DISSERTATION

A COMPARISON OF SUBJECTIVE AND OBJECTIVE PROCEDURES IN THE ADMISSIONS PROCESS OF VETERINARY STUDENTS

Submitted by

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In partial fulfillment of the requirements

for the degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Summer, 2002

COLORADO STATE UNIVERSITY

AUGUST 9, 2001

WE HEREBY RECCOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISON BY LORI RENEI KOGAN ENTITLED A COMPARISON OF SUBJECTIVE AND OBJECTIVE PROCEDURES IN THE ADMISSION PROCESS OF VETERINARY STUDENTS BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION

A COMPARISON OF SUBJECIVE AND OBJECTIVE PROCEDURES IN THE ADMISSION PROCESS OF VETERINARY STUDENTS

In the arduous path leading to the position of a veterinarian is an opportunity limited to a select number of individuals. While admission committees have traditionally focused on objectively defined, cognitive abilities, numerous non-cognitive qualities (i.e., problem-solving, critical thinking, communication skills, personal integrity, and empathy) that contain a subjective component have also been identified as important characteristics of veterinary students as well as practicing professionals. A subjective admissions policy may offer a preferable alternative to traditional objective admissions procedures by permitting the evaluation of non-cognitive criteria without compromising cognitive standards.

The present study was designed to assess Colorado State University's College of Veterinary Medicine and Biomedical Sciences subjective admissions procedure and compare it to their previously employed objective admissions procedure. The first component of the study compared student applications (cognitive and non-cognitive components) from the graduating classes 1998, 1999, and 2000 (i.e., objective admissions policy) with student applications from graduating classes of the 2001 and 2002 (i.e., subjective admissions policy). This was accomplished through a

comparison of undergraduate academic performance, work history, college and community activities, written essays, and recommendation letters.

The second element of the study compared students admitted through the subjective policy with those admitted through the objective policy in terms of veterinary school performance. This was done through a comparison of the graduation rates, cumulative grade point average, and clinical rotation grades of students admitted in the "objective years" with those students in the " subjective years."

Two raters independently coded all application categories and rotation grade sheets from which dependent measures were drawn. Results showed that the objective and subjective admissions procedures were equivalent in terms of students' previous academic performance, work experience, college and community activities, as well as success in veterinary school. Due to benefits of a subjective admissions procedure in terms of faculty and applicant preference, and the equivalence of the procedures in terms of student qualifications and performance, it was concluded that the subjective system has benefits outweighing the objective procedure. Limitations of the current study include a five year sample from one veterinary school and the inability to control for historical changes.

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ACKNOWLEDGEMENTS

I would like to thank my doctoral committee (Bill Boyer, Scott Hamilton, Sherry McConnell, and Wayne Viney) for their contributions to the completion of this dissertation. I want to especially thank Scott Hamilton and Wayne Viney for the support you offered during my graduate years, and in particular, during my transition into the counseling program. Without your support and faith in my abilities, in addition to the support of Kathy Richard, Jan Nerger, and Vicky Volbrecht, the transition would never have happened.

Sherry McConnell, I would like to thank you for your enthusiasm and faith in my abilities. I certainly could not have accomplished this project without you. In addition to your support as a committee member, you have also given me an excellent role model for the professional academician I hope to become.

Several faculty members within the psychology department have helped make my graduate training a rich, rewarding experience. I would like to thank Tammi Vacha-Haase for her guidance and ability to appreciate (most of) my humor. I am grateful for all the opportunities and lessons you have offered. I also want to thank Jerry Deffenbacher for sharing his wisdom and expertise.

I have been fortunate to have wonderful clinical supervisors, and would like to thank Chuck Davidshofer, Scott Hamilton, Kathy Richard, Tammi Vacha-

Haase, and Patricia Vigil for the clinical supervision and counseling tools you have all given me over the years.

I would like to thank Matt for his consistent, unending faith in my ability to make it through the program. I know there were numerous times I asked for advice I never heeded, but your support was a critical component of my success. I am also grateful to my family for the love and guidance you have shown me over the years. I want to thank my Mom and Dad for always making education a top priority, and thank you Andy, for being such a wonderful brother. Thank you, Grandma, for your love and support all these years (I know you were wondering if I would *ever* finish school). I also want to thank Damien and Alexandria for their patience during this process, and for constantly reminding me where my priorities lie.

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A COMPARISON OF SUBJECTIVE AND OBJECTIVE PROCEDURES IN THE ADMISSION PROCESS OF VETERINARY STUDENTS

> A man is ethical only when life, as such, is sacred to him, that of plants and animals as that of his fellow men, and when he devotes himself helpfully to all life that is in need of help (Schweitzer, 1933, p. 158-9)

Doctors have traditionally held a prestigious position in our society. The occupation is often viewed as synonymous with privilege, power, and wealth. Whether the patient has two legs or four, a doctor is often placed on a pedestal and is expected to have "all the answers." It is not only medical knowledge, however, that patients and clients desire. The character and personality of doctors defined the limits of medical care long before the advent of modern medical practices. Competence in medicine has always been ultimately defined in human terms (McGaglie, 1990b). This is still true today; The National Commission on Veterinary Economic Issues (1999) reported 83% of pet owners indicate that the single most important factor considered when selecting a veterinarian is personality characteristics. Due to the critical nature of selecting and training successful veterinarians, the current study examines two admissions procedures used in one U.S. veterinary school.

Role of Admissions Committees

The path that ultimately leads to the position of physician or veterinarian is an arduous one. Many people dream of becoming a doctor, and work toward this goal

school, with admissions committees acting as gatekeepers to the path of these esteemed professions. Every year, medical and veterinary admissions committees are responsible for selecting a limited number of students from a large, and, for the most part, qualified population of applicants (Best, Diekema, Fisher & Smith, 1971). The vast number of applicants who apply to these programs creates the daunting task of choosing potential students from an abundance of qualified men and women. These committees have the responsibility of selecting applicants who demonstrate the greatest promise of becoming successful students and doctors (Render & Jackson, 1975).

> The admission process is designed to promote identification of individuals who have the potential to be successful in the educational program and the capacity to acquire the doctoring skills deemed important by the institution (Koenig, Sireci & Wiley, 1998, p. 1106).

The selection task for medical and veterinary students is of paramount importance to communities, schools, and prospective students. Communities expect schools to produce individuals suitably prepared to fulfill the multitude of professional roles expected of doctors (Marley & Carman, 1999). The role of the admissions committee is pivotal in this process. Because most schools have a very low attrition rate, the decision to admit a student to medical school is, with few exceptions, equivalent to granting them a license to practice medicine (McGaglie, 1990a). Admissions committees, therefore, shoulder the major responsibility for who practices medicine (Johnson, 1983). Students selected for admission who cannot satisfactorily complete a rigorous science curriculum represent a failure of the admissions system, resulting in a loss for everyone involved (Glick, 1994). Students, schools, and communities all bear the cost of admissions mistakes based on faulty selection criteria (Vickers &

Reeve, 1990). Therefore, admissions committees' successful selection of students, those with the most potential for academic and professional success and the least potential for failure, is critical (Confer & Lorenz, 1999).

Selecting the best potential students involves the development and refinement of a fair and effective evaluative process. Lazarus and Van Niekert (1986) define a fair evaluative process as one that is "...just, objective, equitable and unprejudiced. A selection process is just and objective when its prerequisites are explicit and open to reliable measure. There are no hidden criteria. Prerequisites are explicit when they are clearly defined and available to applicants" (p. 346). In addition to being fair, admissions policies must be effective; they must use valid criteria, representative of the range of biographical, cognitive, personal and attitudinal variables required for the successful completion of medical training (Anderson, Hughes & Wakeford, 1980; Lazarus & Van Niekert, 1986).

While "fair" criteria may seem simple at first glance, some have argued that the use of traditional prerequisites is not truly fair because it discriminates against those whose cognitive abilities are not measured by scholastic performance (Lazarus & Van Niekert, 1986). Others contend, however, that the ability to learn and utilize clinical and medical knowledge is central to the success of veterinary students and practicing veterinarians. The National Commission on Veterinary Economic Issues (1999) reported widespread agreement among those involved in the veterinary community that successful veterinarians must possess adequate levels of clinical and medical knowledge. Yet there is clearly more involved in determining successful veterinary

students and future veterinarians than ascertaining their ability to perform well academically.

> An attempt to instill the knowledge required for health care would be futile, unless the selected student possessed the cognitive ability to assimilate extensive and complex material. Similarly, an attempt to instill the required attitudes would be futile unless the students were selected with related personal attributes. Since many of the qualities required for health care delivery are inherent and cannot be taught during an educational process, the selection of students is clearly a fundamental factor... (Lazarus & Van Niekert, 1986, p. 343).

Members of Admissions Committees

Admissions committee members are volunteers who spend countless hours evaluating applications and ultimately making difficult decisions about who to admit and who to deny. Several factors influence the selection of admissions committee members. In addition to availability and willingness to contribute the time and effort needed, committee members are carefully chosen to represent the opinions of other faculty, students, and professionals in the field. Therefore, schools strive to create committees that include faculty from different backgrounds (e.g., advanced students and members of the community). The addition of non-faculty members enriches the committees and provides new insights into the challenging admissions process. Community leaders, teachers, and other professionals provide valuable input and broaden committees' horizons (Glick, 1994). Committee members have the task of reading through all applications, making predictive judgments of potential success, and ultimately extending offers to prospective students. The criteria used for these tasks include cognitive or academic factors (i.e., standardized tests and undergraduate grade point average [GPA]) and non-academic factors (i.e., personality factors, work experience).

Admission Applications

The criteria used by medical and veterinary school admission committees involves several components, but traditionally the committees have relied heavily on objective, cognitive criteria (Confer & Lorenz, 1999; Kelman, 1982; Mitchell, 1990; Render & Jackson, 1975). These criteria include cumulative GPA, grades received in pre-professional required courses, and national standardized examinations such as the Graduate Record Examination (GRE), Medical College Admission Test (MCAT) or Veterinary College Admission Test (VCAT). Most schools include some evaluation of non-cognitive applicant factors, including leadership roles, career-related experiences, and interpersonal skills (McGaglie, 1990b). The application to CSU's CVMBS professional program has remained fairly consistent for the last several years and is representative of the applications required at other veterinary schools in the United States (S. McConnell, personal communication, June 11, 2001). Major headings of CSU's CVMBS application include the following:

- Administrative Information (i.e., name, address)
- Personal Information
    - Demographics
    - Primary occupation
    - Tuition classification
- GRE Scores
- Educational Information
    - All college course work
    - College/university history
    - All pre-veterinary required course work
    - Degrees received
    - Courses to be completed by end of spring term

- Work Experience
  - Veterinary experience
  - Non-veterinary animal experience
  - Other employment
- Activities (i.e., social, civic and charitable activities)
- Disadvantaged Claim (for applicants who feel their academic performance has been affected by a disadvantage)
- Special Circumstances (for applicants who believe they have some unique circumstance which should be brought to the attention of the admissions committee)
- Written Essays
- References

Cognitive/Academic Criteria

Cognitive ability assessment tools used as predictors of successful veterinary students include standardized test scores, pre-veterinary cumulative GPA, and grades received in upper division science courses (Confer, 1990; Confer & Lorenz, 1999; Confer, Turnwald & Wollenburg 1995; Kelman, 1982; Render & Jackson, 1975; Shane & Kearney, 1989).

Standardized test scores. Although a small percentage of veterinary schools ask for the Medical College Aptitude Test (MCAT) or the Veterinary College Admission Test (VCAT) as part of their admissions criteria, the majority of schools require the Graduate Record Examination (GRE). The (GRE) is designed to measure verbal, quantitative and analytical reasoning skills that have developed over a long period of time and are not related to any particular academic concentration (Castellucci, 2000). The GRE is used extensively to select graduate school applicants and to allocate scholarships, fellowships and assistantships to those admitted (Ingram, 1983). The

GRE is divided into three separately timed sections (verbal, analytical, and quantitative) comprised of multiple-choice questions.

The GRE-Verbal measures language skills through the use of analogies, antonyms, sentence completions, and reading comprehension subtests. The GRE-Analytical evaluates rational thinking skills, and the GRE-Quantitative measures mathematical skills, including arithmetic, algebra, geometry, quantitative comparison, discrete quantitative, and data interpretation (Educational Testing Service, 1989). An additional option of the GRE includes subject area tests; achievement tests designed to measure content knowledge in a particular subject. Although there are fourteen subject area tests, the biology subject test is most frequently used by veterinary schools in making admissions decisions (Castellucci, 2000).

There is little consensus among researchers as to what part of the GRE best predicts academic performance. While some have found a significant relationship between the GRE Quantitative and GRE Biology subject test with veterinary academic performance (Confer, 1990; Confer & Lorenz, 1999), others have found that the GRE Verbal score is the best predictor of academic success (Kelman, 1982; Latshaw, 1982). Confer (1990), however, found that the GRE Verbal component was less predictive than either the GRE Quantitative and GRE Analytical components. Despite these varying results, a large number of veterinary schools use the GRE as their sole standard test criterion (Shane & Harrington, 1989).

While researchers continue to explore which section of the GRE is the most predictive of future success for medical and veterinary students, others claim that utilizing GRE scores as criteria for admissions is questionable at best.

> The weight of the evidence... suggests that the wide usage of the GRE as a selection instrument must be questioned... Most of the correlation coefficients obtained were low enough to raise serious doubts about the validity and the usefulness of the GRE in identifying potentially successful graduate students (Thacker & Williams, 1974, p. 939).

Several researchers concur with Thacker and Williams. Morrison and Morrison's meta-analysis (1995), for example, found the Quantitative and Verbal components of the GRE produce minimal predictive validity. Other studies have found no correlation between GRE scores and grades or other measures of academic achievement (e.g., program completion, time lapse between program completion and oral examinations [Ingram, 1983; Oldfield & Hutchinson, 1997]). Marston (1971) described the GRE as "a quantitative, objective predictor that apparently does not predict very well" (p. 653).

> The employment of the GRE as a predictor variable has also been questioned due to its potential to eliminate capable applicants. "[Schools] appear to be losing many talented persons by restricting assessment to conventional mathematical and verbal abilities, such as those of... the GRE... (Humphreys, Lubinski & Yao, 1993, p. 250).

Morrison and Morrison (1995) added,

> [Results] suggest that the Quantitative and Verbal components of the GRE possess minimal predictive validity. The average amount of variance in [graduate GPA] accounted for by performance on these dimensions of the GRE [is] of such little magnitude that it appears they are virtually useless from a prediction standpoint. When this finding is coupled with studies suggesting that performance on the GRE is age, gender, and race specific, the use of this test as a determinant of graduate admission becomes even more questionable" (p. 311, 314).

It is argued, therefore, that reliance on the GRE and other standardized tests creates the potential for rejecting applicants who have the potential to make significant contributions to the medical professions (Oldfield & Hutchinson, 1997).

Undergraduate grade point average. Together with standardized tests, the other common variable used to assess academic ability is undergraduate GPA. This statistic

is computed in a variety of ways, depending on the requirements of each institution. One option is the calculation of a cumulative GPA, derived from all courses taken as an undergraduate. This can be misleading, however, due to the inclusion of classes that have little bearing on intellectual ability (e.g., physical fitness). Therefore, some schools opt to focus on GPA based on selected classes, often upper-division science classes. Yet another option for calculating GPA is to limit the number of years or semesters (e.g., courses taken in the final two academic years). Despite the misleading appearance of objectivity, GPAs can vary tremendously due to a multitude of factors (e.g., selectivity of schools, course load, and work load).

A plethora of studies have been conducted to assess the predictive value of undergraduate GPA on future academic performance. Several studies have found undergraduate cumulative GPA to be a powerful predictor of future academic success (Clapp & Reid, 1976; Confer, 1990; Confer & Lorenz, 1999; Hall, Bailey & Bailey, 1992; Jones & Thomae-Forgues, 1984; Julius & Kaiser, 1978; Noeth, 1974). Other studies have found variations of GPA more useful than cumulative GPA. For example, Zachery and Schaeffer (1994) found that 91 percent of students' grades in core courses taught in veterinary school have a strong positive correlation with pre-veterinary GPA science classes. These results were similar to those found by Julius and Kaiser (1978) who found that undergraduate GPA in pre-veterinary classes is the best predictor of veterinary academic success.

Not all researchers, however, endorse the use of undergraduate GPA as a critical component in the application process. Some studies have found undergraduate GPA to be minimally predictive of performance in medical school (Shen & Comrey, 1997).

One explanation for the discrepancy in the predictive value of undergraduate GPA may lie in the distinction between the first half of medical or veterinary school, which focuses on academic classroom success, and the second half which primarily involves clinical work. Undergraduate GPA appears to adequately predict academic grades within the first two years, but fails to predict clinical ability in the last two years. Therefore, undergraduate GPA predicts academic success in veterinary school in a diminishing time-dependent manner, making the generalization of predictability between GPA and academic success overly simplistic (Hulland & Ilson, 1982). It has been suggested that good college students generally make good medical students. Good grades, though, have not been shown to consistently correlate with good doctors. A relationship between academic success and clinical success has not been proven (Price, Lewis, Loughmiller, Nelson, Murray & Taylor, 1971).

Comparable to views on standardized tests, it has been suggested that reliance on undergraduate GPA may have negative effects on the admission process. Glick (1994) asked, "Whether by selecting exclusively those with the very highest grades, we do not sometimes select for qualities of over-competitiveness, single mindedness and narrowness, which may actually be undesirable [traits]" (p. 267). Glick (1994) continued, noting that

> Probably anyone in the upper third of college graduates (in the American system) if well motivated, can deal capably with medical school. The notion that only those in the top few percent can be doctors reflects largely the law of supply and demand in many countries where places are available only to the select few. The idea has been perpetuated for a whole variety of reasons, including inertia and self-flattery by the doctors (p. 267).

Since GPA scores have been shown to only account for 9-16% of the variance in medical school achievement (Montencinos & Pohlmann, 1987), it is not surprising

that Hulland and Ilson (1982) concluded that the "search for a small group of student admission characteristics which are predictive of success within the veterinary program... may be an impossible task" (p. 5).

One explanation for undergraduate GPA's lack of predictive validity is the vast differences found among colleges and universities. Even though GPA is considered a quantitative variable, it is actually fairly subjective and difficult to compare across institutions (Tekian, 1998a). Issues including grade inflation, quality of instructors, institutional difficulty, credit load, and students' individual learning styles all impact undergraduate GPA (Sedlacek & Prieto, 1990). One option to help address this dilemma is to consider colleges' selectivity level (academic caliber) when assessing GPAs (Blue, Gilbert, Elam & Basco, 2000; Clapp & Reid, 1976; Jones & Thomae-Forgues, 1984; Sarnacki, 1982). Selectivity of undergraduate institutions can be assessed through the Higher Education Research Institute (HERI) Index, (i.e., The Astin Index; Wiley & Koenig, 1996), and Barron's Profiles of American Colleges Admissions Selector Rating (Barron's, 1998). Studies have found that when undergraduate institutions are divided into categories based on selectivity, the average GPA for science courses is highest for low-selectivity institutions and lowest for high-selectivity institutions. In fact, Hall, Bailey and Bailey (1992) found 70% of the variance in science GPAs can be attributed to university selectivity level. The inclusion of "academic caliber" ratings of undergraduate universities as a weighting factor, therefore, may improve the predictive value of undergraduate GPAs.

