower Academic Averages. The Perceptual Ability component of the DAT was significantly correlated with Year 2 Clinical performance, $r = .32, p < .01$. That is, students with high Perceptual Ability scores performed better in second year clinical coursework than students that had low Perceptual Ability scores. Both the Academic Average ($r = .41, p < .01$) and Perceptual Ability ($r = .23, p < .01$) components of the DAT were associated with academic performance in the Year 2 of dental training; students who had higher scores on the Academic Average and Perceptual Ability components of the DAT performed at a higher level in second year academic coursework than students who had lower DAT scores. The Academic Average component was significantly correlated with both Year 3 Clinical performance ($r = .34, p < .01$) and Year 3 Academic performance ($r = .32, p < .05$); students who had higher scores on the Academic Average component of the DAT performed better in both clinical and academic aspects of the third year of dental training. Both Perceptual Ability ($r = 39, p < .05$) and Reading Comprehension ($r = .40, p < .05$) were correlated with clinical performance in Year 4 of dental training. The Reading Comprehension component was also significantly correlated with Year 4 Academic performance ($r = .51, p < .01$) along

with the Academic Average component ($r = .48, p < .05$); students with high Reading

Comprehension and Academic Average scores performed well in academic coursework

in fourth year of dental training.

Canadian Dental Association Interview

Scores on the new CDA interview were significantly correlated with Clinical

performance in Year 3 of dental training ($r = .28, p < .05$). That is, students who received

more favorable scores on the interview performed better in third year clinical coursework

than students who rated lower on the admissions interview. The interview did not

correlate with any of the broad personality factors or any components of the DAT. The

interview did correlate with Fantasy ($r = .18, p < .05$), a facet of Openness to Experience,

and Compliance ($r = -.18, p < .05$), a facet of Agreeableness; students who were more

imaginative and less compliant received more favorable scores on the interview.

Personality Factors and Performance

Conscientiousness was correlated with Agreeableness ($r = .34, p < .01$),

Extraversion ($r = .22, p < .01$), and Neuroticism ($r = -.17, p < .05$); students who were

more conscientious were also more agreeable, more extroverted, and less neurotic than

students who were less conscientious. Agreeableness was also associated high levels of

Extraversion ($r = .16, p < .05$) and Openness to Experience ($r = .26, p < .01$). Openness to

Experience was positively correlated with Extraversion ($r = .45, p < .01$).

Conscientiousness was significantly correlated with Year 2 Clinical performance

($r = .33, p < .01$), Year 2 Academic performance ($r = .21, p < .05$), Year 3 Clinical

performance ($r = .25, p < .05$), and Year 3 Academic performance ($r = .29, p < .05$).

Students who were more conscientious performed better in both the clinical and academic

components of their second and third years of dental training. Both Agreeableness (r = .19, p < .07) and Neuroticism (r = -.20, p < .07) were marginally significantly related to Year 2 Clinical performance. None of the other broad personality factors were significantly correlated with any of the criterion variables. Openness to Experience was significantly correlated with scores on the Academic Average (r = .26, p < .01) and Perceptual Ability (r = .19, p < .05) components of the DAT; students with high scores on the Openness to Experience factor also had high Academic Average and Perceptual Ability scores on the DAT. High Perceptual Ability scores were also associated with Low scores on the Neuroticism factor, r = -.18, p < .05.

Personality Facets and Performance

Table 4 presents the relationships between the narrow facets of the broad personality factors and the dental school performance criteria. Five facets of Conscientiousness were correlated with different performance criteria. Highly competent students performed better in all criteria in Year 1, Year 2, and Year 3 of the dental program with correlations ranging from .22 to .36. Students that were more dutiful also achieved better grades in all performance criteria in Year 1, Year 2 and Year 3 of dental training (correlations ranged from .17 to .43). Students who had high levels of Self-Discipline performed better in Year 2 Clinical coursework (r = .32, p < .01). High scores on Achievement Striving were associated with high grades in Year 2 Academic courses (r = .20, p < .01). Deliberation was associated with better performance in Year 2 Clinical coursework (r = .27, p < .01) and Year 4 Clinical coursework (r = .42, p < .05), whereby students high in deliberation achieved better grades in both criteria.

Table 4   Correlations for Narrow Facets of the Big Five with Dental School Performance Criteria

	M	SD	Year 1	Year 2 Clinical	Year 2 Academic	Year 3 Clinical	Year 3 Academic	Year 4 Clinical	Year 4 Academic	Reliability of Facet
Conscientiousness Facets										
Competence	21.72	3.18	.22**	.36**	.29**	.27*	.34*	.34	.21	.55
Order	18.59	4.74	-.09	.02	-.04	.00	-.02	.06	-.05	.73
Dutifulness	23.03	4.21	.17*	.25*	.21*	.40*	.43*	.05	.13	.69
Achievement Striving	20.34	3.74	.09	.20	.20*	.11	.17	-.08	.04	.68
Self-Discipline	20.56	4.10	.16	.32**	.16	.14	.16	.08	-.12	.74
Deliberation	18.09	4.36	.12	.27**	.14	.19	.23	.42*	.24	.71
Extraversion Facets										
Warmth	23.88	3.79	-.14	.04	-.11	-.10	.03	-.09	-.10	.74
Gregariousness	20.15	4.68	-.13	.04	-.11	-.17	-.03	.08	-.05	.76
Assertiveness	16.84	4.85	.01	.04	.10	.16	.19	.13	.14	.78
Activity	17.73	3.97	.04	-.00	.10	.20	.12	-.03	.17	.55
Excitement Seeking	20.25	4.12	-.13	.01	-.20*	-.14	-.03	-.02	-.19	.56
Positive Emotions	21.79	3.14	-.15	-.12	.00	-.14	.03	-.04	-.07	.50
Openness Facets										
Fantasy	19.24	4.77	-.05	-.22*	-.11	-.11	.08	-.07	.15	.75
Aesthetics	17.01	5.93	-.02	-.00	.04	-.00	.09	.20	.04	.81
Feelings	21.16	4.24	-.15	-.15	-.05	-.12	-.06	.08	.16	.71
Actions	15.78	4.22	.02	-.00	.07	.19	.16	.37	.06	.67
Ideas	19.79	5.17	.14	-.05	.23*	.18	.25*	.02	-.08	.82
Values	21.53	3.92	.03	.18	.13	.01	.01	.08	.10	.61
Agreeableness Facets										
Trust	20.83	4.73	-.00	.19	.02	-.07	.01	.22	-.04	.85
Straightforwardness	20.34	4.32	.08	.10	.19*	.18	.20	-.17	.31	.64
Altruism	24.12	3.49	-.09	.05	-.04	.02	.05	-.02	-.04	.71
Compliance	17.84	4.29	.08	.22*	.03	-.02	-.04	.01	-.19	.69
Modesty	18.08	4.79	.10	.16	.15	.20	.22	.18	.07	.73
Tender-Mindedness	20.11	3.75	-.11	.06	-.15	-.14	-.03	-.09	-.13	.58
Neuroticism Facets										
Anxiety	14.50	4.83	.08	-.13	.07	-.10	.05	-.20	.49**	.83
Angry Hostility	11.63	4.82	-.09	-.15	-.02	.02	.06	.02	.20	.79
Depression	11.58	4.86	-.08	-.20	-.01	-.07	-.05	-.10	.17	.77
Self-Consciousness	14.37	4.19	-.13	-.12	-.08	-.13	-.15	-.14	.24	.59
Impulsiveness	16.19	4.69	-.20*	-.23*	-.18	-.40**	-.27*	.07	.12	.67
Vulnerability	9.60	3.48	.01	-.02	.04	-.03	-.02	-.08	.36	.68

Note: *$p < .05$, **$p < .01$, Two-tailed test

Note: Any correlations involving the narrow facets with: Year 1 performance were based on a sample size of 144; Year 2 Clinical performance were based on a sample size of 95; Year 2 Academic performance was based on a sample size of 109; Year 3 Clinical and Year 3 Academic performance were based on a sample size of 67; and Year 4 Academic and Year 4 Clinical performance were based on a sample size of 28.