Academic Criteria: Summary

When assessing the value of academic criteria, researchers have found that a combination of undergraduate GPA and standardized test scores is the best predictor of pre-clinical achievement in veterinary medical school (Kelman, 1982; Niedzwiedz & Friedman, 1976). It has therefore been suggested that:

> [In] spite of the politically correct trend to minimize the significance of pre-veterinary academic preparation, the traditional and readily available variables, cumulative science grade point averages, cumulative total grade point averages, and standardized test scores should be used to rank students (Zachary & Schaeffer, 1994, p. 59).

Stated succinctly, some argue that the best students tend to stay the best students throughout their first two years in medical or veterinary school, and the average and poor students likewise remain fairly stable. Therefore, it has been argued that undergraduate academic performance is paramount in helping to predict successful medical or veterinary students (Zachery & Shaeffer, 1995).

Several compelling arguments have been made, however, to limit the influence of past academic performance. Hobfoll and Benor (1981) found that students with lower pre-academic grades and standardized test scores are at no greater risk for probation or academic dismissal than students with higher pre-academic grades and test scores. As early as 1967, Gough reflected on the ways that medical schools use academic criteria in selecting medical students and the need for additional information.

> Perhaps these [admissions] committees should even search deliberately for creative and unconventional applicants, individuals of innovative, skeptical and nonconforming temperament, and then see to it that several such candidates are included in each incoming class. There are many kinds of men and women who can practice medicine in a competent and exemplary fashion, and we should do our best to insure that each variant is represented in the incoming pool of medical [students] (p. 649).

This sentiment was echoed by McGaglie nearly 30 years later when he found 84 percent to 91 percent of the variation in medical school achievement, measured by grades and tests, is due to unknown or unmeasured factors, leaving only 9 percent to 16 percent of the variation in achievement explained by GPA and standardized tests (1990a). Similar to the argument against placing significant weight on either undergraduate GPA or standardized test scores alone, it has been suggested that combining these academic indices still does not achieve the desired outcome. These factors cannot indicate the likelihood of success in clinical courses, or in the actual practice of medicine (McManus, 1982).

The use of academic measures as primary admissions criteria is problematic, not only due to their limited predictive value, but because they fail to focus attention on the elimination of undesirable qualities (i.e., indecisiveness and competitiveness; Parkhouse, 1979). Indecisiveness about career choice can be viewed as a potential impediment for future career development by negatively affecting the motivation and commitment necessary for a veterinary career (Mosier, McFarland, Johnson, Elmore & Oyler, 1992). Indecisive students may be more likely to drop out or encounter academic difficulties, while students who have clear career goals have been shown to have stronger self-identity, higher levels of self-esteem, and lower levels of anxiety and dogmatism (Jones & Chenery, 1980).

Another potentially problematic characteristic witnessed in some students is an excessive level of competitiveness. Although core American values of individualism and self-reliance foster a competitive environment for students (McGaglie, 1990a), it is questionable whether this characteristic is desirable in practicing doctors.

> We must ask... if such competition is always appropriate for a profession that is dedicated to the health and well-being of whole communities, not just to the satisfaction of individuals seeking attractive careers (Tekian, 1998b, p. 992).

Academic criteria have also been criticized for their failure in measuring desired characteristics of doctors beyond intellectual ability. Shatzman (1997) stated that admissions committees rely too heavily on grades and standardized tests in selecting students, and that schools should, instead, conduct careful examination of candidates' personality characteristics. The pitfalls of relying on academic standards were realized by the faculty of the University of Adelaide when they changed their curriculum to include a substantial commitment to problem-based and self-directed learning with an emphasis on communication skills. To their dismay, they found that a number of students who were selected because of high academic achievement did not possess these critical skills (Marley & Carman, 1999).

Through the inclusion of non-cognitive criteria in the admissions process, schools may be better able to eliminate applicants who appear qualified in academic standards, but are likely to be poor students and/or doctors because of emotional, motivational or attitudinal problems (Glick, 1994). McGaglie (1990a) indicated that these non-cognitive variables frequently defy objective measurement, but "are most conspicuous when absent" (p. 145).

Non-Cognitive Criteria

Numerous non-cognitive qualities have been identified as important characteristics of medical and veterinary students as well as practicing professionals. Marley and Carman (1999) reported that 75 percent of academic faculty indicate that problem solving, critical thinking, communication skills, personal integrity, and

empathy are essential characteristics, while a science background was rated as important by only 35 percent of faculty. McGaglie (1990b) indicated that the following qualitative categories distinguish medical excellence:

- Character and integrity
- Breadth of knowledge
- Leadership qualities
- Work habits and motivation to study
- Personality and attitude
- Orientation toward service
- Altruism
- Personal effectiveness

More specifically, Lazarus and Van Niekert (1986) compiled a list of personality and attitudinal prerequisites they felt were needed to succeed in medical school. These qualities consisted of the following:

- Maturity: (realistic self appraisal, self acceptance, emotionally stability)
- Integrity: (responsibility, honesty, humility, moral reasoning)
- Extroversion: (friendliness, enthusiasm, people oriented, interpersonal skills)
- Introversion motivation: (endurance, emotional stamina, achievement potential)
- Decisive: (authoritarianism)
- Flexible: (adaptability)
- Tolerance: (patience)
- Service Oriented: (psychosocial concern, helping personality)
- Empathy: (sensitivity, understanding, compassion)

Sedlacek & Prieto (1990) found the following non-cognitive variables help predict students' success in medical school:

- Positive self-concept or confidence

- Realistic self-appraisal
- Preference for long range goals over short term or immediate needs
- Availability of strong support person
- Successful leadership experience
- Demonstrated community service

In a similar vein, CSU's CVMBS created the following list of characteristics to assist the admissions committee define a successful veterinary student and doctor:

- Skill in oral and written communication
- Integrated general understanding of the world, its cultures and people
- An understanding of the concepts and principles of the biological sciences
- Knowledge base of veterinary medical science and comparative biomedicine
- Essentials of scientific and professional behavior to include thoroughness, reliability, efficiency and critical analysis
- Possess problem solving and critical thinking skills
- Experience in scientific investigation and scientific processes
- Skills in finding and using information and the management of information
- Skills and desire for sustained scholarship and lifelong commitment to learning and professional development
- Commitment to betterment of humanity and improvement of one's community, society and the profession
- Business and management skills including management of one's personal affairs
- Compassion for people, animals, and a reverence for life
- Personal integrity and high ethical standards

Clearly, non-cognitive characteristics, in addition to cognitive abilities, are essential to student and doctor success, yet...

> ... we have made no tangible progress in using qualitative variables in medical school admission since at least the 1960's. Research on the topic has been haphazard; references are scattered; and folklore, not data, defines the state-of-

> the-art. Systematic and cumulative research on the issue is conspicuous by its absence, despite widespread acknowledgement that nonacademic characteristics of medical students and physicians are a key feature of professional competence (McGaglie, 1990b, p. 148).

The research that has been conducted on non-cognitive factors has been inconsistent, leading many to question the use of such criteria (Edwards, Johnson & Molidor, 1990; Niedzwiedz & Friedman, 1976). Although some schools have used personality tests to assist admissions committees in gaining a better understanding of applicants' personality characteristics, the research supporting the use of these tests has been equivocal. While some studies have found these tests to possess some degree of predictive value in relation to clinical competence (Pollock, Bryne & Shanley, 1982) other studies have found them to have little predictive value (Aldrich, 1987; Weiss, Lotan, Kedar & Ben-Shakhar, 1988).

The importance of non-cognitive factors in the application process seems evident, however, in spite of the minimal progress that has been made in this area. Confer, Turnwald and Wollenburg (1999) found a significant correlation between subjective criteria and first year academic performance. They hypothesized that several nonacademic attributes, including commitment to a veterinary career, work ethic, previous experience, and maturity can greatly influence academic performance. Other factors such as well-being, responsibility, self-control, tolerance, nurturance, motivation, exposure to the profession, leadership, ability to overcome adversity, and community service have also been found to influence clinical performance in medical school (Elam, Andrykowski & Johnson, 1993; McGaglie, 1990b; Rezler, 1983; Shen & Comrey, 1997; Tekian, Mrtek, Syftestad, Foley & Sandlow, 1996; Walton, 1987).

In fact, some research has suggested that personality traits may be better predictors of clinical performance than prior academic performance (Conger & Fitz, 1963; Rhoades, 1974; Richards, Taylor & Price, 1962). Consequently, many medical and veterinary schools are currently questioning the traditional reliance on cognitive factors and past academic performance (Inui, et al., 1998). The variability in performance for students with similar GRE scores and GPAs clearly illustrates the fact that other factors influence academic performance. These additional predictor variables, although more difficult to measure, are critical components in the application process (Koenig, Sireci & Wiley, 1998). A selection procedure that allows for the inclusion of other applicant characteristics (e.g., work experiences, leadership qualities) in addition to cognitive variables makes sense in light of the lack of consistent evidence linking GPA and standardized test scores with school success (Davidson & Lewis, 1997; Rolfe, Pearson, O'Connell, & Dickinson, 1995). While some medical and veterinary schools now include more subjective qualities in addition to objective cognitive abilities when selecting students, this is by no means a universal practice. Many medical and veterinary schools are contemplating changes in their selection criteria, but are awaiting further evidence to help support such a change (Marley & Carman, 1999).

Those voicing opposition to the inclusion of subjective factors argue that although academic performance is only one factor in determining the success of medical students, including non-cognitive factors does little to improve prediction of academic success (Mavis & Doig, 1998; Zachary & Schaeffer, 1994). Kelman (1982) found that biographical information, including social history, relevant work

experience, and personal references, was unrelated to grades during the first two years or clinical work during the last two years. She suggested that admissions committees would be better served by focusing on pre-veterinary GPA and GRE scores. "Biographical information obtained on the application form contribute nothing to predicting later veterinary school performance, and interviewer ratings would be useful only if they were weighted negatively" (Kelman, 1982, p. 94). Zachary and Schaeffer (1994) indicated agreement with Kelman, stating that there is no justification for placing any weight on subjective factors in the evaluation of program applicants.

Applicant demographics. One component of non-cognitive characteristics is personal demographics (Nowacek & Sachs, 1990). The demographics often used for medical and veterinary schools include geographical location, age, gender, and ethnicity. Additionally, the type of employment applicants hope to obtain after graduation is sometimes factored into decisions pertaining to the demographics of an entering class of students (Nowacek & Sachs, 1990).

Geographical location is a factor for two important reasons. The first reason is based on research indicating that people who grow up in rural settings are more likely to practice in rural settings when they complete school (Rolfe, Pearson, O'Connell & Dickinson, 1995). Likewise, people who grow up in urban settings tend to practice in urban settings (Nowacek & Sachs, 1990). Schools, therefore, are encouraged to help maintain services received by rural areas by ensuring that rural applicants receive a fair chance of being admitted (Marley & Carman, 1999).

The second reason geographical location may be important is when applicants are applying to state funded schools. Often times, residents of the state in which the school is located are considered separately from other applicants. Additionally, some states combine to offer programs that benefit students who do not have a particular type of school in their home state. The Western Interstate Commission for Higher Education (WICHE) is one example. The WICHE professional student exchange program enables students in 13 western states to enroll in selected out of state professional programs, usually because those fields of study are not available at public institutions in their home states. These students pay reduced tuition, usually the same as resident tuition in public institutions, and the home state pays a support fee to the admitting schools to help defray the cost of the students' education. Each state determines the number of students they will support, with the number subject to change every year by legislative or administrative action. WICHE states include: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming.

Other applicant demographics have very different ramifications. Although it is illegal to discriminate against applicants based on age, gender or ethnicity, there are some long-held beliefs about each of these characteristics and the effect they have on success in medical and veterinary school. For example, medical schools have long discriminated against older applicants (Feil, Kristian & Mitchell, 1998), arguing that older students (over 23 years) have difficulty with rigorous classes and study routines because they have been out of school for a longer period of time. Researchers, however, have found no data to support the premise that medical students should be

young and have recently finished their undergraduate work (Neame, Powis & Bristow, 1992; Nowacek & Sachs, 1990). Although applicants aged 30 and older have been found to score lower on the MCAT and possess lower GPAs, they also have stronger reference letters and higher interview ratings. In school, older students perform slightly lower during their first year, but by the second year, there is no measurable difference (Ramsbottom-Lucier, Johnson, & Elam, 1995). These results led Feil and Kristian (1998) to conclude,

> [There] is no data to support any of the theories offered to defend discrimination against older students in admission to medical school. In fact, we suggest that medical schools consider the advantage of admitting older applicants... (p. 100).

Many older students are less concerned with grades and more interested in "real learning" and the thought processes that are associated with becoming a doctor. These students often report feeling that their age and life experiences enhance their clinical work and better prepare them to handle the demands of clients and patients (Feil & Kristian, 1998).

While age trends of veterinary students have changed slowly, gender trends in veterinary medicine have changed dramatically. Historically, women were thought to lack the qualities necessary to become effective doctors and were encouraged to become nurses or assistants, even though research has found no relationship between gender and pre-clinical or clinical performance (Nowacek & Sachs, 1990). Although the number of women entering medical school continues to increase, the growth is much more rapid in veterinary school. In 1985, 2354 men (i.e., 44 percent of the applicant pool) applied to veterinary school, only slightly lower than the number of women (2947, 56 percent) (Association of American Veterinary Medical Colleges,

1998). In 1999, however, 1846 (28 percent) men applied to veterinary school, compared to 4849 (72 percent) women (Association of American Veterinary Medical Colleges, 2000). With women comprising nearly 70 percent of veterinary medical college students, the field has the highest female representation of any health profession with the exception of pharmacy and nursing. It is expected that women will comprise nearly 50 percent of practicing veterinarians by the year 2004 (National Commission on Veterinary Economic Issues, 1999). Interestingly, The National Commission on Veterinary Economic Issues (1999) has reported a recent trend whereby males are being admitted to veterinary schools at slightly higher proportions than would be indicated by the percentage of male applicants.

The increase in female veterinary students is not mirrored by a similar increase in minority student representation. By 2020, it is predicted that one-third of the U.S. population will consist of ethnic minorities, yet the academic community appears to be making minimal progress in increasing the accessibility of medical and veterinary educational opportunities to these populations (Nusbaum, 1999; Tekian, 1998b). Minority students have been underrepresented relative to their numbers in the general population since the beginning of medical education in the U.S. (Cohen, 1997). Despite the fact that many veterinary schools have had minority recruitment programs in existence for over a decade, the national enrollment of minority students has remained around 8 percent (Association of American Veterinary Medical Colleges, 1995) , compared to the current minority population in the U.S. of 20 percent (Almanac, 1997).

The low number of underrepresented minority (URM) applicants and admitted students to medical and veterinary schools has led to a growing debate concerning to the practice of required standardized tests for all applicants, and even more broadly, questioning the fairness of the current system of evaluating cognitive ability (Tekian, 1998a). It has been argued that institutional racism has prevented minorities from demonstrating the same competence level as White non-Hispanics in traditional academic areas. Many URM students come from socioeconomic and educationally disadvantaged backgrounds. This can result in lower scores on standardized tests than non-URM students, thereby leading to increased difficulty in gaining admittance to medical school and poorer academic performance once enrolled (Tekian, 1998a). Furthermore, it has been found that academic predictors are less accurate of performance predictors for African-American students than Caucasian students (Webb et al., 1997). Tekian (1998a) convincingly argued that minority students' potential cannot be evaluated completely and fairly without measuring non-cognitive factors. Sedlacek and Prieto (1990) also concluded that because many minorities have had to demonstrate competence in non-cognitive areas, it is important that admissions committees look at other areas to assist in making admissions decisions. "A commitment to a large, diverse student body in a state institution means that students with MCAT scores and other predictors at levels associated with academic risk will be selected" (Tekian, Mrtek, Syftestad, Foley & Sandlow, 1996, p. S86-87).

Selecting a diverse student body includes more than ethnic diversity. Other examples of diversity include unique life experiences, leadership qualities, evidence of overcoming barriers such as poverty or physical disability, and fluency in multiple

languages (Davidson & Lewis, 1997). A study completed by The University of California, Davis School of Medicine evaluated students admitted under a large umbrella of special consideration admissions. This cohort of students included:

> ...minority students admitted under a traditional affirmative action race based preference. It also includes students with characteristics other than race that were deemed important enough to offer preferential admission despite lower objective scores. These applicants had MCAT or GPA scores that were less than the recommended minimum and were less than that of other applicants who were not offered admission" (Davidson & Lewis, 1997, p. 1154).

These students had lower graduation rates than other students, but the difference was quite small. While 98 percent of the "regular" admitted students graduated, 94 percent of the special consideration group graduated.

> The differences found...were more prominent in the basic science courses in the first and second years of the curriculum. The clinical courses in the third year of the curriculum continued to show differences but the two populations began to merge in their achievements in class work and test scores. After graduation, the residency experiences of the two populations were quite similar, with both populations equally likely to receive positive evaluations and no detectable difference in academic difficulty in their residency training program. By the time they had completed residency, the practice characteristics of the two populations were nearly identical (Davidson & Lewis, 1997, p.1158).

Studies like the one completed by Davidson and Lewis (1997) illustrate the fact that selection by academic history alone...

> ...is no longer desirable or equitable. When seats at medical schools continue to be in such high demand, there is a responsibility to provide equal opportunities to candidates from any school background and to allocate places to applicants who have made their own, clear, informed choice to purse a career in medicine (Marley & Carman, 1999, p. 459).

An emphasis on high preadmission academic scores may also lead to an increase in the proportion of students admitted from educationally advantaged schools and financially advantaged backgrounds. For example, relying on high standardized test scores tends to favor those students who are financially able to take the test more than

once. Schools that base the majority of their admissions decisions on academic ability, therefore, create disadvantages for minorities from lower socioeconomic groups, older applicants, those from less prestigious undergraduate colleges and students with non-science backgrounds (Marley & Carman, 1999; McManus, 1998).

In an effort to identify students with disadvantages, the CSU's CVMBS application asks prospective students to indicate if they have an economic, educational, or cultural/environmental disadvantage (http://www.cvmbs.colostate.edu). CSU's CVMBS defines economic disadvantages as:

> A demonstrated history of low income of applicant and family unit prior to college entrance and pre-veterinary education; level of financial support provided by applicant to the family unit prior to and during pre-veterinary education; if applicant has a major financial responsibility to a household; and history of financial aid.

Educational disadvantages are defined as:

> Inadequate early education because of frequent change of schools during elementary and secondary education; unusual number of hours of employment or necessitated other time commitments for supporting self or family unit during high school and pre-veterinary education; lack of exposure to academic role models and of participation in sound educational programs.

Disadvantages in cultural/environmental include:

> Born to immigrant parents; raised in an ethnic minority culture; raised in a family with English as a second language; experienced bi-cultural stress as a result of transition from a predominantly ethnic minority community to an academic environment; raised in an economically depressed area; raised by someone other than parents; raised in an environment lacking exposure to opportunities offered by higher education; raised in an environment of abuse such as alcohol, drugs, child abuse, and other physical abuse.

Combination of Cognitive and Non-cognitive Criteria

The question of whether cognitive or non-cognitive variables best predict veterinary and medical school success can be misleading because it mandates a choice of one or the other when it is likely that the best predictions come from the inclusion of both. Mitchell (1990) found that although there is "substantial predictive value of traditional academic predictors of performance in medical school... [this does] not suggest, however, that preadmission academic data should be used alone in selecting students" (p. 155). Similarly, Shane and Kearney (1989) reported that "neither subjective evaluation nor cumulative pre-veterinary GPA [are] valid predictors of academic achievement in the professional program" (p. 43). Instead, an examination of multiple data sources is suggested. A recent study confirmed these sentiments by indicating that a combination of preadmission GPA, selected GRE subtest scores, and non-cognitive criteria are better composite predictors than any one criterion alone (Confer, Turnwald & Wollenburg, 1999).