One facet of Extraversion was correlated with one of the performance criteria. Excitement Seeking, characterized by a preference for noisy environments, excitement, and stimulation, was negatively related to Academic performance in Year 2 ($r = -.20$, $p < .05$); students with higher levels of Excitement Seeking performed poorly in Year 2 clinical courses.

Two facets of Openness to Experience were correlated with different performance criteria. Fantasy, characterized by a vivid imagination and daydreaming, had a negative relationship with Year 2 Clinical performance ($r = -.22$, $p < .05$); students with low levels of Fantasy performed better in second year clinical coursework. Ideas, a measure of intellectual curiosity, was positively associated with second year academic coursework ($r = .23$, $p < .05$) and third year academic coursework ($r = .25$, $p < .05$); students who were more intellectually curious achieved higher grades in both second and third year academic courses.

Two facets of Agreeableness were correlated with different criteria. Straightforwardness was related to Year 2 Academic performance ($r = .19$, $p < .05$); students who were more straightforward performed well in second year academic courses. Students who were highly compliant achieved high grades in Year 2 Clinical coursework, $r = .22$, $p < .05$.

Two facets of Neuroticism were correlated with different criteria. High scores on Impulsiveness were associated with low grades in: first year ($r = -.20$, $p < .05$), second year clinical coursework ($r = -.23$, $p < .05$), third year clinical coursework ($r = -.40$, $p < .01$), and third year academic coursework ($r = -.27$, $p < .05$). Anxiety was positively correlated with Year 4 Academic performance ($r = .49$, $p < .01$); students who were more

apprehensive, fearful, and prone to worry performed better in fourth year academic courses than students who were less anxious.

Hierarchical Regression Analyses

A series of hierarchical regression analyses were conducted to determine the contribution of the interview and personality in predicting dental school performance. No regression analyses were performed on the Year 4 performance criteria; the sample size (n= 28) was not large enough to warrant a meaningful analysis. For each regression analysis, age and dental school were entered in the first step as control variables and the Academic Average and Perceptual Ability components of the DAT were entered on the second step; Reading Comprehension was not entered in this step as it did not correlate with any of the criteria. The interview was entered on the third step followed by personality variables on the fourth step. For each criterion in Year 1 and Year 2, two hierarchical regression analyses were performed: the first included all five of the broad personality factors and in the second, the narrow personality facets that were correlated with the performance criteria were substituted for the broad personality factors. The variance accounted for by the first two steps of each regression remained unchanged; thus, only the results for the step with the narrow facets are reported for the second regression analyses. Although no broad factors were significantly correlated with Year 1 performance, and only Conscientiousness correlated with Year 2 performance, it was decided that all five factors should be entered into the regression analysis as the correlation between the factors may have an impact on the outcome. For each criterion in year 3, only one regression was performed. This regression was similar to the first regressions conducted for Year 1 and Year 2 performance but only the broad factor

Conscientiousness was entered on step four. Entering all five factors would have resulted

in a sample size to predictor ratio less than 10. For this same reason, a second regression

substituting the facets that correlated with Year 3 performance criteria was not

performed.

Year 1 Performance

Table 5 presents the results for predicting performance in the first year of dental

school from the interview and personality variables. The control variables entered in the

Table 5

Regression of Year 1 Performance on Personality and Interview

Step	Independent Variables	Beta	R	R^2	ΔR^2	F_{change}	Sig. F
1	Control Variables		.40	.16	.16***	11.66	.00
	Age	-.23**					
	Dental School	.30***					
2	Dental Aptitude Test		.55	.31	.15***	12.87	.00
	DAT Academic Average	.34*					
	DAT Perceptual Ability	.10					
3	Interview	-.06	.56	.31	.00	.53	.47
4	Personality Factors		.63	.39	.08*	3.08	.01
	Conscientiousness	.22*					
	Agreeableness	-.01					
	Extraversion	-.15					
	Openness to Experience	-.13					
	Neuroticism	-.01					
4	Personality Facets		.61	.37	.06*	3.58	.02
	Conscientiousness						
	Competence	.05					
	Dutifulness	.08					
	Neuroticism						
	Impulsiveness	-.18*					

Note: *$p < .05$, **$p < .01$, ***$p < .001$

Listwise N = 126

first step accounted for 16 percent of the variance in first year performance ($\Delta R^2 = .16$, $F_{change}(2,23) = 11.66, p < .001$), with both Age ($\beta = -.23, p < .01$) and Dental School ($\beta = .30, p < .001$) contributing significantly to prediction. The addition of the two DAT components in step two accounted for an additional 14 percent of the variance in Year 1 Performance ($\Delta R^2 = .15$, $F_{change}2,121) = 12.89, p < .001$), but only the Academic Average ($\beta = .34, p < .05$) contributed significantly to the prediction equation. In step three, the interview did not significantly add to the prediction of performance in the first year of dental training ($\Delta R^2 = .00$, $F_{change}(1,120) = .53, p > .05$). The addition of the Big Five in step four accounted for an additional 8 percent of the variance in first year performance ($\Delta R^2 = .08$, $F_{change}(5,115) = 3.08, p < .05$), with Conscientiousness the only significant factor in the prediction equation ($\beta = .22, p < .05$).

Substituting the narrow facets Competence, Dutifulness, and Impulsiveness for the factors in step four accounted for an additional 6 percent of the variance in Year 1 Performance, $\Delta R^2 = .06$, $F_{change}(3,117) = 3.58, p < .05$, with Impulsiveness significantly predicting the criterion ($\beta = -.18, p < .05$).

Year 2 Clinical Performance

Table 6 presents the results for predicting clinical performance in the second year of dental school from the interview and personality variables. The control variables accounted for 34 percent of the variance in the criterion ($\Delta R^2 = .34$, $F_{change}(2,74) = 19.23, p < .001$), but only Dental School contributed significantly to the prediction equation ($\beta = -.59, p < .001$). In step two, the two DAT components accounted for an additional 6 percent of the variance in Year 2 Clinical Performance ($\Delta R^2 = .06$, $F_{change}(2,72) = 3.89, p < .05$), however neither of the components were significant predictors in

Table 6

Regression of Year 2 Clinical Performance on Personality and Interview

Step	Independent Variables	Beta	R	R^2	ΔR^2	F_{change}	Sig. F
1	Control Variables		.59	.34	.34***	19.23	.00
	Age	-.03					
	Dental School	-.59***					
2	Dental Aptitude Test		.64	.41	.06*	3.89	.03
	DAT Academic Average	.16					
	DAT Perceptual Ability	.16					
3	Interview	.03	.64	.41	.00	.08	.78
4	Personality Factors		.73	.53	.13*	3.53	.01
	Conscientiousness	.15					
	Agreeableness	.20*					
	Extraversion	.09					
	Openness to Experience	-.24*					
	Neuroticism	-.03					
4	Personality Facets		.74	.55	.15*	2.96	.01
	Conscientiousness						
	Competence	.12					
	Dutifulness	.01					
	Self-Discipline	.14					
	Deliberation	.03					
	Openness to Experience						
	Fantasy	-.24*					
	Agreeableness						
	Compliance	.16					
	Neuroticism						
	Impulsiveness	.04					

Note: *$p < .05$, **$p < .01$, ***$p < .001$

Listwise N = 77

the prediction equation. The addition of the interview in step three did not add to the prediction of variance in the criterion ($\Delta R^2 = .00$, $F_{change}(1,71) = .08$, $p > .05$). The addition of the five personality factors in the final step accounted for an additional 13 percent of the variance in the criterion ($\Delta R^2 = .13$, $F_{change}(5,66) = 3.53$, $p < .01$), with Agreeableness ($\beta = .20$, $p < .05$) and Openness to Experience ($\beta = -.24$, $p < .05$) as

significant predictors of the criterion. Table 6 also shows that, when the narrow facets of Competence, Dutifulness, Self-Discipline, Deliberation, Fantasy, Compliance, and Impulsiveness are entered in lieu of the broad factor of conscientiousness, the facets account for an additional 15 percent of the variance in the criterion beyond that accounted for by the control variables, the DAT components, and the interview ($\Delta R^2 = .15$, F_{change} (7,64) = 2.96, $p < .01$). Of the facets entered in the fourth step, Fantasy was the only significant facet ($\beta = -.24$, $p < .05$).

Year 2 Academic Performance

Table 7 presents the results for predicting academic performance in the second year of dental school from the interview and personality variables. In step one, the control variables accounted for 22 percent of the variance in the Year 2 Academic performance ($\Delta R^2 = .22$, F_{change} (2,88) = 12.47, $p < .001$), but only Dental School was a significant predictor ($\beta = .43$, $p < .001$). The two DAT components accounted for an additional 20 percent of the variance in Year 2 Academic Performance ($\Delta R^2 = .20$, F_{change} (2,86) = 14.54, $p < .001$), with both Academic Average ($\beta = .32$, $p < .01$) and Perceptual Ability ($\beta = .24$, $p < .01$) contributing significantly to the prediction equation. In step three, the interview did not contribute to the prediction of Year 2 Academic performance ($\Delta R^2 = .00$, F_{change} (1,85) = .44, $p > .05$). The addition of the broad factors in step four accounted for an additional 6 percent of the variance in the criterion; however, this increment was not statistically significant ($\Delta R^2 = .06$, F_{change} (5,80) = 1.68, $p < .05$). The narrow personality facets, entered in step four instead of the broad factors, did not add to the prediction of Year 2 Academic Performance, $\Delta R^2 = .49$, F_{change} (5,80) = .1.80, $p > .05$.

Table 7

Regression of Year 2 Academic Performance on Personality and Interview

Step	Independent Variables	Beta	R	R^2	ΔR^2	F_{change}	Sig. F
1	Control Variables		.47	.22	.22***	12.47	.00
	Age	-.14					
	Dental School	.43***					
2	Dental Aptitude Test		.65	.42	.20***	14.54	.00
	DAT Academic Average	.32**					
	DAT Perceptual Ability	.24**					
3	Interview	-.06	.65	.42	.00	.44	.51
4	Personality Factors		.69	.48	.06	1.68	.15
	Conscientiousness	.20*					
	Agreeableness	.05					
	Extraversion	.01					
	Openness to Experience	-.16					
	Neuroticism	.06					
4	Personality Facets		.70	.49	.07	1.80	.11
	Conscientiousness						
	Competence	.06					
	Dutifulness	.02					
	Achievement Striving	.16					
	Extraversion						
	Excitement Seeking	-.08					
	Openness to Experience						
	Ideas	.00					
	Agreeableness						
	Straightforwardness	.12					

Note: *$p < .05$, **$p < .01$, ***$p < .001$

Listwise N = 91

Year 3 Clinical Performance

Table 8 presents the results for predicting clinical performance in the third year of dental school from the interview and personality variables. The control variables, entered in step one, accounted for 48 percent of the variance in the criterion ($\Delta R^2 = .48$, F_{change} (2,49) = 22.72, $p < .001$), where Dental School was the only significant predictor in the

equation ($\beta = .67, p < .001$). In step two, the two DAT components accounted an for an

additional 13 percent of the variance in Year 3 Clinical Performance ($\Delta R^2 = .13$, F_{change}

$(2,47)= 7.87, p < .05$), but the Academic Average ($\beta = .26, p < .01$) was the only

component that contributed significantly to the prediction equation. The addition of the

interview and Conscientiousness did not add significantly to the prediction of Year 3

Clinical Performance.

Table 8

Regression of Year 3 Clinical Performance on Personality and Interview

Step	Independent Variables	Beta	R	R^2	ΔR^2	F_{change}	Sig. F
1	Control Variables		.69	.48	.48***	22.72	.00
	Age	-.18					
	Dental School	.67***					
2	Dental Aptitude Test		.78	.61	.13**	7.87	.00
	DAT Academic Average	.26**					
	DAT Perceptual Ability	.20					
3	Interview	.03	.78	.61	.10	.10	.75
4	Personality		.80	.63	.02	2.46	.12
	Conscientiousness	.14					

Note: *$p < .05$, **$p < .01$, ***$p < .001$

Listwise N = 52

Year 3 Academic Performance

Table 9 presents the results for predicting academic performance in the third year

of dental school from the interview and personality variables. Age and Dental School

accounted for 17 percent of the variance in third year academic performance ($\Delta R^2 = .17$,

F_{change} $(2,49) = 5.11, p < .01$), with both Age ($\beta = -.27, p < .05$) and Dental School ($\beta = $

$.31, p < .05$) as significant predictors. Entered in step two, the two DAT components

accounted for an additional 11 percent of the variance in Year 3 Academic Performance

($\Delta R^2 = .11$, F_{change} $(2,47)= 3.69, p < .05$), but only Academic Average ($\beta = .32, p < .05$)

contributed significantly to the prediction equation. The interview, entered in step three, did not account for any additional variance in the criterion. The addition of Conscientiousness in step four accounted for an additional 6 percent of the variance in Year 3 Academic Performance ($\Delta R^2 = .06$, F_{change} (1,45)= 4.34, $p < .05$).

Table 9

Regression of Year 3 Academic Performance on Personality and Interview

Step	Independent Variables	Beta	R	R^2	ΔR^2	F_{change}	Sig. F
1	Control Variables		.42	.17	.17*	5.11	.01
	Age	-.27*					
	Dental School	.31*					
2	Dental Aptitude Test		.53	.29	.11*	3.69	.03
	DAT Academic Average	.32*					
	DAT Perceptual Ability	.07					
3	Interview	.05	.54	.29	.00	.16	.69
4	Personality		.59	.35	.06*	4.34	.04
	Conscientiousness	.25*					

Note: *$p < .05$, **$p < .01$

Listwise N = 52

Professional Behaviour in the Clinic as Assessed by the BARS

The following section reports the results concerning the prediction of professional behaviour in the clinic as assessed by the BARS. As in the regression analyses in the previous section, two regression analyses were conducted: the first used the broad personality factors that correlated with the criterion and, in the second, the personality facets that correlated with the criterion were substituted for the factors.

The correlation between the BARS ratings and the performance criteria are presented in Table 10. BARS ratings correlated with Year 1 performance ($r = .18$, $p < .05$), Year 2 Clinical performance ($r = .22$, $p < .05$), and both Year 3 Clinical ($r = .34$, $p < .01$) and Academic performance ($r = .38$, $p < .01$). That is, favorable ratings on the BARS

were associated with high performance in first year, second year clinical coursework, and

all aspects of performance in third year.

Table 10

Correlation of BARS Ratings with Criterion Variables

	M	SD	1	2	3	4	5	6	7	8

Criterion Variables

	M	SD	1	2	3	4	5	6	7	8
1. Year 1	3.54	.32	-							
2. Year 2 Clinical	3.57	.28	.79**[c]	-						
3. Year 2 Academic	3.45	.25	.85**[c]	.79**[c]	-					
4. Year 3 Clinical	3.64	.24	.67**[b]	.70**b	.78**[b]	-				
5. Year 3 Academic	3.48	.30	.60**[b]	.56**[b]	.68**[b]	.61**[b]	-			
6. Year 4 Clinical	3.58	.28	.59**[a]	.76**[a]	.52**[a]	.60**[a]	.47*[a]	-		
7. Year 4 Academic	3.40	.23	.59**[a]	.58**[a]	.61**[a]	.62**[a]	.63**[a]	.33[a]	-	

BARS

	M	SD	1	2	3	4	5	6	7	8
8. BARS Ratings	28.79	1.96	.18*[d]	.22*[c]	.16[c]	.34**[b]	.38**[b]	.36[a]	.26[a]	-

Note: $*p < .05$, $**p < .01$, Two-tailed test

Listwise n: [a]n = 28. [b]n = 71. [c]n = 105. [d]n = 164.