Most medical and veterinary schools do utilize non-cognitive factors to some degree in their admissions decisions. Non-cognitive factors are usually assessed through letters of recommendation, statements of purpose, essays, and supplemental information concerning extracurricular activities, work experience and volunteerism at school or in the community. Some schools hesitate, however, to place too much emphasis on non-cognitive characteristics fearing that subjectivity may contaminate what is believed to be a strictly objective system. Tekian (1998) argues that this concern is misplaced, "because all selection systems are intrinsically subjective" (p. 137). The inclusion of non-cognitive criteria is also supported by Willingham and

Breland (1977) who indicate that there is no inherent reason why non-cognitive factors must be capricious or unaccountable to the rules of equity and public scrutiny. As knowledgeable insiders, admissions committee members are fully capable of identifying personality characteristics needed for success, both in school and upon graduation (Antonovsky, 1987). The inclusion of non-cognitive factors, however, tends to run counter to customary American notions about the importance of objective measurement and classification. Schools, therefore, have been hesitant to incorporate additional non-cognitive qualities into their application process (McGaglie, 1990b).

Thresholds. Some medical and veterinary schools have chosen to use academic thresholds in order to include assessment of both cognitive and non-cognitive factors in their selection process (McGaglie, 1990b; Panel on the General Professional Education of the Physician, 1984; Ready & Nickens, 1996). It has been argued that a C+ cumulative GPA and average MCAT scores are sufficient to ensure adequate progress through a medical program, and therefore, applicants possessing basic academic levels can be selected on nonacademic factors without endangering graduation rates (Johnson, 1983). As Miller (1990) explained, "The most realistic resolution [of determining school admissions] appears to be that of a quantitative floor for screening and a qualitative superstructure for selection" (p. 136). Furthermore, within a pool of applicants who are all above the academic threshold necessary to succeed in school, differences in academic ability are unlikely to be of any practical importance (Glick, 1994). Within this same group, however, great variability in motivation, personality and character may exist and offer valuable tools in determining the best applicants.

The use of academic thresholds allows admissions committees the freedom to explore non-cognitive criteria by freeing up time to focus on fewer qualified applicants. As McCurdy (1997) explained, "Historically, those who have academic profiles that exceed the threshold are able to handle the academic rigors of medical school. But this tells us little about what kind of physician this person will make" (p. 1023). Ready and Nickens (1996) expand on this idea by noting,

> An admission process that systematically considers the MCAT scores and the GPA as threshold measures of academic competence, in conjunction with greater emphasis upon non-cognitive criteria, is likely to produce the most legally defensible, ethnically diverse, and highest quality student body possible... (p. 657).

Interviews. Personal interviews, for several reasons, are the most popular method for assessing non-cognitive applicant characteristics. Interviews are positive for public relations and they give individualized attention to applicants. They allow committee members the ability to use their experience to make judgments of non-cognitive variables seen in potential students (Glick, 1994). Furthermore, faculty members tend to have faith in their own judgment thereby feeling interviews are a useful component in the admissions process (Walton, 1987).

Considerable debate has been waged for and against the predictive value of interviews, however, and their place in the admissions process. Yet some researchers have found the interview to be a good predictor of academic achievement (Powis, Neame, Bristow & Murphy, 1988) and clinical performance (Meredith, Dunlap & Baker, 1981). For example, Hobfoll and Benor (1981) found candidates who were rated high on traits such as maturity, motivation, rapport, empathy, and integrity

through the interview process were more likely to have high clinical ratings compared to those who were rated low on these traits.

Some studies have found no correlation between interview ratings and grades (Hulland & Ilson, 1982; Walton, 1987), and others have actually found a negative correlation (Kelman, 1982). A study by Kelman and Canger (1994) found no correlation between interview ratings of student characteristics and clinicians' ratings on the same characteristics when the students were seniors. They also discovered that faculty could not perceive any differences on characteristics typically measured in the interview between a class admitted with an interview as part of the admissions process and a class admitted without an interview. They concluded that interviewing potential students was a poor use of faculty resources.

Letters of recommendation. Another avenue to gain information on applicants is through letters of recommendation, which are required by most medical and veterinary schools. These letters are used to gain general impressions of applicants' cognitive abilities and non-cognitive characteristics (Johnson, et al., 1998). Recommendation letters offer a personalized view of the applicant from the perspective of someone who knows the applicant well and is able to judge his or her academic and non-academic qualities. Some academicians question, however, the validity of these letters, especially when applicants are given advice to write their own letters. As Castellucci (2000) identified, many applicants are instructed to "...craft a letter extolling your virtues and accomplishments in detail" (p. 81). It is not surprising that recommendation letters have been found to be "biased, too flattering to their subjects, and not good predictors of performance" (Walton, 1987, p. 29).

Admissions Policies at CSU's CVMBS: General

Applicants to CSU's CVMBS are derived from three primary sources: Colorado residents, Western Interstate Commission for Higher Education (WICHE) residents, and residents of Non-sponsored states. Applicants are considered residents of Colorado if they have lived in Colorado for at least one year and have completed other residency requirements (e.g., obtained a Colorado driver's license, registered to vote in Colorado). Colorado has funded 75 positions in the CVMBS for the last several years.

The professional student exchange program, WICHE, enables students in 13 Western states to enroll in selected out-of-state professional programs and permits these students to pay reduced tuition. The number of funded WICHE positions at CSU's CVMBS has varied from 40 to 50 in the last several years. Non-sponsored applicants come from all other states and can also include applicants from Colorado or WICHE states who chose to be considered in the Non-sponsored applicant pool. Typically, initial offers are made to Non-sponsored students based on the perceived number of positions remaining after Colorado and WICHE student admissions. After the first round of offers to Colorado and WICHE residents have been made, the Admissions Board mails out second offers to Non-sponsored students to fill the remaining available positions. Due to the enormous expense for Non-sponsored students, many admissions committee members feel an obligation to fill as many of the available positions with Colorado and WICHE students who are not burdened with full out-of-state tuition expenses.

In addition to the regular application process, CSU's CVMBS offers two alternative options: Vet Start and VetPrep. Annually, Vet Start offers a maximum of five high school graduates early acceptance into the veterinary program. Students with disadvantaged backgrounds (economic, educational, or cultural/environmental) are given special consideration. Undergraduate and professional program tuition scholarships are given to all selected candidates. The program then provides guidance through a three-year undergraduate pre-veterinary curriculum at CSU. Students who successfully complete the program are guaranteed admission into the professional veterinary medical program.

VetPrep is a program that admits seven qualified, disadvantaged students who were previously denied admission to the PVM program. These students participate in a year-long program that helps to prepare them academically for the PVM curriculum. Upon successful completion of the program, these students are admitted into the CVMBS. Because the admissions process for Vet Start and VetPrep students is markedly different than the regular application process, these students were eliminated from all analyses used in this study.

Applicants for Veterinary Schools in the US: Graduating Years 1998 - 2002

One potential confound in comparing multiple years of applications is a change in the applicant pool during the examined years. Therefore, applicant numbers and characteristics for graduating classes 1998 - 2002 were examined. The number of vet school applicants between 1998 - 2002 (graduating years) has steadily increased every year, with the exception of 2000 (See Table 1). The number of applicants for the graduating year 1998 was 5428, compared to 6783 applicants for the graduating

class of 2002 (Association of American Veterinary Medical Colleges, 2000). The percentage of female applicants increased steadily between 1998 and 2002, from 67 percent to 70 percent. The number of minority applicants (African-American, Hispanic, Native American/Alaskan, Asian/Polynesian, and other) has remained around 10 percent for all years analyzed. The mean age of applicants has also remained fairly stable, from 25.0 (SD = 4) in 1998 to 24.2 (SD = 4) in 2002 (Association of American Veterinary Medical Colleges, 2000). As depicted in Table 1, CSU's CVMBS pool of applicants reflects national trends. Average GRE scores and undergraduate GPAs for CSU's CVMBS applicants between the years 1998 – 2002 are presented in Table 2.

CSU's CVMBS Subjective Admissions Policy

CSU's CVMBS subjective admissions policy was implemented in the Fall of 1997. Students are initially screened with the use of a loosely defined academic "threshold" of a 3.20 GPA. Applicants with GPAs less than 3.20 are occasionally admitted to the program, although this is unusual given the current quality of the applicant pool. GRE scores are also used to assess academic potential. The committee explains the use of GRE scores in the following manner:

> GRE scores are also part of the assessment of academic potential and there are three general categories into which GRE scores fall. The first is the most common and includes individual scores in the 500's and 600's. These scores are generally acknowledged as "competitive" and the committee member usually then moves on to more meaningful comparative academic information. The second situation is one in which the overall or an individual score is exceptionally low (low 400's or less). In combination with a less-than-average GPA, a low GRE score can contribute to a negative assessment of academic potential. The third category of GRE scores we generally see includes the "exceptionally high" overall or individual scores (usually over 700 on individual scores). These types of scores can contribute positively to the assessment of

> academic potential even with a lower than average GPA. It is generally recommended that non-admitted applicants retake the examination [GRE] if at least one individual score was less than 480 (CSU's CVMBS admissions material, 2000).

Applicants with low GRE scores and/or GPAs, who do not have special circumstances that might explain their low academic record, are denied admission. The remaining applications are divided into groups based upon the state in which an applicant resides (i.e., Colorado residents, WICHE states, and Non-sponsored states) and non-cognitive aspects are assessed.

Students are informed of the weight placed on non-cognitive abilities. The admission committee states,

> The first [basic responsibility] is to admit a group of applicants who have an optimal academic potential for completing the professional program. The second basic responsibility of the committee is to admit a population of students who have the greatest potential to contribute in a positive fashion to the veterinary profession (CSU's CVMBS admissions material, 2000).

The committee has summarized a number of qualities they feel are important in terms of a student's potential to become an "outstanding" veterinarian. These consist of the following:

- A sense of the importance of community service
- Demonstration of leadership qualities
- Possession of good social skills
- An understanding or insight about the veterinary profession, animals and their human owners
- Possession of excellent communication skills
- Potential to contribute to the profession in a unique or diverse fashion

The Admissions Committee feels it is important for potential students to have strengths in both cognitive and non-cognitive areas. "While strengths in one area of

the application may balance minor weaknesses in another, applicants must essentially convince the Committee that they can handle a rigorous science program and that they possess qualities the Committee associates with being an outstanding veterinarian" (CSU's CVMBS admissions material, 2000).

Unique among veterinary schools in the U.S., CSU's CVMBS admissions process is completely subjective in nature. To the author's knowledge, all other veterinary programs in North America use some type of objective ranking criteria to make selection decisions. The process at CSU's CVMBS involves subjective reviews of applications based on criteria discussed during Admissions Committee meetings prior to the review process. Two reviewers read each applicant file and assess candidates' qualities in a subjective manner and make an initial admissions decision based on that review, with no points or percentages applied.

CSU's CVMBS Admissions Committee. The Admissions Committee at CSU's CVMBS is comprised of 8-12 members and changes annually, although many individuals have remained on the Committee for several years. The Committee always includes at least one individual from outside the field (e.g., a leader from one of the campus advocacy offices), and one practicing veterinarian from the community. The Committee works in pairs, and every attempt is made to construct dyads from different backgrounds and positions (e.g., a clinical faculty member paired with a basic science faculty member).

After the applications are divided by residency status (Colorado, WICHE, and Non-sponsored), each pair of Committee members is given a sub-set of the total applicant pool. For example, one pair of reviewers might be given one-half of the

Colorado applications, with another pair of reviewers receiving the other half of Colorado applicants. A third group may be given the applications from one-half of the Non-sponsored states, etc. Each pair then divides their subset of applications in half and each member takes one-half of the pair's applications. Individually, the committee members read each application, focusing on the information listed below. After each reviewer finishes with his/her reviews, files are exchanged within pairs of reviewers so that each file is read by a minimum of two reviewers.

- Quality of academic program
  - Number and quality of upper division science courses
  - Degrees or certifications
  - Workload
  - Difficulty of courses/course load
  - Professional school
  - GPA
  - Recent academic performance
  - Diversity, breadth of coursework
  - Special consideration
- Extracurricular activities - achievements, community service, diversity
  - Leadership
  - Quantity, diversity of activities
  - Dedication to activities
  - Socially relevant activities
  - Work accomplishments
  - Diversity of life experiences
  - Geographical diversity
  - Family circumstances
- Work experience - veterinary, non-veterinary, non-animal
  - Veterinary interactions

- Knowledge, understanding of animals and/or their owners
- Diversity of veterinary, animal experiences
- Work experiences

- Essays and recommendation letters
  - Ability to communicate
  - Meaningful content
  - Realism, maturity
  - Depth of understanding of the profession
- Letters of recommendation
- Disadvantage claims
  - Economic, social and cultural disadvantages (includes learning and physical disabilities)
- Special circumstances
  - (e.g., lengthy illness resulting in class absence and poor academic performance in a semester, death of a family member, etc.)

After assessing the applications, each committee member completes an evaluation sheet for every application, whereby they judge each category as "strong" or "weak" and include any pertinent comments. The committee member, based on the preceding factors, subsequently divides the applications into one of three status categories: definitely admit, consider admit or interview, or deny. After both members in a pair have completed this process and met together to reach consensus on each applicant's status, the entire Committee comes together to establish the overall categories of "definitely admit", "consider admit or interview", and "deny."

WICHE resident applicants are then ranked and submitted to the main WICHE office. At this point, WICHE combines the rankings from CSU's CVMBS with rankings from veterinary schools in Oregon and Washington and determines to which applicants CSU's CVMBS may extend an offer. Non-resident applicants are handled

differently. The Committee members work together until they reach consensus on Non-sponsored applicants as to whom to admit, whom to rank as alternates, and whom to deny. Due to costs incurred by potential students, interviews are not offered to WICHE or Non-sponsored applicants.

The Colorado applicants from the "consider admit or interview" category are contacted in order to schedule an interview. Two Committee members, who are given a summary of the applicants' pertinent history, conduct each interview. The interviewers (usually different Committee members than those who read an applicant's file) are asked to indicate their opinions of the following areas on a continuum scale anchored on one end with "exceptional candidate" and the other end with "weak candidate."

- Views and insights about the veterinary profession
- Social responsibilities and dedication to professional service
- Social, people skills
- Ethical issues
- Previous preparation (work, volunteer, and academic)
- Unique qualities
- File review issues
- Suggestions/Comments for Improvement

The interview forms ask for an overall recommendation of "exceptional," "acceptable," or "weak." The two interviewers are asked to reach consensus prior to making a final judgment.

An interview question list is used as a guideline during the interview process. The actual wording of the guidelines has changed slightly every year, but for the years analyzed in the current study, the guidelines included the following main areas:

- Views and insights about the veterinary profession (e.g., "Why do you want to be a veterinarian? What are the current and future primary issues facing veterinarians?")
- Social responsibilities and dedication to professional service (e.g., "What is a veterinarian's role in the community? Define professionalism.")
- Social, people skills (e.g., "How do you deal with conflict? Explain your role as a group/team member.")
- Ethical issues (e.g., "Describe an ethical dilemma you've had to deal with in your veterinary volunteer experiences. How would you handle an unethical or misdiagnosed treatment of a case by another veterinarian?")
- Previous preparation (work, volunteer and academic) (e.g., "What courses have you liked the best/least? Describe a time in any class that you have taken in which you were faced with problems or stresses that tested your coping skills.")
- Unique qualities (e.g., "How will you uniquely contribute to veterinary medicine? Why should we select you out of the many applicants that we have?")
- File review issues
- Questions asked by applicant

CSU's CVMBS Objective Admissions Policy

The graduating class of 2000 was the last year admitted to CSU's CVMBS through an objective admissions system. The Admissions Committee during these years was similar in composition to that described under subjective admissions. Pairs of committee members assessed applications that met a GPA threshold of 3.2. Reviewers read each file and assigned points to major categories (i.e., program quality). Under each major quality, a list of items was offered to help reviewers focus on the appropriate items. Points were given for whole categories rather than for each individual sub-category. Two committee members read each application and if there

was a discrepancy between points allocated, a third reviewer was selected. Points were assigned as follows:

- Undergraduate GPA (0 - 700 points)
- GRE scores (0 - 200 points)
- Program quality (0 - 200 points)
  - Upper division science courses
  - Degrees or certifications
  - Workload
  - Difficulty of courses/course load
  - Professional school
  - GPA
  - Recent academic performance
  - Diversity, breadth of coursework
  - Special consideration
- Activities (0 - 200 points)
  - Leadership
  - Quantity, diversity of activities
  - Dedication to activities
  - Socially relevant activities
  - Work accomplishments
  - Diversity of life experiences
  - Economic disadvantage
  - Geographical diversity
  - Family circumstances
- Employment (0 - 200 points)
  - Veterinary interactions
  - Knowledge, understanding of animals and/or their owners
  - Diversity of veterinary, animal experiences
  - Work experiences
- Essays and Recommendation Letters (0 - 100 points)

- Ability to communicate
- Meaningful content
- Realism, maturity
- Depth of understanding of the profession

- Interview – when applicable (0 - 300 points)

After final points were calculated, applicants within each state were ranked. The names of the top ranked applicants from WICHE states were sent to the main WICHE office. The top-ranked applicants from Non-sponsored states were offered positions directly from CSU.

Top Colorado applicants (i.e., those with GPAs 3.70 and combined Quantitative and Analytic GRE score of 1500 or higher) were offered early admission positions without an interview. Other top Colorado applicants were given admission offers without an interview, but not as an early admit. The remaining Colorado applicants in the "consider or interview" category were offered interviews. Interviewers were provided with an interview question list to be used as a guide during the interview process.

Each of the interview categories listed below were worth a maximum of 25 points, for a total maximum score of 100 points per interview. In each category, applicants receiving a score of 0-5 were rated "poor," 6-10 were rated "fair, but below average," 11-15 were rated "average," 16-20 were rated "good, above average," and 21-25 were rated "excellent."

The four categories included:

- Poise, confidence, and social skill
- Communicative skill, oral verbal expression
- Problem-solving

- Social responsibility and dedication to professional service

Offers were made to Colorado residents after summing up applicants' total points based on their application, GPA, GRE and the interview.

Residency Status of CSU's CVMBS Applicants

The percentage of applicants drawn from Colorado, WICHE, and Non-sponsored states changes every year. The number of applicants for the graduating years 1998 – 2002 are presented in Table 3.

Since different procedures are used in selecting students from each of these applicant pools, it was felt likely that the groups may differ in applicant characteristics. In order to determine if group differences existed, data were aggregated over the graduating years 1998 – 2002 and one-way ANOVAs were conducted on the following variables: personal characteristics (i.e., age, ethnicity), school related variables (i.e., GRE scores, degrees earned), work experience (veterinary, non-veterinary, and non-animal), activities (college and community), letters of recommendation, and essays (writing ability and content). Grouped by residency status, several of these areas were statistically different (see Appendix A). Additionally, ANOVAs were conducted to determine differences between the objective years (1998 – 2000) and the subjective years (2001 – 2002) for each residency group (see Appendices B, C, and D).

Although there are statistically significant differences between WICHE, Colorado and Non-sponsored applications, the admissions policy at CSU's CVMBS applies to all applications and any evaluation of the school's subjective system, therefore, should entail evaluation of all applicants. As a result, all residency groups were

combined to compare the objective admissions procedure with the subjective admissions procedure.