Correlations among BARS ratings, the predictor, and control variables, along with

means and standard deviations are presented in Table 11. BARS ratings significantly

correlated with Conscientiousness ($r = .29, p < .01$) and Neuroticism ($r = -.25, p < .05$).

Students who were more conscientious and less neurotic or more emotionally stable

received higher ratings on the BARS than those students who were less conscientious and

less emotionally stable. Table 12 presents the correlations between BARS scores and the

narrow facets of the Big Five. BARS scores were related with the Conscientiousness

facets Competence ($r = .22, p < .01$), Dutifulness ($r = .21, p < .01$), Self-Discipline ($r =

.22, p < .01$), and Deliberation ($r = .30, p < .01$); students who were more competent,

dutiful, self-disciplined, and deliberate received higher ratings on the BARS than students

Table 11

Correlations Among BARS Ratings, Predictor and Control Variables

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
BARS Ratings															
1. BARS	28.67	3.20	-												
DAT Measures															
2. Academic Average	18.37	1.88	.10	-											
3. Perceptual Ability	17.45	2.15	.21*	.30**	-										
4. Reading Comp.	19.00	2.74	-.04	.58**	-.09	-									
Interview															
5. Interview Total	5.85	5.05	.07	-.19*	.05	-.12	-								
Personality															
6. Conscientiousness	125.18	16.67	.29**	-.02	.13	-.03	-.02	**.88**							
7. Agreeableness	126.75	18.51	.06	-.02	.03	-.08	-.12	.29**	**.89**						
8. Extraversion	123.40	15.56	.08	-.09	-.14	-.14	.09	.32**	-.01	**.83**					
9. Openness	122.24	17.85	.01	.04	.09	-.11	.11	.13	.16	.41**	**.89**				
10. Neuroticism	81.81	21.52	-.25*	.07	-.30*	.11	.03	-.43**	-.31**	-.14	.03	**.91**			
Control Variables															
11. Year of Study	2.31	.96	-.04	-.10	-.15	.16	.05	-.02	-.16	.02	-.05	.10	-		
12. Age	24.16	1.85	.11	.08	.09	.18*	.01	.02	-.10	-.25**	.00	-.02	.21*	-	
13. Gender			.13	-.00	.23**	-.08	-.20*	.17*	.01	.15	.09	-.43**	-.06	.14	-

Note: *p < .05, **p < .01, Two-tailed test

Listwise N = 134

Table 12 Correlations for Narrow Facets of the Big Five with BARS Ratings

	M	SD	BARS Ratings	Reliability of Facet
Conscientiousness Facets				
Competence	22.08	3.47	.22**	.61
Order	18.94	4.97	.13	.74
Dutifulness	23.81	3.99	.21**	.67
Achievement Striving	21.06	3.77	.11	.70
Self-Discipline	21.14	4.25	.22**	.77
Deliberation	18.15	4.60	.30**	.74
Agreeableness Facets				
Trust	21.34	4.99	.11	.88
Straightforwardness	21.21	4.28	.06	.65
Altruism	25.04	3.31	.06	.70
Compliance	18.11	4.56	.08	.72
Modesty	19.30	4.57	.10	.71
Tender-Mindedness	20.72	3.77	-.11	.63
Extraversion Facets				
Warmth	24.63	3.42	.08	.70
Gregariousness	20.24	4.91	.02	.76
Assertiveness	17.34	4.88	.07	.77
Activity	18.29	4.14	.10	.56
Excitement Seeking	20.19	4.24	-.11	.54
Positive Emotions	22.33	2.72	.08	.59
Openness Facets				
Fantasy	20.02	4.44	-.08	.71
Aesthetics	18.21	5.97	.06	.83
Feelings	22.09	4.35	.08	.73
Actions	16.95	3.95	.02	.65
Ideas	20.66	4.77	.11	.77
Values	23.03	3.45	-.03	.58
Neuroticism Facets				
Anxiety	14.80	4.22	-.09	.81
Angry Hostility	12.23	5.12	.16*	.83
Depression	12.80	5.09	-.20*	.79
Self-Consciousness	14.84	4.33	-.20*	.63
Impulsiveness	17.08	4.65	-.21**	.68
Vulnerability	9.94	3.61	-.19*	.71

Note: *$p < .05$, **$p < .01$, Two tailed test

Listwise N = 160

who were lower on each of the facets. BARS scores were also negatively correlated with five facets of Neuroticism: Angry Hostility ($r = -.16, p < .05$), Depression ($r = -.20, p < .05$), Self-Consciousness ($r = -.20, p < .05$), Impulsiveness ($r = -.21, p < .01$), and Vulnerability ($r = -.19, p < .05$). High scores on these five traits were associated with lower ratings on the BARS.

In the regression of BARS ratings on personality and interview (see Table 13), year of study was not a significant predictor of BARS ratings, ($\Delta R^2 = .00$, F_{change} (1,134)= .19, $p > .05$). The DAT, entered in the second step, accounted for 5 percent of the variance in BARS ratings ($\Delta R^2 = .05$, F_{change} (2,132)= 3.04, $p < .05$), with Perceptual Ability predicting BARS ratings ($\beta = .20, p < .05$). In step three, the interview did not significantly add to the prediction of BARS ratings, $\Delta R^2 = .05$, F_{change} (1,131)= .61, $p > .05$. The personality factors, added in step four, accounted for 9 percent of the variance in BARS ratings ($R^2 = .09$, F (5,126)= 2.55, $p < .05$), with Conscientiousness as the only significant individual predictor of the criterion ($\beta = .24, p < .05$). Table 13 also shows that, when the narrow personality facets Competence, Dutifulness, Deliberation, Self-Discipline, Angry Hostility, Depression, Self-Consciousness, Impulsiveness, and Vulnerability in lieu of the broad factors, the facets account for an additional 12 percent of the variance in BARS ratings; this increment in variance was marginally significant ($R^2 = .12$, F (9,122)= 1.91, $p < .06$). Of the facets entered in this step, Deliberation ($\beta = .28, p < .05$) was a significant predictor in the prediction equation. In the facet regression, there was possible suppression occurring as three of the facets (Angry Hostility, Self-Consciousness, and Competence) had beta weights with signs opposite those of their correlation with the criterion.

Table 13

Regression of BARS Ratings on Personality and Interview

Step	Independent Variables	Beta	R	R^2	ΔR^2	F_{change}	Sig. F
1	Control Variables		.04	.00	.00	.19	.67
	Year	-.04					
2	Dental Aptitude Test		.21	.05	.04	3.04	.05
	DAT Academic Average	.04					
	DAT Perceptual Ability	.20*					
3	Interview	.07	.22	.05	.00	.61	.44
4	Personality Factors		.37	.14	.09*	2.55	.03
	Conscientiousness	.24*					
	Agreeableness	-.04					
	Extraversion	-.02					
	Openness to Experience	-.03					
	Neuroticism	-.14					
4	Personality Facets		.41	.17	$.12^+$	1.91	.06
	Conscientiousness						
	Competence	-.12					
	Dutifulness	.04					
	Deliberation	.28*					
	Neuroticism						
	Angry Hostility	.06					
	Depression	-.07					
	Self-Consciousness	.01					
	Impulsiveness	-.06					
	Vulnerability	-.06					

Note: $*p < .05$, $^+p < .06$

Listwise N = 136

Discussion

The purpose of the present study was to assess those variables that may reliably and validly predict success in both the preclinical and clinical components of undergraduate dental training. That is, the predictive validity of the standard admission variables (DAT and interview) as well as a measure of the Big Five personality model.

The results demonstrated that the Big Five model of personality, both broad factors and narrow facets, adds to the prediction of performance in dental school, particularly in clinical coursework in the later years of the dental program. The results also showed that the DAT is a valid predictor of performance throughout dental training. The new CDA interview was a significant predictor of third year clinical performance; however, the interview did not add to prediction beyond the DAT. The current study also evaluated a BARS developed to measure professional behaviour in the clinical setting. A personality measure predicted ratings on the BARS.

The DAT as a Predictor of Performance

The DAT is a significant predictor of didactic or preclinical coursework (e.g., Boyd & Teteruck, 1979; Chamberlain et al., in press; Smithers et al., 2004). Based on previous research, I expected the DAT to be a valid predictor of academic performance in dental training and this was generally the case. The DAT, specifically the Academic Average component, significantly predicted performance in the first year of dental school; high scores on the DAT component were associated with better performance. This result is consistent with previous studies (Chamberlain et al., in press; Smithers et al., 2004, Thompson et al., 1979); however, Chamberlain et al., also found that the Perceptual Ability component of the DAT was related to first year performance, which was not the case in the present study. Similar to the current study, Smithers et al. (2004) did not find a relationship between Perceptual Ability and first year performance. The current study and that of Smithers et al. had a sample of students from two dental schools whereas Chamberlain et al. had a sample from only one school. Thus, the difference in results may be attributable to the samples used in these recent studies. In addition, the

sample in the current study and that of Smithers et al. was larger than the sample of first year students used by Chamberlain et al.

As expected, the DAT components did not predict Year 2 Clinical performance but were, as hypothesized, a significant predictor of academic performance in the second year of dental training. Specifically, the Academic Average and Perceptual Ability components both predicted success in second year academic coursework. This result is somewhat consistent with that of Smithers et al. (2004) who found that the DAT components were a predictor of second year performance; however, Smithers et al. did not differentiate between clinical and academic performance in the second year of dental training. This result is not consistent with Chamberlain et al. (in press) as they found that the DAT was not a predictor of academic performance in the second year of dental school. One explanation for the difference in results may be the difference in sample size in these studies: for Academic performance, the sample was almost double the size of that used by Chamberlain et al. The larger sample in the current study results in greater power to detect a significant effect.

In the third year of dental training, the DAT was, as expected, a predictor of academic performance. Namely, high scores on the Academic Average component of the DAT related to better performance in third year academic coursework. Surprisingly, the Academic Average component was also a predictor of third year clinical coursework. These results are not consistent with previous research (e.g., Chamberlain et al., in press; Gray et al., 2002; Kramer, 1986; Smithers et al., 2004). Both Smithers et al. (2004) and Chamberlain et al. (in press) found that the DAT did not predict third year academic performance. Chamberlain et al. did find that, when the DAT was regressed together with

the interview and personality, the combination of the three DAT measures predicted

performance. Their analysis only included third year students, as the fourth year students

did not have interview data. However, in a regression on only the DAT and personality

that included both third and fourth year students, the DAT did not predict performance.

The analyses of Chamberlain et al. used sample sizes of 27 and 17 compared to a sample

of 52 in the present study; thus, the power to detect a significant effect was greater in the

current analysis. The current sample was also slightly larger than that of Smithers et al.

who had a sample of 40. The increased sample size in the present study is one

explanation for the finding of a significant relationship between the Academic Average

component of the DAT and third year academic and clinical performance.

Another reason why the Academic Average component of the DAT may predict

clinical performance is the quantitative aspect of clinical grades. That is, clinical grades

in dental programs depend on the completion of a number of certain procedures rather

than an evaluation of the quality of performance (Gray et al., 2002). Cognitive ability is

associated with the ability to reason, solve problems, and process information (Catano et

al., 2005) which may in turn be related to the ability to perform a number of procedures

in a clinical setting without attention to quality (Chamberlain et al., in press). As the

Academic Average component of the DAT is a proxy to a measure of cognitive ability,

this may be a reason for why the DAT was predicting third year clinical performance.

Overall, the results of the current study, along with those of previous pilot studies

(Chamberlain et al., in press; Smithers et al. 2004), provide further evidence that the DAT

is a good predictor of performance throughout dental training, particularly performance in

didactic coursework. Interestingly, the results of the current study also suggest that the

DAT might be a valid predictor of performance in both the academic and clinical aspects of the third year of dental training; however, further research is needed to test these relationships. Nonetheless, the current research further validates the use of the DAT as a selection measure for dental school.

The CDA Interview as a Predictor of Performance

One of the main objectives of this study was to assess the validity of the new CDA interview in predicting both academic and clinical criteria throughout dental training. Chamberlain (2004) attempted to assess the validity of the interview but did not have an adequate sample size to make a meaningful assessment. She did not, in her limited sample, find any relationship between the interview and her performance variables. In the current study, which had a larger sample size, the interview correlated significantly with third year clinical performance. This correlation is promising in that it shows that the interview has the potential to predict clinical performance in dental school. The interview, however, did not increase predictive validity beyond that afforded from the DAT. This result is consistent with Chamberlain. Chamberlain concluded that the lack of prediction was most likely attributable to the small sample sizes used in her analyses and the lack of interview data for fourth year students. Similar to Chamberlain, the fourth year sample in this study was too small to warrant a meaningful analysis. This is disappointing as the interview was designed to predict performance in the later years of dental training when behavioural skills are of increasing importance. In the present study, sample size could be one reason for the failure of the interview to increase the prediction of third year performance. Although the sample was larger than that of Chamberlain, it might still have been too small to provide enough power to detect a significant effect.

Chamberlain (2004) provided several other explanations for the failure of the interview to predict performance. These explanations may apply to this study as well. To account for the nonsignificant results in her study, Chamberlain noted that there were several issues regarding the standardization of the interview. Several interviewers are generally used to administer the interview and the same interviewers are not always paired together. The questions asked during the interview are also not standardized; interviewers select a question from a pair for each of the seven competencies. Thus, each interviewee does not receive the same questions with the possibility of being asked any combination of PBDI and SI questions. Most standardized interviews involve the same panel of interviewers and the same set of questions for all interviews. This lack of standardization could have resulted in some interviews being easier than others were, and there is the potential that some interviewers, despite training in scoring the interview, were not as rigorous as others were. In addition, Chamberlain observed that many of the interviewers used the scoring keys incorrectly as there was little agreement between interview pairs when they recorded the type of question asked (SI or PBDI). Chamberlain suggested that this is potential evidence that the interviewers did not use the scoring keys correctly or gave the answer keys minimal attention. It is not certain whether this is true for the interview data obtained from both dental schools in this study, as I did not have access to the rating forms at both dental schools.

Chamberlain (2004) also found that the interview correlated positively with the Openness to Experience factor. In the current study, there were no significant relationships between the interview and any of the broad factors of personality; however, the interview was positively associated with Fantasy, a facet of Openness to Experience,

and negatively associated with Competence, a facet of Agreeableness. Chamberlain did

not report any correlations between the interview and the personality facets. The result

concerning Fantasy makes sense theoretically as it could be suggested that students who

are more imaginative in generating responses to the interview questions would be rated

more favorably. The negative relationship between compliance and interview scores does

not appear to make sense intuitively; however, it could be that interviewers perceived

interviewees that were overly compliant as too passive or too agreeable. Future research

as these results might be sample specific.

Another purpose of this study was to validate the BARS, developed by

Chamberlain et al. (in press) to provide an assessment of student professional behaviours

in the clinical setting. Although the BARS were based on the competencies assessed by

the CDA interview, the BARS did not correlate with the interview. This result is

consistent with Chamberlain (2004) who also reported no relationship between the

interview and BARS ratings. One reason for this unexpected result may be the small

number of fourth year students with interview data in the analysis; there were only

interview data for 18 fourth year students. The interview was designed to predict

performance in the latter years of dental school, thus the small number of participants

may have reduced the power to detect a significant effect.

Overall, there are elements of the interview that lack standardization and these

inconsistencies in interview administration might be reasons for why the interview is not

predicting performance. Chamberlain (2004) noted that there was an effort to improve

training of interviewers, however the current study does not provide any evidence that the

training has improved the predictive validity of the interview. There is a need for further

research with a larger sample.