Present Study

The literature pertaining to admissions policies within medical and veterinary schools illustrates the need for these schools to continue to move toward further inclusion of non-cognitive criteria in admissions decisions. Although students must clearly be capable of handling the academic workload of veterinary school, it appears that non-cognitive variables are equally, if not more important, to the success of veterinary students. CSU's CVMBS has long been aware of the importance of non-cognitive factors and the admissions committee has searched for ways to incorporate these variables into their objective evaluation process. In an effort to place non-cognitive factors as top priorities, the committee made the decision to become the only current veterinary school in the U.S. to use a totally subjective admissions process. Beginning in Fall 1997, the committee began to admit veterinary students using the same criteria they had employed previously, but no longer assigned numerical values to each part of applicants' files.

The present study was designed to assess this subjective procedure and compare it to the previously used objective system. The first component of the study (i.e., Part 1) compared student applications of the graduating classes 1998,1999, and 2000 (in which the objective admissions policy was in effect) with the applications of students in the graduating classes of 2001 and 2002 (in which the subjective admissions policy was in effect). This was accomplished through a comparison of undergraduate academic performance, work history, college and community activities, written

essays, and recommendation letters. It was hypothesized that few statistically significant differences between the groups would be found, indicating that the two systems are generally comparable in identifying prospective veterinary students.

The second component of the study (i.e., Part 2) compared students' performance in the veterinary program. This was done through a comparison of the graduation, dropout, and dismissal rates of students admitted in the "objective years" (i.e., 1998-2000) with those students admitted in the "subjective years" (i.e., 2001-2002). Additionally, cumulative GPA (through students' second year) and clinical rotation grades of students admitted in the "objective years" were compared to those of students admitted in the "subjective years."

CHAPTER II

METHOD

Coding

Two raters (college undergraduate students receiving research credit) independently coded all application categories and rotation grade sheets from which dependent measures were drawn. Kappa was calculated for all coded nominal variables, and averaged 0.97. Pearson correlations were calculated for all interval variables and averaged 0.98 (See Appendix E). Due to the extremely high agreement between raters (overall interrater reliability = 0.97), one coding set was randomly selected for statistical analyses.

Part I

Veterinary school applications from five years of admitted CSU CVMBS students were divided into two groups: objective admissions procedure (graduating years 1998-2000) and subjective admissions procedure (graduating years 2001-2002). To reduce potential confusion, all years refer to the year in which an applicant graduated or intended to graduate given the average program length of four years. Additionally, the "objective group" refers to the graduating years 1998 – 2000 and the "subjective group" refers to the graduating years 2001 – 2002 unless otherwise noted. The content of these students' applications was divided into cognitive/academic criteria and non-cognitive criteria. Cognitive criteria included the following (see Appendix F for detailed description of cognitive criteria variables):

- GRE (Analytic, Qualitative, Verbal)
- Undergraduate GPA (not including summers)
- Grades in upper level science and math courses (organic chemistry, genetics, biochemistry, and physics)
- Pre-veterinary Required Course Work (biosciences, chemistry, English composition, statistics/biostatistics, physics (including laboratory), and liberal arts)
- Credit Load (number of credits per semester)
- Work Load (number of hours worked per week)
- Degrees/majors obtained by applicants prior to veterinary school

Non-cognitive variables included the following (see Appendix G for detailed description):

- Applicant demographics (age, ethnicity, previous applications, disadvantage claims, and special circumstances)
- Work experience (veterinary, non-veterinary and non-animal – hours, positions, leadership, and species)
- Activities (college and community - hours, leadership, and social relevance)
- Recommendation letters (standard forms)
- Written essays (content and writing ability)

Part II

The second part of the analyses involved a comparison of the performance of the objective group with the subjective group in the CVMBS program. Measures of academic and clinical performance included (see Appendix H for detailed description):

- Veterinary school GPA
- Clinical Rotation Grades (checklist of completed objectives and written comments)
- Graduation Rate

Statistical Analyses

Analysis of Variance (ANOVAs) were conducted on interval data and Chi-Square tests of significance were performed on nominal data to determine statistically significant differences between subjective and objective admissions procedures. Effect size was calculated through R Squared (η^2) for interval data and Cramer's V (V) for nominal data. The decision to use ANOVAs instead of MONOVAs was made to increase the chances of detecting any statistically significant differences between the two admissions procedures and minimize the potential for Type 2 errors (i.e. whereby a false null hypothesis is not rejected; Norusis, 1998). Due to the exploratory nature of this study, significance level was placed at $p < .05$.

CHAPTER III

RESULTS

Part I

The first part of analysis involved the comparison of accepted applicants' files to determine if there are any significant differences in applications for the years in which they were evaluated objectively (1998, n = 130; 1999, n = 138; 2000, n = 135) and the years in which they were evaluated subjectively (2001, n = 133; 2002, n = 137). Total n for the objective group was 403 and the subjective group was 270.

Personal characteristics. As shown in Tables 4 and 5, results of statistical tests revealed that the subjective group contained significantly more students who had previously applied (40.8 percent versus 51.8 percent) than the objective group, although there was no difference in the number of previous applications. Likewise, there was no statistical difference in age (either actual age or the percentage of applicants under 25 years of age), degrees earned, diverse ethnicity, or number of students with disadvantage claims. There were significantly fewer special circumstances reported by applicants in the subjective group when compared to the objective group.

School variables. No statistically significant differences were found in degrees obtained prior to veterinary school (Table 6), undergraduate major, GPA within last four semesters, GRE analytic, GRE qualitative, GRE verbal, average number of credits per semester (Tables 7 and 8), and grades in organic chemistry, biochemistry,

GPA English composition, and GPA statistics. The subjective group was significantly higher in overall GPA, and grades in genetics, physics, GPA biosciences, GPA chemistry, GPA physics, and GPA liberal arts (Table 8).

Work experience. No statistically significant differences between the subjective and objective groups were found in the average number of hours worked per week, veterinary experience hours, veterinary experience leadership hours, non-veterinary experience hours, non-veterinary leadership hours, non-animal positions, non-animal customer-service hours, and non-animal leadership hours. The subjective group had a significantly higher number of veterinary experience positions and non-veterinary experience positions (Table 9).

Activities. Due to the change in which applicants in the graduating classes of 1998 and 1999 were instructed to report their activities, these years were excluded from activities analyses. Therefore, the graduating year 2000 was used to represent the objective group and compared to the graduating years 2001 and 2002. No statistically significant differences between the subjective and objective groups were found in college activities hours, college leadership hours, community activities hours, community leadership hours, and socially relevant community hours. The subjective group had significantly more socially relevant college activities (Table 10).

Essays and recommendation letters. No statistically significant differences between the subjective and objective groups were found when coders rated applicants' writing ability (grammar). There was a statistically significant difference in essay content whereas the subjective group received lower scores than the

objective group (Table 11). Recommendation form letters were not statistically different for the two groups (Table 12).

Part II

The second part of analyses consisted of the examination of differences between the subjective and objective groups in terms of veterinary school performance. Variables examined include graduation rates (including dismissals and drop-outs), overall GPA, and grades in two required rotations.

Graduation rates. A significantly higher number of students in the subjective group, when compared to the objective group, delayed their graduation (i.e., required more than four years to complete their degree; Table 13). There was no statistical difference between groups in the number of students who left the program, resulting in no differences in the graduation rate (Table 14).

Performance in veterinary school. No significant differences were found between the subjective and objective groups in terms of cumulative GPA in veterinary school, critical care scores, after hours scores, emergency medicine scores, critical care comments, after hours comments, emergency medicine comments, and anesthesia comments. The subjective group received statistically lower scores in anesthesia scores than the objective group (Table 15).

CHAPTER IV

DISCUSSION

The present study was designed to evaluate the subjective admissions procedure used by CSU's CVMBS and compare it to the previously employed objective admissions procedure. In order to evaluate these two procedures, applications from admitted students were grouped according to admissions procedure used (subjective: graduating classes 1998- 2000; objective: graduating classes 2001-2002).

Limitations

One limitation of the present study involves the fact that only five years of applicant data from one veterinary school were used to evaluate the two admissions procedures, thus limiting external validity of the findings. Additionally, since the subjective system is still relatively new, the class of 2001 was the only matriculated class to date that was admitted through the subjective admissions policy. Although the class of 2002 was included in the subjective group for most analyses (except graduation variables), this is still a comparatively limited sample. It is possible that these years do not accurately reflect the policy's impact. In fact, it is likely that the first year of the subjective system was a learning experience for the admissions committee and the CVMBS program, generally.

Another limitation of the current study is the inability to control for potential historical changes and influences which may have confounded the present results. For example, the number of students nationwide who require more than four years to

complete an undergraduate degree has increased in recent years (Hall, 1999; Melton, 2000). This trend may have influenced results leading to differences between the subjective and objective groups in length of time to graduate. Although it is possible that the subjective system selects students who require more time to complete their degrees, this difference may simply be a reflection of a larger trend in higher education. Lastly, the composition of the applicant pool was not the same every year. Numerous factors influenced the number of total applicants (e.g., WICHE states' legislators, changes in the application process for veterinary schools nationwide). Likewise, the Admissions Committee was similar, but not exactly the same, during the years analyzed. These limitations clearly point to the need for additional research to more fully understand the effects of a subjective admissions policy. The present study, however, is an important first step in evaluating the subjective admissions system.

Part 1

The primary categories analyzed in the applications for the objective and subjective years included personal characteristics, school variables, work experience, activities, essays, and recommendation letters.

Personal characteristics. The personal characteristics categories that were statistically different for the subjective group as compared to the objective group were the number of applicants who had applied previously and the number of applicants who indicated they had some type of special circumstances. More students who had applied previously were admitted in the subjective years than those admitted in the objective years. This increase reflects a national trend in the number of repeat

applicants. In 1995, 26 percent of the total U.S. veterinary applicant pool was comprised of repeat applicants. This percentage grew to 29 percent in 1997 and 35 percent in 1999 (AAVMC, 1999). In turn, the number of repeat applicants most likely reflects an overall increase in the numbers of applicants during this period (i.e., more applicants applied per position, so fewer applicants were admitted and thus forced to reapply).

The other personal characteristic found to be statistically different in the two groups was that of special characteristics whereby the subjective group had a statistically lower number of admitted students with special circumstances than the objective group. While these results suggest that the subjective system might not be as conducive as the objective system in admitting students with special circumstances, closer inspection of the data indicates that this might not be the case. When the years 2001 and 2002 were analyzed separately, a more detailed picture emerged. In 2001, only 4 percent of admitted students reported a special circumstance. This number increased to 17 percent in 2002; a dramatic increase over the preceding year and a moderate increase over the years when the objective system was in effect. It is possible that Committee members struggled with how best to integrate special circumstances into a subjective admissions policy, resulting in a decreased number of students with special circumstances during the first year of the subjective system. The fact that the number of special circumstances increased dramatically the following year suggests that the year 2001 was perhaps an anomaly.

Although there was not a statistically significant difference in the number of students who reported a disadvantage claim during the subjective years compared to

objective years, the trend in the data was similar to that found for special circumstances. Nine percent of the students in the class of 2001 claimed a disadvantage, compared to 12 percent in 2002. Even though it is too early in the transition to the subjective system to adequately predict whether this trend will continue, it is encouraging to find that one of the goals of the subjective system, namely increased diversity, appears to be advancing in a positive direction.

Interestingly, the lack of age difference, specifically the number of applicants over 25 years of age, found between the subjective group and the objective groups can be seen as a positive factor in the quest for increased diversification. The number of applicants over 25 years of age increased from 48 percent in the objective group to 53 percent in the subjective group despite the fact that the number of veterinary applicants nationally *under* 25 years of age had steadily increased during these years. Slightly more than 55 percent of U.S. applicants in 1995 were under 25 years of age, compared to 68 percent of U.S. applicants in 1999 (AAVMC, 1999). Given this national trend, it appears that the subjective admissions process had a positive impact in promoting age diversity.

Another component of diversity is ethnicity; a form of diversity that veterinary schools have been struggling to increase for many years. While medical schools have made significant advances in the ethnic diversification of their classes, veterinary schools have been unable to achieve similar diversity goals. This is thought to be at least partially attributable to differences in ethnic composition of medical and veterinary applicant pools. Minority applicants (African-American, Hispanic, American Indian/Alaskan, and Asian/Pacific Islander) comprise approximately one-

third of medical school applicants, but only one-tenth of veterinary school applicants (AAVMC, 1999).

Results indicate no difference between the subjective system and the objective system in the percentage of admitted ethnic minority students. It has been acknowledged that traditional recruiting and admissions procedures have not been as successful with most minority populations as they have been with Caucasians (Guerrero, 1998). It has therefore been suggested that other avenues beyond traditional recruitment methods are needed to increase the number of minority students in veterinary medicine. This has been one of the arguments used to support the development of such programs as Vet Start and VetPrep at CSU. Although applicants from these programs were not included in this study due to the unique ways these students are assessed and admitted, it is important to note the presence of these programs and the positive impact they have had on increasing ethnic diversity.

Undergraduate academic concentration can be another source of diversity. Traditionally, the majority of veterinary school applicants have had an undergraduate bioscience major. As long as students can successfully complete upper-division bioscience classes, one avenue toward increasing diversity is to broaden the breadth of acceptable undergraduate majors and degrees to include non-bioscience fields. Perhaps through combining knowledge and skills obtained in non-bioscience areas with those traditionally acquired by veterinary students, a class comprised of students with diverse educational backgrounds can help create an enriched academic experience for all students. The subjective system appears to promote this type of diversity. Applicants with a dual bioscience and non-bioscience background, or a

non-bioscience background only, increased from 19 percent in the objective group to 25 percent in the subjective group.

School variables. Overall, few changes were found between the objective and subjective groups in terms of school variables. The type of degree earned by applicants (e.g., BS, MS) and overall undergraduate GPA remained similar although recent GPA (i.e., last four semesters) increased slightly in the subjective years. Specific upper-division science class grades (i.e., genetics, physics, organic chemistry, biology) in the subjective group were either slightly higher or equivalent to those in the objective group. Grades in all of the prerequisite areas (i.e., GPA biological science, GPA chemistry, GPA liberal arts, and GPA physics) were approximately one-tenth of a point higher in the subjective group as compared to the objective group. Although these increases were statistically significant, it is not known whether the subjective system selects students with higher grades. These increases may reflect trends in grade inflation, or come as a result of the increased competition due to increases in the numbers of applications since the onset of the subjective system. It appears, however, that the subjective admissions procedure does not have a negative impact on incoming classes' past academic performance.

Work experience. The veterinary application divides previous work experience into veterinary, non-veterinary animal related, and non-animal related. The number of positions and hours for each type of work experience, in addition to leadership hours (for all experience types) and customer-service hours (non-animal only) were calculated. The only differences found between the two groups were statistically significant increases in the number of veterinary and non-veterinary positions for the

subjective group when compared to the objective group. The number of positions, instead of the total number of hours, may more accurately reflect diverse work experiences. Therefore, although the number of total hours of animal-related experience reported by applicants remained consistent, the number of positions, and possibly the number of new experiences, increased under the subjective policy.

Activities. College and community service activities are included in the veterinary medicine application to provide a more complete picture of each applicant. When comparisons were made between the subjective group and objective group, the number of hours recorded for college and community activities were essentially equivalent. In addition to total hours, activities were coded as either high or low in social relevance. The number of socially relevant college activity hours was significantly higher in the subjective group, while the number of socially relevant community activities stayed the same. No differences were found in the number of college or community leadership hours for the subjective vs. the objective group.

Although the inclusion of college and community involvement is a critical piece in the evaluative process, the different ways in which applicants appeared to define activities created a wide range of stated experiences and hours of involvement. For example, some applicants included recreational sports (e.g., bike riding) or church membership. Some applicants gave the number of hours they participated in these activities (often in the thousands), while other applicants indicated they were involved in an activity, but did not designate the specific number of hours. Perhaps the use of activities within the admissions process may be more helpful if the term is more clearly defined or if subcategories are included. Additionally, if the Admissions

Committee feels that certain types of activities are important (i.e., charity work), it might be beneficial to ask for that information directly in order to make more accurate comparisons among applicants.

Essays. Another avenue used by committee members to evaluate applicants is the personal essay. The writing ability (grammar, flow) and content (maturity, message) of these essays were compared across groups. The percentage of essays in the objective group rated as "poor" was less than the percentage found in the subjective group yet the number of essays rated "good" in content was significantly higher in the objective group vs. the subjective group. One possible explanation is that applicants selected via the subjective system do not write as well as those selected objectively, although this seems unlikely due to the applicants' similar GRE – Verbal scores. Another possible explanation lies with the essay options given for the graduating classes of 1998 and 1999 compared to the graduating classes of 2000-2002. During this time, the options for essays changed, with one less option available to applicants during the subjective years 2000-2002. One essay question that remained constant during all applicant years analyzed was one that asked for a description of a personally admired veterinarian. It became apparent during the coding procedure that the answers given to this question were very similar to one another, and therefore, most of these essays were coded as "average." By decreasing the number of other options, it is likely that applicants chose this question more frequently during the subjective years than in the prior years when the objective system was in effect. Therefore, it is possible that the increase in "average" essay content was due to the change in essay choices and not the writing ability of applicants.

Recommendation letters. The recommendation letter summary forms changed throughout the years analyzed, creating the need to limit the years analyzed. Therefore, the graduating class of 2000 was compared to the graduating class of 2002, with no statistically significant differences found in the individual items rated by applicants' references. However, due to the "halo effect" found in letters of recommendation and minimal variance in ratings, the importance of this information in making admissions decisions is somewhat questionable.

Part 2

The second part of the study investigated applicants' performance within the veterinary program. Data used for these analyses included graduation variables, GPA, and clinical evaluations.

Graduation Rates. A statistically higher number of students in the subjective group, compared to the objective group, required more than four years to complete their degree because of medical concerns, academic problems, or acquiring a combined degree. There was not, however, a statistically significant difference between groups in the percentage of students who ultimately graduated. Although it is possible that the subjective system selects students with a higher propensity for delayed graduation, it is also possible that this reflects a larger trend. As indicated earlier, national trends reveal that the number of years students require for postsecondary degrees is increasing, thereby reducing the number of students who complete a traditional university program in four years (Hill, 1999; Melton, 2000).

Performance in veterinary school. No statistically significant differences were found between the objective and subjective groups in overall GPA or in clinical

rotation grades (i.e. scores and written comments), with the exception of anesthesia rotation scores. Although there was no statistically significant difference in anesthesia faculty's written comments, there was a significant decline in anesthesia scores between the objective and subjective groups. The reason for this decline is unclear. It is possible that students admitted in the subjective group perform worse in the anesthesia rotation than students in the objective group, yet no other rotation scores or written comments (including anesthesia written comments) were significantly different across the two groups. Another possibility is that this decline may be due to changes within the faculty or Anesthesia department. Although the same four faculty members were in charge of assigning rotation grades for the years analyzed, it was not possible to determine which faculty member actually assigned the grade for each week. Therefore, it is possible that the percentage of rotations evaluated by each faculty member failed to remain constant. Because the faculty had different styles of interacting with students and critiquing their performance, it is possible that a change in teaching assignments for each faculty member could have impacted rotation grades. Further analysis of student performance in the anesthesia rotation over the next few years will be important to more clearly understand the relationship between admissions procedures and anesthesia scores.

Conclusion

The current study was designed to compare two admissions policies that have been utilized at CSU's CVMBS through the assessment of admitted students' characteristics and their performance in veterinary school. The subjective system appears to allow the admissions committee to select students with similar

prerequisites, who perform equally well in veterinary school, as those students selected by an objective system. Therefore, if both systems are equivalent within these parameters, does it matter which system is used? There are several reasons, including issues of diversity and perceptions of committee members and applicants, that favor the use of a subjective admissions policy.