Personality as a Predictor of Performance

The current study continues research aimed at evaluating the use of a personality

measure in the selection of students for dental school. The results support the use of the

Five-Factor model of personality in dental admissions as it demonstrated an ability to

explain incremental variance over the DAT in the prediction of academic and clinical

performance.

The broad *Conscientiousness* factor predicted performance in all aspects of both

the second and third year of dental training. In terms of the prediction of first year

performance, although the factor did not correlate with the first year performance, in a

regression of Year 1 performance on the five factors, Conscientiousness accounted for an

additional 8 percent of the variance in the criterion beyond the DAT. Students who were

more conscientious performed better in the first three years of dental school than did

students who were less conscientious. The narrow Conscientiousness facets also

predicted the performance criteria. The Competence facet predicted all criteria, both

academic and clinical, in the first three years of dental school. That is, students who were

more capable, well-prepared and sensible performed better than did students who were

lower on these traits. The Dutifulness facet, adherence to ethical principles, also predicted

all criteria in the first three years of dental training. Deliberation, a measure of thinking

before acting, predicted first year performance and second year Clinical performance.

Self-Discipline, a measure of motivation, and Order, the tendency to be neat, tidy, and

well organized, predicted second year clinical performance. Achievement Striving

predicted second year academic performance; students with high aspirations, were

diligent, and had a sense of direction performed better than students who scored lower on

the facet. These results are in line with what was expected as Conscientiousness is linked

to various aspects of performance (Barrick & Mount, 1991) and it can be presumed that

students who are more conscientious would demonstrate higher levels of performance

than students who are lower in conscientiousness.

Agreeableness predicted performance in second year clinical coursework; higher

Agreeableness scores were associated with better performance in Year 2 clinical courses.

One of its facets, Straightforwardness, a measure of frankness, sincerity, and ingenuity,

predicted second year academic performance. Students high on this facet performed

better in second year clinical courses than students who scored lower on

Straightforwardness.

The broad *Neuroticism* factor did not predict any of the performance criteria

assessed in the current study, but its facet Impulsiveness, the inability to control urges,

predicted first year performance, second year academic performance, and third year

academic and clinical performance. That is, students who were low on this facet

performed at higher levels in first year, second year didactic courses, and both didactic

and clinical aspects of third year.

Openness to Experience predicted performance in second year clinical

coursework; students who were less open to new experiences performed better in second

year clinical coursework than did students who were more open to new experiences. Two

facets of Openness to Experience correlated with the dental school performance criteria.

Fantasy, a measure of imagination and daydreaming, predicted second year clinical

performance. That is, students who daydreamed less and were less imaginative performed better in clinical coursework than did students who daydreamed more and were more imaginative. Ideas, being intellectually curious, predicted third year academic coursework. The relationship between Openness to Experience, and its facet Fantasy, with second year clinical performance may reflect the dental education environment, which requires students to follow established procedures. This type of environment would not be favorable for students who were more creative; rather, students who were more comfortable using established methods and techniques would be more successful in the clinical setting.

The broad *Extraversion* factor was not associated with any of the performance criteria. Moreover, none of the narrow Extraversion facets correlated with the criterion measures.

Overall, the current results are to some extent consistent with the results of previous pilot studies (Chamberlain, 2004; Smithers et al., 2004). Tables 14 to 16 present a comparison of the results concerning personality and the prediction of dental school performance between the current study and the previous pilot studies. The most probable reason for the difference in results between the current study and those of Chamberlain is the size of Chamberlain's samples, which were generally smaller than the samples used in the current analysis. In the current study there was second year academic and clinical performance data for 91 and 77 students, respectively, and third year performance data for 52 students whereas Chamberlain had second year performance data for 37 to 47 students and third year performance data for 17 to 27 students, depending on whether the interview was included in the analysis. These differences in sample sizes would affect the

Table 14   Comparison of the Personality Predictors of First Year Performance in the Current Study and the Previous Pilot Studies

Predictors	Smithers et al.	Chamberlain	Poole
Conscientiousness	No	Yes	Yes*
Competence	No	Yes	Yes
Dutifulness	No	Yes	Yes
Self-Discipline	No	Yes	No
Deliberation	No	Yes	No
Agreeableness	No	Yes*	No
Trust	No	Yes	No
Straightforwardness	No	Yes	No
Compliance	No	Yes	No
Modesty	No	Yes	No
Extraversion	No	No	No
Warmth	No	Yes	No
Openness to Experience	No	Yes	No
Actions	No	Yes	No
Neuroticism	No	Yes	No
Angry Hostility	No	Yes	No
Depression	No	Yes	No
Impulsiveness	No	No	Yes*

Note: Yes or No indicates whether the factor or facet was significantly correlated with the criterion.

* Indicates that the predictor was significant in regression analysis.

power to detect significant effects and could lead to sampling error. As the current samples were larger than those of Chamberlain were, the current study would have increased power to detect a significant effect. This explanation does not explain the inconsistencies between the current results and those of Smithers et al.'s (2004) research, as the samples used in their study were comparable to those in current study. The most likely reason for differences in the prediction of second year performance is that Smithers et al. used an overall measure of second year performance in lieu of separating the

Table 15   Comparison of the Personality Predictors of Second Year Performance in the Current Study and the Previous Pilot Studies

Predictors	Smithers et al.	Chamberlain	Poole
	Year 2 Clinical Performance		
Conscientiousness	No	Yes	Yes
Competence	No	Yes	Yes
Dutifulness	No	Yes*	Yes
Self-Discipline	No	No	Yes
Order	No	Yes*	Yes
Deliberation	No	Yes	Yes
Agreeableness	No	No	Yes*
Compliance	No	No	Yes
Modesty	No	Yes	No
Straightforwardness	Yes*	No	No
Openness to Experience	Yes*	No	Yes*
Fantasy	No	No	Yes*
Ideas	Yes*	No	No
Neuroticism	No	No	No
Impulsiveness	No	No	Yes
	Year 2 Academic Performance		
Conscientiousness	-[a]	Yes	Yes*
Competence	-	Yes	Yes
Dutifulness	-	Yes*	Yes
Achievement Striving	-	No	Yes
Agreeableness	-	Yes	No
Trust	-	Yes	No
Modesty	-	Yes	No
Straightforwardness	-	Yes	Yes
Openness to Experience	-	No	No
Ideas	-	No	Yes

Note: Yes or No indicates whether the factor or facet was significantly correlated with the criterion.

* Indicates that the predictor was significant in regression analysis.

Note: [a] Smithers et al. used an overall second year performance criterion; thus, their results are only presented in the top portion of the table.

Table 16   Comparison of the Personality Predictors of Third Year Performance in the Current Study and the Previous Pilot Studies

Predictors	Smithers et al.	Chamberlain	Poole[a]
Year 3 Clinical Performance			
Conscientiousness	No	No	Yes
Competence	No	Yes*	Yes
Dutifulness	No	No	Yes
Extraversion	No	No	No
Positive Emotions	Yes*	No	No
Openness to Experience	Yes	No	No
Ideas	Yes*	No	No
Neuroticism	No	No	No
Depression	No	Yes*	No
Impulsiveness	No	No	Yes
Year 3 Academic Performance			
Conscientiousness	No	Yes	Yes*
Competence	No	Yes	Yes
Dutifulness	No	Yes	Yes
Deliberation	No	Yes	No
Extraversion	No	Yes	No
Warmth	No	Yes	No
Assertiveness	No	Yes	No
Activity	No	Yes	No
Agreeableness	No	No	No
Compliance	Yes*	No	No
Tender-Mindedness	Yes	No	No
Vulnerability	Yes*	No	No
Openness to Experience	Yes*	No	No
Fantasy	Yes*	No	No
Aesthetics	Yes	No	No
Ideas	Yes	No	Yes
Feeling	No	Yes	No
Neuroticism	No	No	No
Impulsiveness	No	No	Yes

Note: Yes or No indicates whether the factor or facet was significantly correlated with the criterion.

* Indicates that the predictor was significant in regression analysis.

Note: [a] Poole did not conduct regression analyses for third year performance criteria on the narrow facets.

criterion into a clinical and academic component. Another explanation for the

inconsistencies between these studies might be differences in the samples used; the

results may be sample specific, particularly those concerning the narrow personality

facets. In addition, the current sample and that of Smithers et al. (2004) consisted of

students from two dental schools whereas Chamberlain's (2004) sample was from one

dental school, which may account for some of the differences in results. Despite the

inconsistencies, the results suggest that using a measure of the Big Five could be a

valuable addition to the dental school admissions process. Moreover, the current results

build on the previous pilot studies. Inconsistencies between these studies highlight the

need for further research with a larger, more generalizable sample.

Broad vs. Narrow Personality Measures as Predictors of Performance

Overall, the results of the current study, along with those of previous pilot studies

(Chamberlain, 2004; Chamberlain et al., in press, Smithers et al., 2004), suggest that both

broad factors and narrow facets of personality are predictors of performance in dental

school andshould be used in the selection of dental students. Conscientiousness and one

or more of its facets predicted performance criteria throughout dental training as well as

the BARS ratings of professionalism. In the case of Neuroticism, its Impulsiveness facet

predicted first year performance but the factor itself was not a significant predictor.

However, Neuroticism did predict BARS ratings. Although, the facets generally did not

account for significantly more variance than the factors, previous research has shown that

the narrow facets accounted for more variance in the criterion (Chamberlain, et al., in

press; Smithers et al., 2004).

The current results, and more so those of the previous pilot studies (Chamberlain, 2004; Chamberlain et al., in press, Smithers et al., 2004), suggest that narrow personality facets can add significantly to the prediction of performance in dental school. Although including an assessment of the narrow facets as part of the admissions process provides a rich set of predictors, the applicant processing time is increased. The current results do provide an indication that the broad factors Conscientiousness, Agreeableness, and Neuroticism predict performance and account for additional variance beyond the DAT. As such, admissions committees could benefit from administering a shorter version of the NEO-PI-R that provides a valid and reliable assessment of the broad factors only. However, there is a need for additional research with a larger, more generalizable sample in order to compare the validity of the broad factors and narrow facets in the prediction of performance in dental school.

The BARS Measure of Professionalism

In the current study, the BARS ratings positively correlated with Conscientiousness and negatively correlated with Neuroticism whereby Conscientiousness predicted an additional 9 percent of the variance in BARS ratings beyond the DAT and year of study. In terms of the narrow facets of personality, Competence, Dutifulness, and Deliberation, facets of Conscientiousness, correlated positively with BARS ratings. Angry Hostility, Depression, Self-Consciousness, Impulsiveness, and Vulnerability, facets of Neuroticism, correlated negatively with BARS ratings. Interestingly, the narrow facets explained almost three times more variance than the broad personality factors but this increment was only marginally significant. Of the set of facets entered into the prediction equation, Deliberation was a

significant individual predictor of professionalism. Table 17 presents a comparison of the

current results concerning the BARS and personality and the results of Chamberlain et al.

Table 17

Comparison of the Personality Predictors of Professionalism in the Current Study and
Chamberlain et al. (in press)

Predictors	Chamberlain et al.	Poole
Conscientiousness	Yes*	Yes*
Competence	Yes	Yes
Dutifulness	No	Yes
Deliberation	Yes*	Yes*
Self-Discipline	Yes	No
Agreeableness	No	No
Trust	Yes	No
Openness to Experience	No	No
Ideas	Yes*	No
Neuroticism	Yes	Yes
Angry Hostility	Yes	Yes
Depression	Yes	Yes
Self-Consciousness	Yes	Yes
Impulsiveness	Yes	Yes
Vulnerability	No	Yes
Impulsiveness	Yes	Yes

Note: Yes or No indicates whether the factor or facet was significantly correlated
with the criterion. * Indicates that the predictor was significant in regression analysis.

(in press). The results with the broad factors are consistent between the two studies but

there were some differences with regard to the narrow facets that correlated with BARS

ratings. Similar to Chamberlain et al., the facets accounted for more variance in the

criterion than the broad factors but the set of facets in their study accounted for 20

percent of the variance in BARS ratings whereas the facets only accounted 12 percent of

the variance in BARS ratings in the current study. Despite the differences between these

studies, the current results provide additional support for the suggestion that personality

is a factor in forming dental student's professional behaviour in the clinic and build on

the research of Chamberlain et al.

Along with reaffirming the results concerning the relationship between BARS ratings

and personality, another aim of this study was to examine the validity of the BARS as a

measure of clinical behaviour. Chamberlain et al. (in press) found that BARS ratings

were significantly correlated with first year overall performance, third year clinical

performance, and the Perceptual Ability component of the DAT. More recently,

Cunningham (2005) reported that the BARS ratings were correlated .63 with skills

assessment ratings whereby the skills assessment is an exception form that is completed

by faculty when they observe very good or very poor performance in the clinic. The

current study replicated these results of Chamberlain et al. but also found that BARS

ratings correlated with second and third year academic performance. Overall, the current

results in conjunction with previous research with the BARS provide support for the

validity of the BARS as an assessment of performance in the clinic. Yet, all of the

research to date using the BARS was conducted at one dental school; thus, there is a need

for additional research in other dental school populations to assess the generalizability of

the BARS as a measure of professionalism. Developing tools to evaluate student

behaviour in the clinic can provide objective assessments of clinical performance.

Limitations and Future Research

The main limitation of the current study is sample size. Sample size decreased

across the year of study, with only 28 students having grades in fourth year courses and

18 having interview data. The small number of fourth year students did not permit

regression analyses for this year of study. Although larger than that of the previous pilot study by Chamberlain et al. (in press), the sample for third year was also smaller than is ideal for the regression analysis. Thus, the power to detect a significant effect decreases and there were not enough cases in third year to permit an assessment of the predictive ability of the narrow personality facets. With a larger sample, there would have been more power, which could have resulted in some analyses being significant, or if already significant, the amount of variance accounted for could increase. Most importantly, a larger sample, especially more third and fourth year students, could help to better evaluate the validity of the interview. Related to this limitation, the generalizability of the results to other dental school is an issue. Although the sample consisted of participants from two dental schools, the majority of the sample was from one of the schools; this was especially the case for second year clinical grades. Additionally, as the sample was from only two of the 10 Canadian dental schools, the question remains as to whether the results of the current study are applicable to the entire Canadian dental student population. Moreover, the BARS data was collected from one dental school. One original goal of this research was to recruit a larger, more representative sample, which would have allowed for a better assessment of the validity of the interview, the personality measure, and the BARS assessment of professional behaviour but due to logistical reasons, data could only be obtained from two of the schools in time for inclusion in this study. In order for this stream of research to advance, future studies need to have larger samples that comprise students from multiple Canadian dental schools.

A third limitation of this study is range restriction. Range restriction is a problem because it underestimates the true correlations in the population (Catano et al., 2004).

Students admitted into dental training are more homogeneous in terms of academic averages and DAT scores than the larger applicant pool. As a result, the correlations computed on this homogeneous group will be smaller in magnitude than correlations computed on a more heterogeneous group, such as the total applicant pool. There are corrections for range restriction; however, the data were not available to compute the correction.

One other limitation of this study, and research evaluating academic performance in general, is the reliability of the criterion measure used; that is, course grades. The nature of course grades means that their reliability cannot be formally assessed. Course grades may actually be unreliable criterion measures due to variability in instructors, among courses, and across schools. For example, the same course could be taught by a different instructor from one year to the next and the different instructors, although following the same grading scheme could have different conceptions of performance. Despite this variability and potential unreliability, course grades are the only available measure of academic performance. However, alternative assessments such as the BARS used in the current study, could help to improve the prediction of performance, in this case clinical performance. The BARS, as a tool developed to evaluate student behaviour in the clinic, can provide objective assessments of clinical performance, which can help to standardize the assessment of clinical performance. Faculty that used the measure found that it allowed them to assess aspects of student performance that were not captured by course grades.