As discussed previously, one of the goals of the subjective system is to create greater student diversification. In fact, much of the impetus for implementing the subjective system was due to changes in affirmative action laws. Although a complete description and analysis of affirmative action is beyond the scope of this study, it is important to recognize the impact of this issue within the educational system. Bakke v. The Regents of the University of California (1976) is often referred to as the case in which affirmative action was defined by the Supreme Court. In response to Bakke (1976), Justice Powell indicated that minority racial or ethnic status could constitute a "plus" in an applicant's admissions file. It was reasoned that special admissions programs were appropriate when colleges could not achieve their objectives without the use of race-conscious measures. Justice Blackmun explained, "...to get beyond racism we must first take account of race. There is no other way. And in order to treat some persons equally, we must first treat them differently" (Bakke v. The Regents of the University of California, 1976, p. 407). However, through several additional court cases, it became clear that race or ethnic background should constitute only one element in the selection process, and that individual comparisons among applicants should not result in the systematic exclusion of any certain group. For example, Proposition 209, voted in by Californians in 1996, prohibited preferences based on

race, sex, color, ethnicity or national origin in education admissions (Pavela, 1998). Part of the problem with affirmative action is that many individuals feel that the focus on race does not address the larger segregation issue, namely that of socioeconomic level. Many feel that the true meaning of the Bakke case is to support broad diversity goals not limited to ethnic diversity. Instead of race-based solutions to remedy the lack of diversity, schools have been instructed to reach for "diversity along a broader spectrum to include individuals who have experienced educational disadvantage as a result of poverty, geographic location, physical disability, sexual orientation and similar factors" (Kolling, 1998, p. 30). Ideally, this quest for diversity should not result in lower admissions criteria for minority candidates, but instead lead to the reconstitution of admissions criteria for all candidates (Bickel, 1998).

Why the tremendous effort to create more diverse classrooms? One reason rests with the argument that the quality of education improves as a result of a diverse student body. Students learn more in a class with diverse classmates then they learn in a class with students similar to themselves (Bowen, 1999). Another critical reason is the need for increased numbers of diverse talented, educated people in the mainstream of American society (Bowen, 1999).

One argument against the inclusion of diversity in the application process is that of merit. Applicants, it is argued, should be evaluated purely on merit, usually defined in academic settings as being "book/test smart." Although this definition of merit superficially appears to be fair and just, it does not include the myriad of other characteristics important to consider. While some people criticize admissions decisions based on indices other than academic as unfair, others argue that a fair

system judges every individual according to a consistent set of criteria that reflect the objectives of the college. Fairness, therefore, does not preclude certain criteria; it indicates that the same criteria should be used for everyone. This does not imply that all applicants must be judged in isolation from others. For example, it may be seen as fair to reject an applicant because the college already has many other students similar to the one under consideration. Merit, in this case, would depend on what a particular incoming class needs in order to achieve the variety desired. As stated by Bowen (1999), "in choosing individuals, all their attributes are relevant, including the multiple groups to which they belong and the relationship of their attributes to those of the other people being considered" (p. 144). Stern (2001) echoed these sentiments, indicating that looking beyond cognitive criteria does not compromise admissions standards, but does create pressure for colleges to change their admissions policies. Through the development of a subjective admissions system, CSU's CVMBS appears to have successfully created an admissions policy that allows a broader definition of merit, thereby creating greater class diversification, for the benefit of all students. The subjective system allows the committee to evaluate applicants as individuals, perhaps partially explaining why committee members report they prefer the subjective system to the previous objective system.

Committee members who have served on the Admissions Committee during both objective and subjective policy years report feeling more personal commitment to the subjective admissions process. Part of this satisfaction, they report, is due to the perception of increased fairness (i.e., the ability to incorporate all of an applicants' information into a final decision) and decreased bias in the admissions process. When

committee members were involved in the objective system, the distribution of application files was similar to that of the subjective system. Following distribution, each pair of committee members independently rated a group of applications, giving points for each part of the application in a previously discussed manner. After they had completed their point sheets, members exchanged files so that each file was rated twice. If the number of points given by the two committee members were discrepant, a third rater was asked to complete a point sheet. However, due to the need to remain objective and analytical, raters rarely discussed individual applications. Due to the nature of the system, discussion was felt to be unnecessary because it was an *objective* system. The only objective reason to discuss a file would be to discuss a mathematical error.

Under the current subjective system, two members still read and evaluate each application based on previously discussed and established criteria. A critical difference between the two systems, however, lies with the Committee interactions after having read their assigned applicant files. Due to the nature of the subjective system, the committee members are encouraged to talk, defend and argue about "their" applicants, especially the ones that are not a clearly defined "admit" or "deny." Each time they meet as a group and talk about application files, it gives the Committee an opportunity to refine their collectively agreed upon criteria, thereby limiting the biases that were possible when Committee members were independently rating files. What was once an isolated, removed process has been transformed into one of interaction and involvement. It is not surprising, therefore, that committee members feel more vested.

The subjective system appears to take a comparable amount of time when compared to the objective system, yet because the committee members feel better about their ability to make fair decisions, they are more likely to give the time and effort admissions decisions require. At this early stage, though, it is not certain which process is actually more time consuming because the number of applicants and the time of the year in which applications are received have not stayed consistent. Further analysis to determine differences in time commitment under the new system is needed. What does seem certain, however, is that the committee members favor the subjective system; particularly the checks and balances as well as the opportunity to contribute to the future of veterinary medicine.

In addition to the Committee members, the applicants themselves have indicated they prefer the new system to the objective system. They seem to realize that they have an opportunity explain themselves. The CVMBS's application has a designated area to indicate disadvantage claims and another separate area to report any special circumstances. This space was added to the application to encourage students to explain anything that they feel is important for committee members to know in order to view their application fairly. Applicants are able to explain their relevant personal history and describe their own diversity. As a result, the admissions committee has a more complete application. The committee can therefore make a decision based on all the unique aspects that meld to create that applicant, and make a fair decision based on previously established criteria that encompasses the truly important components of successful veterinary students and capable, accomplished veterinarians.

As veterinary schools continue to search for alternatives to traditional admissions policies that rely primarily on academic performance, perhaps they will find a solution in a subjective admissions system that allows for better communication among admissions committees, and the opportunity to create classes of students with the diverse talents called upon in the field of veterinary medicine.

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Table 1

Demographics of US and CSU's CVMBS Applicants for Graduating Years 1998 - 2002

Year	Source	Number	Males	Females	Ethnic Minorities
1998	US	5428	1810 (33.35%)	3618 (66.65%)	603 (11.11%)
	CSU	656	162 (24.63%)	494 (75.37%)	69 (10.57%)
1999	US	6634	2158 (32.53%)	4476 (67.47%)	567 (8.55%)
	CSU	764	237 (31.02%)	527 (68.98%)	85 (11.13%)
2000	US	6424	2027 (31.55%)	4397 (68.45%)	721 (11.22%)
	CSU	746	214 (28.69%)	532 (71.31%)	78 (10.46%)
2001	US	6630	2005 (30.24%)	4625 (69.76%)	704 (10.62%)
	CSU	758	193 (25.46%)	565 (74.54%)	69 (9.10%)
2002	US	6783	2015 (29.71%)	4768 (70.29%)	745 (10.98%)
	CSU	804	199 (24.75%)	605 (75.25%)	85 (10.57%)

Table 2

Average GPAs and GRE scores for CSU's CVMBS Applicants for Graduating Years 1998 - 2002

Year	Applicants	GPA	GRE Verbal	GRE Quantitative	GRE Analytic
1998	656	3.31	507	574	602
1999	764	3.36	499	582	608
2000	746	3.36	504	594	617
2001	758	3.43	504	558	578
2002	804	3.41	507	602	621

Table 3

Residency Status of CSU's CVMBS Applicants for Graduating Years 1998 - 2002

Year	Colorado	WICHE	Non-Sponsored	Total
1998	56 (44.4%)	34 (27.0%)	36 (28.6%)	126
1999	61 (44.9%)	51 (37.5%)	24 (17.6%)	136
2000	63 (46.7%)	51 (37.8%)	21 (15.6%)	135
2001	73 (56.6%)	43 (33.3%)	13 (10.1%)	129
2002	65 (53.7%)	43 (35.5%)	13 (10.7%)	121

Table 4

Personal Characteristics of Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective		X^2 or F (df)
Previously applied*	n= 62	(40.8%)	n= 129	(51.8%)	X^2 = 7.48 (1) p < .01
Times applied	M= 1.51	SD= .84	M= 1.60	SD= .92	F = .91 (1,289) p = ns
Age	M= 25.90	SD= 4.89	M= 26.00	SD= 4.64	F = .064 (1,645) p = ns
Age – under 25	n= 206	(51.9%)	n = 117	(46.8%)	X^2 = 1.59 (1) p = ns
Disadvantage claims	n= 25	(6.3%)	n = 25	(10.0%)	X^2 = 2.95 (1) p = ns
Special circumstances**	n= 65	(16.5%)	n = 25	(10.0%)	X^2 = 5.31 (1) p < .05

* V = .108

** V = .091

Table 5

Ethnicity of Applicants Admitted Using Objective Versus Subjective Admissions Policies

Ethnicity*	Objective		Subjective	
Caucasian	n = 346	(88.0%)	n = 222	(88.8%)
Non-Caucasian	n = 47	(12.0%)	n = 28	(11.2%)
American Indian	n = 6	(1.5%)	n = 4	(1.6%)
Asian American	n = 15	(3.8%)	n = 6	(2.4%)
African American	---	---	---	---
Hispanic	n = 19	(4.8%)	n = 13	(5.2%)
Other	n = 7	(1.8%)	n = 5	(2.0%)

* $X^2 = 0.09$ (1), p = ns

Table 6

Degrees Earned Prior to Veterinary School of Applicants Admitted

Using Objective Versus Subjective Admissions Policies

	Objective		Subjective	
Degree earned*				
Less than BA/BS	n = 54	(13.6%)	n = 27	(10.8%)
BA/BS	n = 290	(73.0%)	n = 200	(80.0%)
MA/MS	n = 47	(11.8%)	n = 18	(7.2%)
PhD/MD	--	--	--	--
Other	n=6	(1.5%)	n = 5	(2.0%)

* X (3) = 5.44, p = ns

Table 7

Undergraduate Major, GPA, and GRE Scores of Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective		X^2 or F (df)
Major					$X^2 = 5.56$ (2) p = ns
Bioscience	n = 319	(80.8%)	n = 186	(74.7%)	
Non-Bioscience	n = 6	(1.5%)	n = 10	(4.0%)	
Combination	n = 70	(17.7%)	n = 53	(21.3%)	
GRE analytic	M = 632.53	SD = 82.64	M = 633.60	SD = 92.96	F = 0.02 (1,639) p = ns
GRE qualitative	M = 608.72	SD = 79.33	M = 617.04	SD = 82.59	F = 1.62 (1,638) p = ns
GRE verbal	M = 529.13	SD = 86.81	M = 519.68	SD = 85.82	F = 1.82 (1,639) p = ns
Number credits per semester	M = 13.79	SD = 2.41	M = 13.63	SD = 2.15	F = .725 (1,644) p = ns
Overall GPA*	M = 3.64	SD = .24	M = 3.68	SD = .24	F = 4.03 (1,645) p < .05
GPA: last four semesters	M = 3.60	SD = .29	M = 3.64	SD = .29	F = 3.63 (1,638) p = ns

* $\eta^2 = .006$

Table 8

Undergraduate Grades of Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	F (df)	η^2
Organic chemistry	M = 3.07	M = 3.17	F = 2.15 (1,612)	
	SD = .83	SD = .84	p = ns	
Biochemistry	M = 3.23	M = 3.34	F = 2.86 (1,556)	
	SD = .76	SD = .69	p = ns	
Genetics	M = 3.48	M = 3.64	F = 8.84 (1,619)	η^2= .014
	SD = .69	SD = .57	p < .005	
Physics	M = 3.36	M = 3.51	F = 7.23 (1,624)	η^2= .011
	SD = .72	SD = .63	p < .01	
GPA English	M = 3.57	M = 3.61	F = .659 (1,593)	
	SD = .57	SD = .58	p = ns	
GPA statistics	M = 3.56	M = 3.54	F = .064 (1,625)	
	SD = .62	SD = .64	p = ns	
GPA biosciences	M = 3.59	M = 3.70	F = 8.22 (1,643)	η^2= .013
	SD = .48	SD = .44	p < .005	
GPA chemistry	M = 3.39	M = 3.48	F = 3.87 (1,633)	η^2= .006
	SD = .58	SD = .55	p < .05	
GPA liberal arts	M = 3.77	M = 3.82	F = 3.83 (1,644)	η^2= .006
	SD = .33	SD = .31	p < .05	
GPA physics	M = 3.42	M = 3.55	F = 6.49 (1,626)	η^2= .010
	SD = .65	SD = .59	p < .01	

Table 9

Work Experience of Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective		
	M	SD	M	SD	F
Work hours per week	17.17	10.20	18.56	10.83	F= 2.69 (1,643) p = ns
Veterinary positions*	3.05	2.02	3.74	2.17	F= 16.62 (1,643) p < .001
Veterinary hours	2581.84	4130.65	2753.92	3427.41	F= 0.30 (1,640) p = ns
Veterinary leadership hours	54.85	560.08	140.26	1790.15	F= 0.78 (1,643) p = ns
Non-veterinary positions**	3.97	2.89	5.09	3.12	F= 21.40 (1,640) p < .001
Non-veterinary hours	5254.27	9907.99	5343.25	8384.74	F= 0.01 (1,639) p = ns
Non-veterinary leadership hours	395.42	2064.19	381.78	1816.70	F= 0.01 (1,639) p = ns
Non-animal positions	4.42	2.75	4.61	2.68	F= 0.70 (1,644) p = ns
Non-animal leadership hours	2269.34	9886.04	1816.72	4181.72	F= 0.47 (1,643) p = ns
Customer-service hours	3212.75	10158.25	2667.15	4052.91	F= 0.67 (1,644) p = ns

* $\eta^2 = .025$

** $\eta^2 = .032$

Table 10

College and Community Activities of Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective		
	M	SD	M	SD	F (df)
College – total hours	1045.47	1209.92	1314.64	1784.42	F = 2.45 (1,643) p = ns
College - leadership hours	236.19	610.62	339.57	949.37	F = 1. 30 (1,642) p = ns
College - socially relevant*	1054.17	1208.93	1453.25	1961.12	F = 4.60 (1,640) p < .05
Community - total hours	1200.97	3306.98	1202.56	2282.92	F = 0 (1,643) p = ns
Community - leadership hours	539.89	2978.39	362.07	1304.10	F = 0.66 (1,642) p = ns
Community - socially relevant	1499.59	3742.17	2120.52	3828.15	F = 2.31 (1,639) p = ns

* $\eta^2 = .012$

Table 11

Written Essays of Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective		X^2 or F (df)
Writing ability					$X^2 = 2.36$ (2)
					$p = ns$
Poor	$n = 49$	(12.4%)	$n = 22$	(8.8%)	
Average	$n = 236$	(59.6%)	$n = 157$	(62.8%)	
Good	$n = 111$	(28.09%)	$n = 71$	(28.4%)	
Content					$X^2 = 7.74$ (2)
					$p < .05$
Poor	$n = 30$	(7.6%)	$n = 10$	(4.0%)	$X^2 = 3.35$ (1)
					$p = ns$
Average*	$n = 269$	(67.9%)	$n = 194$	(77.6%)	$X^2 = 7.30$ (1)
					$p < .05$
Good	$n = 97$	(24.5%)	$n = 46$	(18.4%)	$X^2 = 3.24$ (1)
					$p = ns$

* $V = .106$

Table 12

Recommendation Letters of Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	X^2 or F (df)
Intellectual ability	M = 4.76	M = 4.78	F = 0.22 (1,262)
	SD = 0.27	SD = 0.28	p = ns
Motivation	M = 4.90	M = 4.91	F = 0.11 (1,260)
	SD = 0.19	SD = 0.20	p = ns
Initiative	M = 4.82	M = 4.84	F = 0.43 (1,262)
	SD = 0.26	SD = 0.25	p = ns
Perseverance	M = 4.87	M = 4.87	F = 0.03 (1,262)
	SD = 0.21	SD = 0.24	p = ns
Emotional stability	M = 4.82	M = 4.82	F = 0 (1,262)
	SD = 0.23	SD = 0.27	p = ns
Honesty and integrity	M = 4.94	M = 4.94	F = 0 (1,262)
	SD = 0.14	SD = 0.15	p = ns
Ability to work w/others	M = 4.85	M = 4.88	F = 0.67 (1,262)
	SD = 0.25	SD = 0.23	p = ns
Ability to listen and follow	M = 4.88	M = 4.89	F = 0.26 (1,261)
directions	SD = 0.21	SD = 0.21	p = ns

Table 13

Delayed Graduation Variables of Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective		
	n	Percent	n	Percent	X^2 (df)
Graduate in four years*	393	(99.0%)	240	(96.0%)	$X^2 = 6.49$ (1) $p < .01$
Delay					
Combined degree	0	--	2	(0.8%)	$X^2 = 3.19$ (1) $p = ns$
Medical	1	(0.3%)	3	(1.2%)	$X^2 = 0.22$ (1) $p = ns$
Family/personal	2	(0.5%)	2	(0.8%)	$X^2 = 0.22$ (1) $p = ns$
Other school or job	1	(0.3%)	0	--	$X^2 = 0.63$ (1) $p = ns$
Academic failure**	0	--	3	(1.2%)	$X^2 = 4.79$ (1) $p < .05$

* $V = .100$

** $V = .086$

Table 14

Graduation Variables of Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective	
Graduated program*	n = 393	(99.0%)	n = 245	(98.0%)
Left program				
Deceased	n = 1	(0.3%)	0	--
Transfer	n = 2	(0.5%)	n = 2	(0.8%)
Left vet school	n = 1	(0.3%)	n = 1	(0.4%)
Academic failure	0	--	n = 2	(0.8%)

* $\underline{X^2} = 4.15$ (4) $\underline{p} = \underline{ns}$

Table 15

Veterinary School Performance of Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective		
	M	SD	M	SD	F
Overall GPA	3.41	0.41	3.47	0.41	$F = 3.36$ (1,644) $p = ns$
Critical care scores	84.50	42.00	83.43	17.56	$F = 0.03$ (1,105) $p = ns$
After hours scores	81.89	9.35	80.71	18.38	$F = 0.15$ (1,91) $p = ns$
Emergency scores	79.92	12.68	79.53	19.33	$F = 0.01$ (1,92) $p = ns$
Anesthesia scores*	76.19	14.09	69.70	13.26	$F = 13.98$ (1,246) $p < .001$
Critical care comments	2.85	0.88	3.12	0.91	$F = 2.31$ (1,100) $p = ns$
After hours comments	2.80	0.87	2.88	1.09	$F = 0.15$ (1,85) $p = ns$
Emergency comments	2.75	1.08	2.79	1.24	$F = 0.03$ (1,89) $p = ns$
Anesthesia comments	3.11	0.72	3.05	0.63	$F = 0.42$ (1,235) $p = ns$

* $\eta^2 = .054$

APPENDICES

APPENDIX A

COGNITIVE AND NON-COGNTIVE ASPECTS OF CSU'S CVMBS APPLICATIONS: COMPARISONS ACROSS RESIDENCY STATUS

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COGNITIVE AND NON-COGNTIVE ASPECTS OF CSU'S CVMBS APPLICATIONS: COMPARISONS ACROSS RESIDENCY STATUS

Personal Characteristics

When assessing personal characteristics, Colorado residents were more likely to be older and have applied previously. Non-sponsored applicants were more likely to be of diverse ethnicity, and to have submitted a disadvantage claim.