Along with the directions for future research already discussed, it would be beneficial for future research to continue to compare the efficacy of the broad factors and

narrow traits as predictors of performance, especially clinical performance for which the traditional admissions variables generally fail to adequately or consistently predict. Additionally, it would be useful to collect personality data from the entire applicant pool and from practicing dentists. Personality data from admitted and non-admitted applicants would allow for a comparison of the personality profiles of those are not admitted into dental training with successful students already enrolled and practicing dentists. Chamberlain et al. (in press) found that students whose profiles were similar to dentists' average profile performed better in the first year of dental school. The Big Five profile for the current sample was more similar to the profile of the students in Chamberlain et al.'s study than to the dentist's profile in their study. However, the Big Five profile of the current sample, when compared to the student profile in Chamberlain et al.'s research, was more similar to the dentist's profile. Future research in this area could help in the development of a profile of the ideal dental student.

Overall, the results of this study suggest that there are different sets of predictors for clinical and academic components of dental training and dental students need both cognitive skills and non-cognitive competencies, such as personality to succeed in their studies. As such, further investigations of the role of personality in predicting dental school performance are warranted. Additionally, the BARS appears to be a promising assessment of professionalism in dental school and further research with this tool is need to not only validate its use as an assessment of clinical performance but ultimately, to assess the validity of the new CDA interview; future studies with more interview data will help in achieving this objective.

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Appendix A

Canadian Dental Association Interview Competencies

Communication:

This competency focuses on the student's ability/skill in oral communication with patients, fellow students, staff and faculty. It addresses the manner of a student's speech, the ability to clarify technical terminology for non-technical persons, the clarity and conciseness of the information transferred.

Conscientiousness:

This competency focuses on a student's ability to be enthusiastic and committed to ones work. It addresses such characteristics as preparedness, planning and organization, sustained enthusiasm, attention to detail, maintenance of standards, pride and responsibility.

Integrity:

This competency addresses such characteristics as a willingness to admit to shortcomings or personal limitations. It addresses such issues as personal and professional ethical/moral standards. It is best seen in situations requiring trust.

Judgment and Analysis:

This competency addresses the student's ability to make rational, realistic, sound decisions based on a thorough examination and synthesis of relevant patient and treatment information.

Self Control:

This competency focuses on a student's ability to remain calm and focused in stressful situations. The student will typically be able to deliver a calm measured response under pressure that displays a consistent degree of behavioural stability.

Sensitivity to Others:

This competency relates to the consideration of the needs of others. It addresses the student's ability to discern and respond to the emotional, physical and mental as well as dental needs of others. It is based in a respect for others and addresses an ability to recognize and respect diverse needs.

Tact and Diplomacy:

This competency focuses on the student's ability to put others at ease and to promote a harmonious and consensual environment in which disagreements and conflicts are more easily resolved.

Appendix B

Informed Consent Form

Introduction
We invite you to take part in a research study at the Faculty of Dentistry. Taking part in this study is voluntary. You may withdraw from the study at any time without penalty. Your performance as a student and your progress in the dental program will not be affected in any way by whether you participate or not in this study. The study is described below. This description tells you about the risks, inconvenience, or discomfort which you might experience. Participating in this study will not benefit you, but we might learn things that will benefit others. You should discuss any questions you have about this study with the people who explain it to you.

Purpose of Study
The purpose of this study is to develop the procedures by which we can identify and assess those variables that reliably and validly predict success in both the preclinical and clinical components of dental school programs. As well, we will attempt to assess two additional measurements: a personality inventory and an assessment tool that will assess professional behaviour in a clinical setting.

Study Design
This study will look at the relationship among different measures of academic and clinical performance including NDEB scores and admission criteria, personality, and professional behaviour in a clinical setting. Most of the data that will be used in this study is routinely collected as part of the admission procedures or in the evaluation of your performance throughout dental school.

Who Can Participate in the Study
Any student enrolled in the four year D.D.S. program may participate in this study.

Who Will be Conducting the Research
The Principal Investigator and Co-Investigators named above will conduct the study. Dr. Catano is a Psychologist employed at Saint Mary's University. Amanda Poole is a graduate student in the masters' program in industrial/organizational psychology at Saint Mary's University and this research will constitute her Masters thesis project. Dr. Don Cunningham is the Assistant Dean of the Faculty of Dentistry at Dalhousie University. Dr. Cleghorn is a dentist and faculty member at Dalhousie University. Dr. Dean Kolbinson is the Director, Clinical Programs in the Faculty of Dentistry at the University of Saskatchewan.

What You Will Be Asked to Do
You will be asked for your permission to use data from your admissions tests and measures of your performance in the dental program as part of this study. This data is routinely collected as part of your enrollment in the dental program. You will also be asked to complete a paper-and-pencil inventory that assesses personality variables. Your performance data will be collected throughout your enrollment in the dental program. We also ask that your scores from the NDEB examination be included in the data file.

Finally, you will allow your behaviour in your clinical courses to be rated by clinical dental faculty in your program.

Possible Risks and Discomforts
There are no known or possible adverse events or side effects that could arise from participation in this study. There are no known or perceived risks to your health, safety, and welfare by participating in this study.

Possible Benefits
You will not benefit directly from this study.

Compensation
You will not be paid to participate in this study. However, when we ask you to participate we will be holding an evening meeting and will supply pizza and sodas for that meeting.

Confidentiality
You will not be identified in any reports or publications. You will be assigned an identification code and the key that will link your name to the assigned code will be kept separate from the database. The dataset will not contain any personal identifier. All data will be grouped together and only the group statistics will be reported. The database will be under the secure control of the principal investigator. This data will only be seen by the investigators and will not be used in any way to evaluate your performance as part of the dental program nor will it have any effect on your progress in the program. When the study is finished the data will remain in the possession of the Principal Investigator for a minimum of five years. Given the size of the database it will be stored on a CD in his/her office. The CD will not have the identification key on it.

Questions
If you have any questions about participating in this study, now or in the future, please address those to the Contact person listed above. If any information becomes available that might alter your decision to participate in this study, we will present that information to you immediately.

Summary
You will receive a copy of this consent form. As well, at the end of the study a report will be available to all participants. If you would like a copy of that report, please provide the principal investigator with contact information and we will send you a summary of the results of the study when it is complete.

Termination
You may terminate your participation in this study at any time and for any reason. Termination will have no effect on the evaluation of your performance as a student in the faculty of dentistry or your progress in the program.

Problems or Concerns
In the event that you have any problems or difficulties with, or wish to voice concern about, any respect of your participation in this study, you may contact *[insert name of REB contact for the respective school]* at *[insert email]*, Chair, *[insert name of dental school]*.

Title of Project: A Pilot Study in Preparation for a National Longitudinal Study to Establish the Validity and Reliability of the Assessment Instruments Used to Select Students for Programs in Dentistry

Signature
I have read the explanation about this study. I have been given the opportunity to discuss the study and my questions have been answered to my satisfaction. By signing this consent form, I hereby consent to take part in this study. However, I realize that my participation is voluntary and I am free to withdraw from the study at any time. You are being given a copy of this consent form to keep for your own records.

Participant

Name (please print): _____

Signature: _____

Date: _____

Please keep one copy of this form for your own records.

Research Ethics Board Certificate Notice

The Saint Mary's University Research Ethics Board has issued an REB certificate related to this thesis. The certificate number is: O4 – 142

A copy of the certificate is on file at:

Saint Mary's University, Archives
Patrick Power Library
Halifax, NS
B3H 3C3

Email: archives@smu.ca
Phone: 902-420-5508
Fax: 902-420-5561

For more information on the issuing of REB certificates, you can contact the Research Ethics Board at 902-420-5728/ ethics@smu.ca .

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