School Variables

Non-sponsored applicants' grades were significantly lower than Colorado and WICHE applicants in overall GPA, GPA for most recent four semesters, GPA in Biological Sciences, GPA in Chemistry, and Genetics. Non-sponsored applicants' grades were significantly lower than WICHE (but not Colorado) in Physics, GPA for Statistics, and GPA Physics. WICHE applicants' grades were significantly higher than Colorado and Non-sponsored applicants in Organic Chemistry, Statistics, and GPA Physics. Colorado applicants' scores were significantly higher than WICHE applicants for the Analytic and Verbal GRE tests.

Work history

Colorado applicants, when compared with WICHE and Non-sponsored applicants, had more Vet-Related, Non-Vet Related, and Non-Animal Positions in addition to more Vet-Experience Hours. Colorado applicants, when compared to WICHE applicants, also had more Customer Service Hours, Non-Animal Leadership Hours, and Non-Vet hours.

Activities

Colorado applicants, when compared to WICHE and Non-sponsored applicants, reported more College Activities Hours, and Socially Relevant College Activities Hours. Colorado applicants were also found to have more Community Activities Hours and Socially Relevant Community Hours than Non-sponsored applicants.

Table 1

Personal Characteristics of Colorado, WICHE, and Non-sponsored Applicants

	Colorado	WICHE	Non-Sponsored	X^2 or F (df)
Previously applied	n = 203 (63.8%)	n = 62 (28.1%)	n = 26 (24.3%)	X^2 = 89.74 (2) p <.001 V = .373
Times previously applied	M = 1.62 (SD = .97)	M = 1.42 (SD = .62)	M = 1.55 (SD = .87)	F = 2.37 (2,288) p = ns
Age	M = 26.95 SD = (5.18)	M = 24.63 SD = (4.01)	M = 25.64 SD= (4.37)	F = 16.36 (2,644) p <.001 η^2= .048
Age (under 25)	n = 124 (39.0%)	n = 144 (64.9%)	n = 55 (51.4%)	X^2 = 35.11 (2) p <.001 V = .233
Ethnicity				X^2 = 12.27 (2) p < .005 V = .138
Non-Caucasian	n = 29 (9.1%)	n = 23 (10.5%)	n = 23 (21.5%)	
Caucasian	n = 288 (90.9%)	n = 196 (89.5%)	n = 84 (78.5%)	
Disadvantage claims	n = 34 (10.7 %)	n = 10 (4.5%)	n = 6 (5.6%)	X^2 = 7.83 (2) p < .05 V = .110
Special circumstances	n = 43 (13.6%)	n = 28 (12.6%)	n = 19 (17.8%)	X^2 = 1.65 (2) p < .438

Table 2

Degrees Earned Prior to Veterinary School: Colorado, WICHE, and Non-sponsored Applicants

	Colorado		WICHE		Non-Sponsored	
Degrees earned*	n	Percent	n	Percent	n	Percent
Less that BA/BS	27	(8.5%)	42	(18.9%)	12	(11.2%)
BA/BS	258	(81.1%)	160	(72.1%)	72	(67.3%)
MA/MS	29	(9.1%)	16	(7.2%)	20	(18.7%)
Other	4	(1.3%)	4	(1.3%)	3	(2.8%)

* $X^2 = 25.31$ (6) $p < .001$; $V = .198$

Table 3

Undergraduate Major, GPA, and GRE Scores of Colorado, WICHE, and Non-sponsored Applicants

	Colorado	WICHE	Non-sponsored	X^2 or F (df)
Major				$X^2 = 17.99$ (10) $p < .055$ V = .167
Bioscience	230 (72.8%)	186 (83.8%)	89 (84.0)	
Non-bioscience	8 (2.5%)	6 (2.7%)	2 (1.9%)	
Combination	78 (24.7%)	30 (13.5%)	15 (14.2)	
Number credits/ semester	13.52 (2.41)	13.98 (2.18)	13.83 (2.27)	F = 2.61 (2,643) $p < .074$
GRE analytic*	642.08 (86.26)	620.63 (87.39)	631.26 (84.22)	F = 4.04 (2,638) $p < .018$
GRE qualitative	613.48 (82.01)	604.43 (80.94)	623.50 (74.76)	F = 2.078 (2,637) $p < .126$
GRE verbal**	535.84 (85.91)	510.91 (86.19)	524.66 (85.12)	F = 5.49 (2,638) $p < .004$
Overall GPA	3.68 (0.22)	3.68 (0.22)	3.52 (0.25)	F = 21.53 (2,644) $p < .001$, $\eta^2 = .063$
GPA – last four semesters	3.63 (0.28)	3.63 (0.29)	3.55 (0.31)	F = 3.06 (2,637) $p < .05$, $\eta^2 = .010$

* $\eta^2 = .013$

** $\eta^2 = .017$

Table 4

Undergraduate Grades of Colorado, WICHE, and Non-sponsored Applicants

	Colorado	WICHE	Non-Sponsored	X^2 or F
	M (SD)	M (SD)	M (SD)	
Organic	3.07	3.22	2.97	F = 3.55 (2,611)
Chemistry	(0.86)	(0.80)	(0.80)	p < .05, η^2= .011
Genetics	3.56	3.60	3.33	F = 6.32 (2,618)
	(0.63)	(0.63)	(0.72)	p < .005, η^2= .020
Biochemistry	3.26	3.34	3.16	F = 1.92 (2,555)
	(0.73)	(0.74)	(0.73)	p = ns
Physics	3.41	3.49	3.26	F = 3.65 (2,623)
	(0.71)	(0.65)	(0.69)	p < .05, η^2= .012
GPA-	3.67	3.65	3.49	F = 6.25 (2,642)
Biosciences	(0.43)	(0.48)	(0.47)	p < .005, η^2= .019
GPA-	3.42	3.51	3.29	F = 5.34 (2,632)
Chemistry	(0.57)	(0.57)	(0.54)	p < .005, η^2= .017
GPA- English	3.55	3.66	3.54	F = 2.78 (2,592)
composition	(0.60)	(0.52)	(0.60)	p = ns
GPA-	3.50	3.67	3.46	F = 5.97 (2,624)
Statistics	(0.65)	(0.56)	(0.67)	p < .005, η^2= .019
GPA- Physics	3.46	3.57	3.31	F = 6.19 (2,625)
	(0.67)	(0.55)	(0.64)	p < .005, η^2= .019
GPA- Liberal	3.78	3.81	3.75	F = 1.55 (2,643)
arts	(0.31)	(0.32)	(0.33)	p < .214

Table 5

Work Experience of Colorado, WICHE, and Non-sponsored Applicants

	Colorado	WICHE	Non-Sponsored	X^2 or F
Hours worked per week	M = 19.01 SD= 10.85	M = 16.98 SD = 9.90	M = 15.31 SD = 9.92	F = 5.88 (2,642) p < .003, η^2= .018
Veterinary positions	M = 3.82 SD = 0.12	M = 2.77 SD = 0.14	M = 2.93 SD = 0.20	F = 19.25 (2,642) p < .000, η^2= .057
Veterinary hours	M= 3155.03 SD= 4593.39	M = 2147.13 SD = 2996.28	M = 2160.58 SD= 3871.21	F = 5.47 (2,639) p < .004, η^2= .017
Veterinary leadership hours	M = 138.15 SD = 1642.93	M = 57.92 SD = 5544.39	M = 0 SD= 0	F = 0.64 (2,642) p < .530
Non-veterinary positions	M = 4.98 SD = 3.20	M = 3.95 SD = 2.63	M = 3.64 SD = 2.96	F = 11.91 (2,639) p < .000, η^2= .036
Non-veterinary hours	M= 6092.92 SD = 10994.22	M = 5149.83 SD = 8264.21	M = 3170.89 SD= 4463.07	F = 3.96 (2,638) p < .05, η^2= .012
Non-animal positions	M = 5.07 SD = 2.79	M = 3.89 SD = 2.25	M = 4.05 SD = 3.06	F = 14.65 (2,643) p < .001, η^2= .044
Non-veterinary leadership hours	M = 477.41 SD = 1959.79	M = 348.64 SD = 2342.67	M = 214.26 SD = 833.20	F = 0.78 (2, 638) p = ns
Customer-service hours	M= 3947.12 SD = 11058.48	M = 1909.84 SD = 3548.55	M = 2451.58 SD= 5132.50	F = 4.22 (2,643) p < .05, η^2= .013
Non-animal leadership hours	M= 3112.30 SD = 11150.79	M = 954.14 SD = 2231.09	M = 1435.41 SD= 4183.84	F = 5.04 (2,642) p < .01, η^2= .015

Table 5

College and Community Activities of Colorado, WICHE, and Non-sponsored Applicants

	Colorado	WICHE	Non-sponsored	
	M (SD)	M (SD)	M (SD)	X^2 or F
College - total hours	1028.08 (1432.54)	757.60 (1245.30)	596.76 (1085.19)	$F = 5.36$ (2,642) $p < .005$, $\eta^2 = .016$
College - leadership hours	251.52 (676.62)	179.85 (769.99)	113.72 (281.05)	$F = 1.93$ (2,641) p = ns
College - socially relevant	1138.14 (1600.06)	781.48 (1253.84)	649.71 (1205.00)	$F = 6.58$ (2,639) $p < .001$, $\eta^2 = .020$
Community – total hours	1053.40 (2498.83)	836.64 (1910.96)	447.40 (1004.90)	$F = 3.31$ (2,642) $p < .05$, $\eta^2 = .010$
Community - leadership hours	297.83 (89.50)	319.02 (107.18)	116.47 (154.77)	$F = 0.64$ (2,641) p = ns
Community - socially relevant	1657.48 (3351.93)	1282.58 (2935.02)	813.17 (1946.73)	$F = 3.27$ (2,638) $p < .05$, $\eta^2 = .010$

Table 6

Written Essays of Colorado, WICHE, and Non-sponsored Applicants

	Colorado		WICHE		Non-Sponsored		X^2 (df)
Writing ability*							X^2 = 16.03 (4) $p < .005$
Poor	n=25	(7.9%)	n=30	(13.5%)	n=16	(15.1%)	
Average	n=183	(57.5%)	n=143	(64.4%)	n=67	(63.2%)	
Good	n=110	(34.6%)	n=49	(22.1%)	n=23	(21.7%)	
Content**							X^2 = 9.65 (4) $p < .05$
Poor	n=12	(3.8%)	n=21	(9.5%)	n=7	(6.6%)	
Average	n=226	(71.1%)	N=160	(72.1%)	n=77	(72.6%)	
Good	n=80	(25.2%)	N=41	(18.5%)	n=22	(20.8%)	

* V = .158
** V = .122

Table 7

Recommendation Letters of Colorado, WICHE, and Non-sponsored Applicants

	Colorado	WICHE	Non-sponsored	X^2 or F (df)
Intellectual ability	M = 4.80 SD = 2.56	M = 4.74 SD = .30	M = 4.73 SD = .18	F = 0.85 (2,135) p = ns
Motivation	M = 4.91 SD = .18	M = 4.88 SD = .21	M = 4.91 SD = .16	F = 0.50 (2,133) p = ns
Initiative	M = 4.84 SD = .24	M = 4.80 SD = .27	M = 4.78 SD = .31	F = 0.67 (2,135) p = ns
Perseverance	M = 4.89 SD = .18	M = 4.86 SD = .20	M = 4.85 SD = .31	F = 0.32 (2,135) p = ns
Emotional stability*	M = 4.87 SD = .22	M = 4.76 SD = .25	M = 4.87 SD = .20	F = 3.50 (2,135) p < .05
Honesty and integrity	M = 4.95 SD = .13	M = 4.93 SD = .16	M = 4.94 SD = .12	F = 0.26 (2,135) p = ns
Work with others	M = 4.84 SD = .27	M = 4.87 SD = .20	M = 4.84 SD = .31	F = 0.23 (2,135) p = ns
Listen & follow directions	M = 4.90 SD = .18	M = 4.86 SD = .24	M = 4.87 SD = .18	F = 0.62 (2,134) p = ns

* $\eta^2 = .049$

Table 8

Delayed Graduation Variables of Colorado, WICHE, and Non-sponsored Applicants

	Colorado		WICHE		Non-sponsored		X^2 (df)
	n		n		n		
Graduate in four years	307	(96.5%)	221	(99.5%)	105	(98.1%)	$X^2 = 5.64$ (2) p = ns
Delay							
Combined degree	2	(0.6%)	0	--	0	--	
Medical	4	(1.3%)	0	--	0	--	
Family/personal	3	(0.9%)	0	--	1	(0.9%)	
Other school or job	0	--	0	--	1	(0.9%)	
Academic failure	2	(0.6%)	1	(0.5%)	0	--	

Table 9

Graduation Variables of Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Colorado		WICHE		Non-sponsored		X^2 (df)
	n		n		n		
Graduated program	313	(98.4%)	221	(99.5%)	104	(97.2%)	$X^2 = 3.07$ (2) p = ns
Left program							
Deceased	1	(0.3%)	0	--	0	--	
Transfer	1	(0.3%)	0	--	3	(2.9%)	
Left vet school	1	(0.3%)	1	(0.5%)	0	--	
Academic failure	2	(0.6%)	0	--	0	--	

APPENDIX B

COGNITIVE AND NON-COGNTIVE ASPECTS OF CSU'S CVMBS APPLICATIONS: COLORADO RESIDENTS

Table 1

Personal Characteristics of Colorado Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	X^2 or F (df)
Previously applied *	n = 102 (56.7%)	n = 101 (73.2%)	X^2 = 9.24 (1) p < .001
Times applied	M = 1.57 SD = .94	M = 1.67 SD = 1.00	F = .59 (1, 201) p = ns
Age	M = 26.74 SD = 5.41	M = 27.23 SD = 4.87	F = .707 (1,316) p = ns
Age – under 25	N = 78 (43.3%)	N = 46 (33.3%)	X^2 = 3.28 (1) p = ns
Ethnicity			X^2 = .292 (1) p = ns
Caucasian	N = 164 (91.6%)	N = 124 (89.9%)	
Non-Caucasian	N = 15 (8.4%)	N = 14 (10.1%)	
Disadvantage claims	N = 14 (7.8%)	N = 20 (14.5%)	X^2 = 3.69 (1) p = ns
Special circumstances	N = 30 (16.9%)	N = 13 (9.4%)	X^2 = 3.65 (1) p = ns

* V = .170

Table 2

Degrees Earned Prior to Veterinary School of Colorado Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective	
Degrees earned*				
Less than BA/BS	n = 18	(10.0%)	n = 9	(6.5%)
BA/BS	n = 139	(77.2%)	n = 119	(86.2%)
MA/MS	n = 20	(11.1%)	n = 9	(6.5%)
PhD/MD	--	--	--	--
Other	n = 3	(1.7%)	n = 1	(0.7%)

* $X^2 = 4.25$ (3) p = ns

Table 3

Undergraduate Major, GPA, and GRE Scores of Colorado Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	X^2 or F (df)
Major			$X^2 = 3.58$ (2)
			p = ns
Bioscience only	N = 134	N = 96	
	(74.9%)	(70.1%)	
Non-bioscience only	N = 2	N = 6	
	(1.1%)	(4.4%)	
Combination	N = 43	N = 35	
	(24.0%)	(25.5%)	
GRE analytic	M = 646.43	M = 636.45	F = 1.04 (1,315)
	SD = 80.36	SD = 93.35	p = ns
GRE qualitative	M = 612.02	M = 615.36	F = .13 (1,314)
	SD = 79.49	SD = 85.4	p = ns
GRE verbal	M = 540.11	M = 530.29	F = 1.02 (1,315)
	SD = 84.49	SD = 87.71	p = ns
Average number of credits	M = 13.66	M = 13.34	F = 1.41 (1,316)
	SD = 2.56	SD = 2.18	p = ns
Overall GPA	M = 3.70	M = 3.66	F = 1.90 (1,316)
	SD = .21	SD = .24	p = ns
GPA: last four semesters	M = 3.63	M = 3.62	F = .178 (1,312)
	SD = .27	SD = .28	p = ns

Table 4

Undergraduate Grades of Colorado Applicants Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	F (df)
Organic chemistry	M = 3.06	M = 3.09	F = .128 (1,304)
	SD = .86	SD = .88	p = ns
Biochemistry	M = 3.23	M = 3.30	F = .710 (1,278)
	SD = .76	SD = .71	p = ns
Genetics	M = 3.54	M = 3.60	F = .692 (1,303)
	SD = .67	SD = .58	p = ns
Physics	M = 3.37	M = 3.46	F = 1.11 (1,308)
	SD = .76	SD = .64	p = ns
GPA English composition	M = 3.51	M = 3.59	F = 1.33 (1,282)
	SD = .61	SD = .58	p = ns
GPA statistics	M = 3.53	M = 3.46	F = .802 (1,310)
	SD = .63	SD = .68	p = ns
GPA biosciences	M = 3.65	M = 3.70	F = .911 (1,316)
	SD = .42	SD = .44	p = ns
GPA chemistry	M = 3.40	M = 3.45	F = .621 (1,314)
	SD = .58	SD = .55	p = ns
GPA liberal arts	M = 3.75	M = 3.81	F = 2.99 (1,316)
	SD = .32	SD = .30	p = ns
GPA Physics	M = 3.42	M = 3.50	F = 1.19 (1,308)
	SD = .71	SD = .62	p = ns

Table 5

Work experience of Colorado Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	F (df)
Work hours per week	M =18.02 SD = 10.35	M =20.30 SD = 11.38	F = 3.48 (1,316) p = ns
Veterinary positions*	M = 3.46 SD = 2.21	M = 4.29 SD = 2.37	F = 10.34 (1,316) p < .001
Veterinary hours	M = 3062.35 SD = 5050.74	M = 3275.92 SD = 3932.47	F = .168 (1,316) p = ns
Veterinary leadership hours	M = 49.26 SD = 571.22	M = 254.10 SD = 2407.36	F = 1.22 (1,316) p = ns
Non-veterinary positions**	M = 4.47 SD = 3.08	M = 5.63 SD = 3.25	F = 10.46 (1,315) p < .001
Non-veterinary hours	M = 6306.04 SD = 12343.59	M = 5816.48 SD = 8983.49	F = .154 (1,315) p = ns
Non-veterinary leadership hours	M = 471.44 SD = 1877.06	M = 485.16 SD = 2069.09	F = .004 (1,315) p = ns
Non-animal positions	M = 4.89 SD = 2.78	M = 5.30 SD = 2.78	F = 1.74 (1,316) p = ns
Non-animal leadership hours	M = 3493.58 SD = 14151.37	M = 2617.73 SD = 5115.62	F = .480 (1,315) p = ns
Customer-service hours	M = 4553.72 SD = 14261.28	M = 3155.91 SD = 4014.14	F = 1.25 (1,316) p = ns

* $\eta^2 = .032$
** $\eta^2 = .032$

Table 6

College and Community Activities of Colorado Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	F
College - total hours	M = 1336.40 SD = 1508.57	M = 1423.88 SD = 1757.93	F = .12 (1,315) p = ns
College - leadership hours	M = 353.81 SD = 827.83	M = 355.49 SD = 836.75	F = .00 (1,315) p = ns
College - socially relevant	M = 1353.02 SD = 1504.23	M = 1603.30 SD = 2008.93	F = .77 (1,315) p = ns
Community – total hours	M = 1379.90 SD = 4268.49	M = 1360.73 SD = 2364.07	F = 00 (1,315) p = ns
Community - leadership hours	M = 745.23 SD = 4091.05	M = 297.65 SD = 998.63	F = 1.47 (1,315) p = ns
Community - socially relevant	M = 1600.62 SD = 4343.44	M = 2391.23 SD = 3960.66	F = 1.60 (1,314) p = ns

Table 7

Written Essays of Colorado Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective		X^2 or F (df)	V or η^2
Writing ability					$X^2 = 1.10$ (2)	
					$p = ns$	
Poor	$n = 15$	(8.3%)	$n = 10$	(7.2%)		
Average	$n = 99$	(55.0%)	$n = 84$	(60.9%)		
Good	$n = 66$	(36.7%)	$n = 44$	(31.9%)		
Content					$X^2 = 9.56$ (2)	$V = .173$
					$p < .01$	
Poor	$n = 7$	(3.9%)	$n = 5$	(3.6%)	$X^2 = .015$ (1)	
					$p = ns$	
Average	$n = 116$	(64.4%)	$n = 110$	(79.7%)	$X^2 = 8.85$ (1)	$V = .167$
					$p < .005$	
Good	$n = 57$	(31.7%)	$n = 23$	(16.7%)	$X^2 = 9.34$ (1)	$V = .171$
					$p < .001$	

Table 8

Recommendation Letters of Colorado Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	X^2 or F (df)
Intellectual ability	M = 4.80	M = 4.80	F = .03 (1,316)
	SD = .26	SD = .27	p = ns
Motivation	M = 4.91	M = 4.88	F = .61 (1,316)
	SD = .19	SD = .22	p = ns
Initiative	M = 4.84	M = 4.85	F = .06 (1,316)
	SD = .24	SD = .26	p = ns
Perseverance	M = 4.88	M = 4.87	F = .18 (1,316)
	SD = .19	SD = .25	p = ns
Emotional stability	M = 4.86	M = 4.86	F = .02 (1,316)
	SD = .22	SD = .26	p = ns
Honesty and integrity	M = 4.95	M = 4.94	F = .13 (1,316)
	SD = .14	SD = .15	p = ns
Ability to work	M = 4.84	M = 4.89	F = 1.56 (1,316)
with others	SD = .27	SD = .18	p = ns
Ability to listen and follow	M = 4.90	M = 4.90	F = .01 (1,316)
directions	SD = .18	SD = .16	p = ns

Table 9

Delayed Graduation of Colorado Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective
Graduate in four years*	n = 178 (98.9%)	n = 130 (94.2%)
Delay		
Combined degree	0	n = 2 (1.4%)
Medical	n = 1 (0.6%)	n = 3 (2.2%)
Family/personal	n = 1 (0.6%)	n = 2 (1.4%)
Other school or job	0	0
Academic failure	0	n = 2 (1.4%)

* $X^2 = 7.74$ (1) p = ns

Table 10

Graduation Variables of Colorado Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective
Graduated program*	n = 178 (98.9%)	n = 135 (97.8%)
Left program		
Deceased	n = 1 (0.3%)	0
Transfer	n = 1 (0.6%)	0
Leave vet school	0	n = 1 (0.6%)
Academic failure	0	n = 2 (1.4%)

* $X^2 = 5.46$ (4) p = ns

Table 11

Veterinary School Performance of Colorado Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	F
Overall GPA	M = 3.70	M = 3.66	F 1.90 (1,316)
	SD = .21	SD = .24	p = ns
Critical care	M = 2.86	M = 3.09	F .852 (1,52)
comments	SD = .84	SD = .96	p = ns
After hours	M = 2.45	M = 2.94	F = 2.95 (1,43)
comments	SD = .80	SD = 1.10	p = ns
Emergency medicine	M = 2.72	M = 3.06	F .937 (1,44)
comments	SD = 1.20	SD = 1.13	p = ns
Critical care scores	M = 88.00	M = 78.54	F = .629 (1,53)
	SD = 55.52	SD = 20.24	p = ns
After hours scores	M = 78.95	M = 81.50	F = .432 (1,44)
	SD = 7.74	SD = 16.27	p = ns
Emergency medicine	M = 80.61	M = 82.39	F = .144 (1,44)
scores	SD = 13.04	SD = 18.33	p = ns
Anesthesia	M = 3.02	M = 3.05	F = .055 (1,119)
comments	SD = .76	SD = .62	p = ns
Anesthesia scores*	M = 75.59	M = 69.40	F = 5.81 (1,125)
	SD = 14.40	SD = 14.39	p < .01

* $\eta^2 = .044$

APPENDIX C

COGNITIVE AND NON-COGNTIVE ASPECTS OF CSU'S CVMBS APPLICATIONS: WICHE RESIDENTS

Table 1

Personal Characteristics of WICHE Applicants Using Objective Versus Subjective Admissions Policies

	Objective		Subjective		X^2 or F (df)
Previously applied*	n = 45	(33.1%)	n = 17	(20.0%)	X^2 = 4.44 (1) p < .05
Times applied	M = 1.45	SD = .66	M = 1.35	SD = .49	F = .27 (1,60) p = ns
Age	M =24.82	SD = 3.97	M = 24.33	SD = 4.08	F = .81 (1,220) p = ns
Age – under 25	n = 85	(62.5%)	n = 59	(68.6%)	X^2 = .86 (1) p = ns
Ethnicity					X^2 = .19 (1) p = ns
Caucasian	n = 120	(90.2%)	n = 76	(88.4%)	
Non-Caucasian	n = 13	(9.8%)	n = 10	(11.6%)	
Disadvantage claims	n = 6	(4.4%)	n = 4	(4.7%)	X^2 = .01 (1) p = ns
Special circumstances	n = 20	(14.7%)	n = 8	(9.3%)	X^2 = 1.40 (1) p = ns

* V = .142

Table 2

Degrees Earned Prior to Veterinary School of WICHE Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective	
Degrees earned*				
Less than BA/BS	n = 26	(19.1%)	n = 16	(18.6%)
BA/BS	n = 97	(71.3%)	n = 63	(73.3%)
MA/MS	n = 12	(8.8%)	n = 4	(4.7%)
PhD/MD	--	--	--	--
Other	n = 1	(0.7%)	n = 3	(3.5%)

* $X^2 = 3.52$ (3); p = ns

Table 3

Undergraduate Major, GPA, and GRE Scores of WICHE Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	X^2 or F (df)	V or η^2
Major			X^2 = .683 (2)	
			p = ns	
Bioscience	n = 116	n = 70	--	
	(85.3%)	(81.4%)		
Non-bioscience	n = 2	n = 2	--	
	(2.2%)	(3.5%)		
Combination	n = 17	n = 13	--	
	(12.5%)	(15.1%)		
GRE analytic	M = 618.00	M = 624.77	F = .31 (1,219)	
	SD = 83.48	SD = 93.57	p = ns	
GRE qualitative	M = 599.63	M = 611.98	F = 1.22 (1,219)	
	SD = 82.37	SD = 78.54	p = ns	
GRE verbal	M = 511.85	M = 509.42	F = .04 (1,219)	
	SD = 87.29	SD = 84.91	p = ns	
Number of credits	M = 13.88	M = 14.12	F = .62 (1,220)	
	SD = 2.34	SD = 1.89	p = ns	
Overall GPA	M = 3.66	M = 3.72	F = 4.46 (1,220)	η^2 = .020
	SD = .22	SD = .23	p < .05	
GPA: last four	M = 3.60	M = 3.69	F = 5.96 (1,220)	η^2 = .026
semesters	SD = .30	SD = .27	p < .01	

Table 4

Undergraduate Grades of WICHE Applicants Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	F (df)	η^2
Organic chemistry	M = 3.15	M = 3.33	F = 2.63 (1,206)	
	SD = .81	SD = .77	p = ns	
Biochemistry	M = 3.29	M = 3.43	F = 1.76 (1,189)	
	SD = .77	SD = .68	p = ns	
Genetics	M = 3.50	M = 3.77	F = 9.88 (1,212)	η^2 = .045
	SD = .69	SD = .48	p < .001	
Physics	M = 3.42	M = 3.61	F = 4.52 (1,213)	η^2 = .021
	SD = .67	SD = .59	p < .05	
GPA English Comp.	M = 3.65	M = 3.67	F = .04 (1,207)	
	SD = .50	SD = .54	p = ns	
GPA statistics	M = 3.66	M = 3.68	F = .07 (1,213)	
	SD = .57	SD = .54	p = ns	
GPA biosciences	M = 3.60	M = 3.75	F = 5.43 (1,219)	η^2 = .024
	SD = .50	SD = .42	p < .01	
GPA chemistry	M = 3.46	M = 3.58	F = 2.35 (1,212)	
	SD = .59	SD = .54	p = ns	
GPA liberal arts	M = 3.79	M = 3.85	F = 1.84 (1,220)	
	SD = .35	SD = .28	p = ns	
GPA Physics	M = 3.51	M = 3.65	F = 3.18 (1,213)	η^2 = .021
	SD = .57	SD = .52	p = ns	

Table 5

Work Experience of WICHE Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	
Work hours per week	M = 17.68 SD = 9.76	M = 15.87 SD = 10.07	F = 1.77 (1,219) p = ns
Veterinary positions	M = 2.68 SD = 1.69	M = 2.92 SD = 1.66	F = 1.05 (1,219) p = ns
Veterinary hours	M = 2348.88 SD = 3367.70	M = 1829.07 SD = 2274.81	F = 1.57 (1,217) p = ns
Veterinary leadership hours	M = 49.26 SD = 571.22	M = 254.10 SD = 2407.36	F = 1.22 (1,219) p = ns
Non-veterinary positions	M = 3.71 SD = 2.46	M = 4.33 SD = 2.85	F = 2.91 (1,217) p = ns
Non-veterinary hours	M = 5307.24 SD = 8368.91	M = 4908.22 SD = 8143.67	F = .121 (1,216) p = ns
Non-veterinary leadership hours	M = 368.42 SD = 2708.33	M = 318.28 SD = 1644.60	F = .024 (1,216) p = ns
Non-animal positions	M = 4.03 SD = 2.36	M = 3.66 SD = 2.07	F = 1.40 (1,220) p = ns
Non-animal leadership hours	M = 1126.60 SD = 2497.04	M = 681.40 SD = 1707.72	F = 2.11 (1,220) p = ns
Customer-service hours	M = 1969.42 SD = 3464.95	M = 1815.62 SD = 3695.54	F = .10 (1,220) p = ns

Table 6

College and Community Activities of WICHE Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	F (df)
College - total hours	M = 848.25 SD = 898.82	M = 1159.00 SD = 1769.67	F = 1.36 (1,220) p = ns
College - leadership hours	M = 151.82 SD = 333.84	M = 322.12 SD = 1201.97	F = .98 (1,219) p = ns
College - socially relevant	M = 849.73 SD = 897.71	M = 1213.63 SD = 1793.56	F = 1.82 (1,217) p = ns
Community - total hours	M = 1338.33 SD = 2534.12	M = 998.49 SD = 2275.05	F = .66 (1,220) p = ns
Community - leadership hours	M = 484.14 SD = 1735.45	M = 492.14 SD = 1806.96	F = .00 (1,219) p = ns
Community - Socially relevant	M = 1815.29 SD = 3680.65	M = 1672.49 SD = 3651.94	F = .05 (1,219) p = ns

Table 7

Written Essays of WICHE Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective		X^2 or F (df)
Writing ability					$X^2 = 1.17$ (2)
					p = ns
Poor	n = 21	(15.4%)	n = 9	(10.5%)	
Average	n = 85	(62.5%)	n = 58	(67.4%)	
Good	n = 30	(22.1%)	n = 19	(22.1%)	
Content*					$X^2 = 5.86$ (2)
					p = ns
Poor**	n = 18	(13.2%)	n = 3	(3.5%)	$X^2 = 5.84$ (2)
					p < .01
Average	n = 93	(68.4%)	n = 67	(77.9%)	$X^2 = 2.38$ (1)
					p = ns
Good	n = 25	(18.4%)	n = 16	(18.6%)	$X^2 = .00$ (1)
					p = ns

* V = .164
** V = .162

Table 8

Recommendation Letters of WICHE Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	F (df)
Intellectual ability	M = 4.74	M = 4.73	F = .01 (1,220)
	SD = 0.30	SD = 0.30	p = ns
Motivation	M = 4.88	M = 4.94	F = 2.52 (1,220)
	SD = 0.21	SD = 0.15	p = ns
Initiative	M = 4.80	M = 4.82	F = .20 (1,220)
	SD = 0.27	SD = 0.23	p = ns
Perseverance	M = 4.86	M = 4.89	F = .64 (1,220)
	SD = 0.20	SD = 0.23	p = ns
Emotional stability	M = 4.76	M = 4.79	F = .30 (1,220)
	SD = 0.25	SD = 0.27	p = ns
Honesty and integrity	M = 4.93	M = 4.96	F = 1.03 (1,220)
	SD = 0.16	SD = 0.13	p = ns
Ability to work	M = 4.87	M = 4.89	F = 2.85 (1,220)
w/others	SD = 0.20	SD = 0.25	p = ns
Ability to listen and	M = 4.85	M = 4.88	F = .36 (1,220)
follow directions	SD = 0.25	SD = 0.26	p = ns

Table 9

Delayed Graduation Variables of WICHE Applicants Using Objective Versus Subjective Admissions Policies

	Objective		Subjective	
Graduate in four years*	n = 136	(100%)	n = 85	(98.8%)
Reasons for delay				
Combined degree	0	--	0	--
Medical	0	--	0	--
Family/personal	0	--	0	--
Other school or job	0	--	0	--
Academic failure	0	--	n = 1	(1.2%)

* $X^2 = 1.59$ (1) p = ns

Table 10

Graduation Variables of WICHE Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective	
Graduated program*	n = 135	(99.3%)	n = 86	(100%)
Left program				
Deceased	0	--	0	--
Transfer	0	--	0	--
Leave vet school	n = 1	(0.7%)	0	--
Academic failure	0	--	0	--

* $X^2 = 6.35$ (4) p = ns

Table 11

Veterinary School Performance of WICHE Applicants for Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	X^2 or F (df)	η^2
Critical care	M = 2.59	M = 3.45	F = 8.80 (1,32)	η^2 = .216
comments	SD = .98	SD = .69	p < .005	
After hours	M = 3.24	M = 2.72	F = 1.88 (1,26)	
comments	SD = .83	SD = 1.19	p = ns	
Emergency	M = 2.80	M = 2.61	F = .29 (1,35)	
comments	SD = .98	SD = 1.21	p = ns	
Critical care	M = 77.18	M = 92.11	F = 17.83 (1,34)	η^2 = .334
scores	SD = 11.98	SD = 9.18	p < .001	
After hours	M = 84.87	M = 77.83	F = 1.21 (1,28)	
scores	SD = 9.22	SD = 23.01	p = ns	
Emergency	M = 79.90	M = 78.68	F = .06 (1,37)	
scores	SD = 13.24	SD = 17.70	p = ns	
Anesthesia	M = 3.17	M = 3.04	F = .83 (1,84)	
comments	SD = .71	SD = .66	p = ns	
Anesthesia	M = 78.49	M = 70.15	F = 8.96 (1,88)	η^2 = .092
scores	SD = 14.18	SD = 11.94	p < .005	

APPENDIX D

COGNITIVE AND NON-COGNTIVE ASPECTS OF CSU'S CVMBS APPLICATIONS: NON-SPONSORED RESIDENTS

Table 1

Personal Characteristics of Non-Sponsored Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective		X^2 or F (df)
Previously applied *	n = 15	(18.5%)	n = 11	(42.3%)	X^2 = 6.06 (1) p < .01
Times applied	M = 1.27	SD = .46	M = 1.36	SD = .50	F = .26 (1,24) p = ns
Age	M = 25.85	SD = 4.74	M = 25.00	SD = 2.97	F = .75 (1,105) p = ns
Age – under 25	n = 43	(53.1%)	n = 12	(46.2%	X^2 = .38 (1) p = ns
Ethnicity					X^2 = .76 (1) p = ns
Caucasian	n = 62	(76.5%)	n = 22	(84.6%)	
Non-Caucasian	n = 19	(23.5%)	n = 4	(15.4%)	
Disadvantage claims	n = 5	(6.2%)	n = 1	(3.8%)	X^2 = .20 (1) p = ns
Special circumstances	n = 15	(18.5%)	n = 4	(15.4%)	X^2 = .13 (1) p = ns

* V = .238

Table 2

Degrees Earned Prior to Veterinary School of Non-Sponsored Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective	
Degrees earned*				
Less than BA/BS	n = 10	(12.3%)	n = 2	(7.7%)
BA/BS	n = 54	(66.7%)	n = 18	(69.2%)
MA/MS	n = 15	(18.5%)	n = 5	(19.2%)
PhD/MD	--	--	--	--
Other	n = 2	(2.5%)	n = 1	(3.8%)

* X^2 = .54 (3); p = ns

Table 3

Undergraduate Major, GPA, and GRE Scores of Non-Sponsored Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	X^2 or F (df)
Major			$X^2 = .15$ (2)
			p = ns
Bioscience	n = 69	n = 20	
	(86.3%)	(76.9%)	
Non-bioscience	n = 1	n = 1	
	(1.3%)	(3.8%)	
Combination	n = 10	n = 5	
	(12.5%)	(19.2%)	
GRE analytic	M= 625.71	M= 647.69	F = 1.33 (1,101)
	SD= 82.20	SD = 89.59	p = ns
GRE qualitative	M = 617.01	M = 642.69	F = 2.32 (1,101)
	SD= 72.75	SD = 78.77	p = ns
GRE verbal	M = 533.90	M = 497.31	F = 3.69 (1,101)
	SD= 87.62	SD = 71.98	p = ns
Number of	M = 13.92	M = 13.56	F = .49 (1,104)
credits	SD = 2.18	SD = 2.57	p = ns
Overall	M = 3.49	M = 3.63	F = 6.26 (1,105)
GPA*	SD = .25	SD = .23	p < .01
GPA: last four	M = 3.53	M = 3.62	F = 1.39 (1,102)
semesters	SD = .29	SD = .34	p = ns

Table 4

Undergraduate Grades of Non-Sponsored Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	F (df)
Organic	M = 2.95	M = 3.04	F = .24
chemistry	SD = .80	SD = .81	(1,98) p = ns
Biochemistry	M = 3.14	M = 3.22	F = .16
	SD = .76	SD = .65	(1,85) p = ns
Genetics	M = 3.32	M = 3.39	F = .19
	SD = .72	SD = .72	(1,100) p = ns
Physics	M = 3.21	M = 3.43	F = 1.80
	SD = .70	SD = .66	(1,99) p = ns
GPA English	M = 3.55	M = 3.50	F = .13
comp.	SD = .57	SD = .68	(1,100) p = ns
GPA	M = 3.44	M = 3.53	F = .30
statistics	SD = .68	SD = .64	(1,98) p = ns
GPA	M = 3.46	M = 3.57	F = .77
biosciences	SD = .53	SD = .48	(1,104) p = ns
GPA	M = 3.27	M = 3.34	F = .32
chemistry	SD = .54	SD = .56	(1,103) p = ns
GPA liberal	M = 3.76	M = 3.72	F = .22
arts	SD = .30	SD = .43	(1,104) p = ns
GPA Physics	M = 3.26	M = 3.47	F = 1.86
	SD = .64	SD = .65	(1,101) p = ns

* η^2 = .056

Table 5

Work Experience of Non-Sponsored Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	F (df)
Work hours per week	M =14.39	M = 18.15	F= 2.87 (1,104)
	SD =10.22	SD = 8.52	p = ns
Veterinary positions	M = 2.75	M = 3.50	F = 3.12 (1,104)
	SD = 1.95	SD = 1.66	p = ns
Veterinary hours	M = 1882.15	M = 3006.88	F = 3.29 (1,103)
	SD = 2597.38	SD = 3149.76	p = ns
Veterinary leadership hours	0	0	F = NA p < NA
Non-veterinary positions*	M = 3.29	M = 4.73	F = 4.84 (1,104)
	SD = 2.94	SD = 2.78	p < .05
Non-veterinary hours	M = 2813.53	M = 4270.46	F = 2.11 (1,104)
	SD = 4078.54	SD = 5422.45	p = ns
Non-veterinary leadership hours	M = 269.90	M = 43.08	F = 1.46 (1,104)
	SD = 950.02	SD = 152.60	p = ns
Non-animal positions	M = 4.05	M = 4.04	F = .00 (1,104)
	SD = 3.12	SD = 2.93	p = ns
Non-animal leadership hours	M = 1472.76	M = 1320.46	F = .03 (1,104)
	SD = 4389.62	SD = 3551.28	p = ns
Customer-service hours	M = 2309.23	M = 2889.62	F = .25 (1,104)
	SD = 5197.66	SD = 5000.46	p = ns

* $\eta^2 = .045$

Table 6

College and Community Activities of Non-Sponsored Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	F (df)
College - total hours	M = 665.48 SD = 510.94	M = 1249.62 1994.41	F = 1.70 (1,104) p = ns
College - leadership hours	M = 93.81 SD = 168.50	M = 312.15 SD = 496.59	F = 3.70 (1,104) p = ns
College - socially relevant	M = 668.33 SD = 513.17	M = 1421.77 SD = 2204.75	F = 2.34 (1,104) p = ns
Community - total hours	M = 339.14 SD = 415.26	M = 1038.04 SD = 1836.94	F = 2.91 (1,104) p = ns
Community - leadership hours	M = 69.05 SD = 208.37	M = 278.77 SD = 589.35	F = 2.41 (1,104) p = ns
Community - socially relevant*	M = 434.62 SD = 491.18	M = 2162.00 SD = 3668.85	F = 4.57 (1,102) p < .05

* $\eta^2 = .096$

Table 7

Written Essays of Non-Sponsored Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective	
Writing ability*				
Poor	n = 13	(16.3%)	n = 3	(11.5%)
Average	n = 52	(65.0%)	n = 15	(57.7%)
Good	n = 15	(18.8%)	n = 8	(30.8%)
Content**				
Poor	n = 5	(6.3%)	n = 2	(7.7%)
Average	n = 60	(75.0%)	n = 17	(65.4%)
Good	n = 15	(18.2%)	n = 7	(26.9%)

* $X^2 = 1.76$ (2) p = ns

** $X^2 = .94$ (2) p = ns

Table 8

Recommendation Letters of Non-Sponsored Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	F (df)
Intellectual ability	M = 4.73	M = 4.80	F = 1.03 (1,104)
	SD = 0.18	SD = 0.22	p = ns
Motivation	M = 4.91	M = 4.92	F = .07 (1,104)
	SD = 0.16	SD = 0.15	p = ns
Initiative	M = 4.78	M = 4.79	F = .02 (1,104)
	SD = 0.31	SD = 0.22	p = ns
Perseverance	M = 4.85	M = 4.84	F = .00 (1,104)
	SD = 0.31	SD = 0.23	p = ns
Emotional stability	M = 4.87	M = 4.74	F = 1.91 (1,104)
	SD = 0.20	SD = 0.34	p = ns
Honesty and	M = 4.94	M = 4.89	F = 1.09 (1,104)
integrity	SD = 0.12	SD = 0.17	p = ns
Ability to work	M = 4.84	M = 4.73	F = .97 (1,104)
w/others	SD = 0.31	SD = 0.33	p = ns
Ability to listen and	M = 4.87	M = 4.84	F = .12 (1,104)
follow directions	SD = 0.18	SD = 0.26	p = ns

Table 9

Delayed Graduation Variables of Non-Sponsored Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective	
Graduate in four years*	n = 79	(97.5%)	n = 26	(100%)
Delay				
Combined degree	0	--	0	--
Medical	0	--	0	--
Family/personal	n = 1	(1.2%)	0	--
Other school or job	n = 1	(1.2%)	0	--
Academic failure	0	--	0	--

* $X^2 = .65$ (1) p = ns

Table 10

Graduation Variables of Non-Sponsored Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective		Subjective	
Graduated program*	n = 80	(98.8%)	n = 24	(92.3%)
Left program				
Deceased	0	--	0	--
Transfer	n = 1	(1.7%)	n = 2	(7.7%)
Leave vet school	0	--	0	--
Academic failure	0	--	0	--

* $X^2 = 3.01$ (4) p = ns

Table 11

Veterinary School Performance for Non-Sponsored Applicants Admitted Using Objective Versus Subjective Admissions Policies

	Objective	Subjective	X^2 or F (df)
Overall	M = 3.36	M =3.42	F = .81 (1,105)
GPA	SD =0.44	SD =0.37	p = ns
Critical care	M =3.33	M =2.28	F = 7.00 (1,12)
comments*	SD =0.69	SD =0.80	p < .021
After hours	M =2.92	M =3.00	F = .03 (1,12)
comments	SD =0.79	SD =0.92	p = ns
Emergency medicine	M =2.71	NA	F = NA
comments	SD =1.08	NA	p < NA
Critical care scores	M =86.50	M =77.50	F = 1.45 (1,14)
	SD =11.50	SD =17.73	p = ns
After hours scores	M =84.00	M =83.33	F = .01 (1,15)
	SD =12.09	SD =16.77	p = ns
Emergency medicine	M =78.00	M =30.00	F = NA
scores	SD =11.51	NA	p < NA
Anesthesia	M =3.19	M =3.07	F = .25 (1,28)
comments	SD =0.60	SD =0.66	p = ns
Anesthesia scores	M =72.21	M =69.85	F = .28 (1,29)
	SD =12.43	SD =11.58	p = ns

* $\eta^2 = .368$

APPENDIX E

INTERRATER RELIABILITY: PEARSON CORRELATIONS AND KAPPA CALCULATIONS

APPENDIX E

INTERRATER RELIABILITY: PEARSON CORRELATIONS AND KAPPA CALCULATIONS

Variable	Kappa
Previously applied	1.00
Age under 25 years or not	.966
Residency	1.00
Degrees earned	.953
Ethnicity	1.00
Species (projected applicants' favorite)	.939
Disadvantage claim	.955
Special circumstances claim	.945

Variable	Pearson Correlation
Number of times previously applied	1.00
Number of years since previously applied	.984
Age	.913
Average number of credits	.993
Highest number of credits	.983
Lowest number of credits	.990
Overall GPA	.982
Highest GPA	.993
Lowest GPA	.996
Average number hours worked per week	.985
Highest number hours worked per week	.983
Lowest number of hours worked per week	.989
Organic chemistry grade	.973
Genetics grade	.976
Biochemistry grade	.985
Physics grade	.969

GPA last two years	.932
GPA biological sciences	.981
GPA chemistry	.995
GPA composition	.986
GPA statistics	.998
GPA physics	.985
GPA liberal arts	.997
GRE analytic	.982
GRE qualitative	.985
GRE verbal	.976
Number of veterinary experience positions	.979
Number of veterinary experience hours	.973
Number of veterinary experience leadership hours	.987
Number of non- veterinary animal experience positions	.966
Number of non- veterinary animal experience hours	.954
Number of non- veterinary animal leadership hours	.916
Number of non-animal experience positions	.981
Number of non-animal experience hours	.927
Number of non-animal customer service hours	.981
Number of non-animal leadership hours	.986
College activities hours	.992
College activities leadership hours	.979
College activities socially relevant hours	.967
Community activities hours	.981
Community activities leadership hours	.966
Community activities socially relevant hours	.990
Recommendation letter: intellectual ability	.995
Recommendation letter: motivation	.979
Recommendation letter: initiative	.990
Recommendation letter: perseverance	.993
Recommendation letter: emotional stability	.974

Recommendation letter: honesty and integrity	.983
Recommendation letter: ability to work with others	.979
Recommendation letter: ability to listen/follow directions	.972
Essay: writing ability	1.00
Essay: content	1.00
Critical care written comments	.957
After hours written comments	.963
Emergency medicine written comments	.968
Anesthesia written comment 1	.908
Anesthesia written comment 2	.905

Note. All significance levels are $p < .000$

Average overall interrater reliability = .966

Average Pearson correlations for interval data = .976

Average Kappa for nominal data = .970

APPENDIX F

PART 1 OF ANALYSES: DEFINITIONS AND DISCRIPTIONS OF ALL COGNITIVE VARIABLES

APPENDIX F

PART 1 OF ANALYSES: DEFINITIONS AND DISCRIPTIONS OF ALL COGNITIVE VARIABLES

Graduate Record Exam (Analytic, Qualitative, and Verbal)

The GRE was used for general admissions test data for all applicants. Due to the minimal amount of students who took the MCAT and VCAT, these tests were not included in analyses).

Grade Point Average

Overall GPA (including undergraduate and graduate work, not including summers)

GPA for applicants' most recent four semesters (not including summers)

Class Grades

Grades received for upper level science and math courses (not including laboratories)

Organic Chemistry

Genetics

Biochemistry

Physics

Pre-veterinary Required Course Work

The number of credits recorded under these headings varied for applicants but approximated eight credit hours).

Biological Sciences – Minimum of three semester credits (This included genetics or an acceptable alternative and a laboratory associated with a biological science course or course in which laboratory was included).

Chemistry - Minimum of three semester credits (This included biochemistry or an acceptable alternative and a laboratory associated with a chemistry science course or course in which laboratory was included).

English Composition - Minimum of three semester credits

Statistics or Biostatistics - Minimum of three semester credits

Physics (including laboratory) - Minimum of four semester credits

Liberal Arts - Minimum of twelve semester credits

Credit Load (average - not including summers)

In addition to grades, it was felt important to record applicants' average number of credits per semester. A student who earns a 4.0 GPA in a semester in which she enrolled in 6 credits is a very different scenario from the student who completed 20 credits with a 4.0 GPA.

Work Load (average - not including summers)

Similar to credit load, workload can impact school performance. A comparison between students who need work and students who must work is not fair without some way of assessing total workload (work hours and class credits). Therefore, work hours as well as a work to credit ratio was calculated. Average credit load and hours worked per week were used to calculate a work/credit ratio.

Degrees and Majors

Degrees obtained by applicants prior to veterinary school were coded as "less than BA/BS", "BA/BS", "MA/MS", "PhD or MD", or "other." The highest degree earned was used for coding. Concentration areas of prior education, including degrees and majors were coded as: science only (i.e. biology, chemistry and not social sciences), science and non-science, and non-science only (including social sciences).

APPENDIX G

PART 1 OF ANALYSES: DEFINITIONS AND DISCRIPTIONS OF ALL NON-COGNITIVE VARIABLES

APPENDIX G

PART 1 OF ANALYSES: DEFINITIONS AND DISCRIPTIONS OF ALL NON-COGNITIVE VARIABLES

Demographics of applicants

Age

Residency (Colorado, WICHE, and Non-sponsored)

Ethnicity (coded as American Indian, Asian American, African-American, Caucasian, Hispanic, and other). Due to the limited number of minority students, however, another variable was created by grouping all non-Caucasian students into one category and Caucasian students into another category to assess any increases or decreases in the graduating classes' ethnic diversity.

Previous applications (coded as Yes, he/she has applied before, and No, he/she has not applied before.)

Number of previous applications (when applicant has applied previously)

The number of years since the last application (when applicant has applied previously)

Disadvantage claims (coded as social, financial, physical disability, learning disability, or other). Disadvantage claims were coded as to the reason given and also coded as yes or no

Special circumstances (coded as physical health problems, financial, family health and responsibilities, past trauma, family, language/culture, or first generation). Special circumstances were coded as to the reason given and also coded as yes or no.

Work Experience

Veterinary Experience

Total number of veterinary positions

Total number of hours worked within a veterinary experience

Total number of leadership roles within a veterinary experience

The primary animal(s) involved in each position (more than one was acceptable). Choices included: Small animal (when not more clearly specified), Large Animal (when not more clearly specified), Horses, Dogs, Cats, Exotics, Cattle, and Sheep. These categories were later combined into: small animal, large animal, equine, or exotics.

Non-veterinary animal experience

Total number of non-veterinary positions

Total number of hours worked within a non-veterinary experience

Total number of leadership roles within a non-veterinary experience

The primary animal(s) involved in each position (more than one was acceptable).

Non-animal experience

Total number of non-animal positions

Total number of hours worked within a non- animal experience

Total number of leadership roles within a non- animal experience

Total number of customer related roles within a non- animal experience

College and Community activities

Number of hours

Social relevance (The social relevance of each activity was coded as either low (e.g. bike riding, school clubs) or high (e.g. charity fundraisers). Low socially relevant activities were coded as "1" and high socially relevant activities were coded as "2". These numbers were then used as multipliers when calculating the total number of socially relevant activities. For example, 30 hours of white water rafting was calculated as 30 X 1 = 30, and 30 hours of riding a bike to raise money for AIDS was calculated as 30 X 2 = 60. It should be noted that the graduating classes of 1998 and 1999 had applications that asked applicants to record their activities in number of years, in contrast to graduating classes of 2000, 2001 and 2002 when participation in number of hours was required. In order to calculate participation for 1998 and 1999, each year was recorded as 32 hours (one hour per week for two semesters) unless

the student noted otherwise. Although calculated for future analyses within these two years, these years were not used for analyses in the present report due to the inability to compare them accurately with other application years.

College activities total number of hours

College activities total number of leadership hours

College activities total number of socially relevant

Community activities total number of hours

Community activities total number of leadership hours

Community activities total number of socially relevant

Recommendation letters

Applicants were required to supply three letters of recommendation. These letters were accompanied by a standard form for those who wrote recommendation letters to rate students on a five point scale with 1= Poor, Bottom 5%; 2 = Fair, Next 30%; 3 = Average, Next 40%; 4 = Good, Next 20%; and 5 = Excellent, Top 5%. Each applicant's file contained three letters of recommendation. The average score of the three raters were recorded for the following characteristics:

Intellectual ability

Initiative

Perseverance

Emotional stability

Honesty and integrity

Ability to work with others

Ability to listen and follow directions

The applications for the graduating class of 1998 were asked slightly different questions, but were felt similar enough in most areas for comparative analyses. Questions from 1998 applications were placed on a slightly different 5-point scale: 1 = Unsatisfactory, Bottom 5%; 2 = Fair, Next 30%; 3 = Satisfactory, Next 40%; 4 = Excellent, Next 20%; and 5 = Outstanding, Top 5%

The items from 1998 used to compare to other years are as follows:

1998	1999-2002
Intellectual ability	Intellectual ability
Initiative	Initiative and originality: independent thought, work and resourcefulness
Perseverance	Industry: promptness, application, perseverance, energy
Emotional stability	"How would you evaluate the motional maturity of the applicant- (very mature, mature, immature but development, immature, unable to judge)"
Honesty and Integrity	General assessment: overall personality
Ability to work with others	Interpersonal skills: ability to relate to others
Ability to listen and follow directions	Not assessed for the class of 1998 (no similar question)

Written Essays

Essay questions were coded for content (depth and maturity) as poor, average or good. Writing ability (grammar, word choice and flow) was likewise coded as poor, average or good. The options for essay questions varied over the years examined. The 1998 graduating class included five options:

1. Your particular admiration for a DVM professional
2. Why a veterinary medical education is important to you
3. How your education will affect your life and that of your environment
4. What you want to accomplish with your veterinary medical education
5. What challenges the veterinary medical profession may anticipate in the 1990's

Essay questions for 1999 changed minimally, with Question 5 altering the phrase "in the 1990's" to "in the next ten years."

Essay questions for 2000, 2001 and 2002 retained Question 1, and added the following to replace Questions 2-5.

2. What challenges the veterinary medical profession may anticipate in the next ten years
3. Describe a problem faced by society and how you might contribute to its solution
4. If changing careers, please use the essay space to comment on your reasons.

APPENDIX H

PART 2 OF ANALYSES: DEFINITIONS AND DISCRIPTIONS OF VETERINARY SCHOOL PERFORMANCE VARIABLES

APPENDIX H

PART 2 OF ANALYSES: DEFINITIONS AND DISCRIPTIONS OF VETERINARY SCHOOL PERFORMANCE VARIABLES

GPA

Overall GPA (determined by end of sophomore year)

Clinical Rotation Grades

Critical Care Evaluation Totals - calculated as percentages

Anesthesia Grade Totals – sum of Weeks 1 and 2

Anesthesia Written Comments – sum of Weeks 1 and 2

Graduation Rate

Overall graduation rate in four years (excluding 2002)

Delayed graduation – (excluding combined degree or physical accident)

Drop-out/Dismissal Rate

The grades in two required senior clinical rotations (limited to the graduating classes of 2000 and 2001). The anesthesia rotation grade form consisted of ten specific skills given a grade of "A", "Pass" or "Fail." Because "pluses" and "minuses" as well as combined grades (e.g. A/P) were used, a point system was created to change the grades into numerical values. These points were then converted into a percentage of total points possible. Points were calculated as follows:

A = 2

A- = 1.75

P/A = 1.5

P+ = 1.25

P = 1.0

P- = .75

F = 0

Faculty graded each student on these ten factors at the end of Week 1 and again at the end of Week 2. In addition, faculty wrote comments about the rotation

experience for both week one and week two. Coders gave these comments a letter grade (A, A-, B+, B, B-, C+, C, C-, D+, D, D-, F) based on the information exchanged. The same four faculty members wrote comments for both of the years analyzed. Because the faculty were fairly consistent in their wording, it was possible to assess the comments and assign a letter grade. For example, one faculty member used the words "good", "very good" and "excellent" which were translated into B, B+, and A. Another faculty member used the words "satisfactory", "good" and "excellent" which were redefined as C, B, and A. The other faculty members followed similar patterns.

The other rotations used for assessment in this study include Critical Care, After-hours, and Emergency Medicine (CCU/AH/EM). All of these rotations are under the broad heading of Critical Care, and are required by all students. The evaluation form utilized in the three rotations was identical and therefore, they were combined together to form the CCU grade variable. The forms included 20 "yes" or "no" statements that began with: "I would describe this individual as..." Examples of statements include, "Too quick to discard potential alternative solutions for a problem" and "willing to engage challenging problems." The form underwent some revisions for the class of 2000 resulting in the faculty rating students on seven variables (i.e. problem solving skills, general knowledge) on a scale from 1 (Superior) to 5 (Poor). Score from all questions were coded as a percentage of total points possible.

Comments given by CCU faculty members for the graduating class of 2001 consisted of two major components, the first of which was a short paragraph which described the student's ability to use professional judgment (e.g. "A positive response in professional judgment. Adequately demonstrates the ability and habits of mind to make professional judgments. Generally fulfills the demands for professional judgment of individuals in this rotation" and "Very strong in professional judgment. Repeatedly demonstrating the consistent internal motivation and mental ability to make professional judgments. Making judgments that are mindful of relevant considerations, contexts, methods and criteria.")

The second paragraph consisted of more personalized observations, including comments such as, "Excellent week. Keep working on your self-confidence. I think you have a lot of abilities" and "You are eager to provide good patient care. I am concerned about your didactic and problem-solving skills. Keep reading and working on your recall." Similar to the anesthesia rotation, these comments were graded on an A-F grading scale.

The content of the evaluation sheet comments for the class of 2000 was similar to the second paragraph which discussed more personal observations. Although the rotations were required for all students, some student files were missing their evaluation form(s) for one or both of these rotations. For these students, if they took either of these rotations as an elective, and that evaluation sheet was in their file, their elective grades were used for analyses. This was only done within a rotation, i.e. if a CCU evaluation form was missing, it could only be replaced with a CCU elective and not Anesthesia. If no elective rotations were available for CCU, some students had nurse evaluations which used the same coding sheet. These evaluations were used if all other options had been extinguished.