ABSTRACT
Empathy can be defined as the ability to understand and connect with the emotional state and frame of mind of another. Establishing connections with others is a crucial skill for veterinarians who must earn the trust and compliance of their clients to provide quality care for their patients. This is a longitudinal study using the Davis Interpersonal Reactivity Index (IRI) to assess changes in veterinary students’ self-reported empathy as they progressed through the didactic portion of the DVM program at Colorado State University. The IRI consists of four subscales that measure cognitive and affective components of empathy: Perspective Taking, Fantasy, Emphatic Concern, and Personal Distress. Data were collected at three time points, corresponding to the start of the first year, the fourth semester (second year), and the fifth semester (third year). Results showed an overall decline in Perspective Taking scores, with a significant decrease between first and second year. There was an overall increase in students’ levels of Personal Distress as they progressed through the program. The significant difference was found between years 1 and 3. This is especially concerning because the enhanced unease in interpersonal interactions coincides with students entering clinical rotations in the third year—the very time when these traits are necessary for quality client and patient care. Veterinary educators are urged to use this information as a basis for investigating novel curricular and programmatic interventions to counteract these changes in student empathy.

Key words: empathy, communication, veterinary students, longitudinal, Davis Interpersonal Reactivity Index

INTRODUCTION
Professional veterinary medical (DVM) programs are academically and personally challenging. Students set high expectations for themselves and are faced with learning a vast amount of information while also attempting to master the professional and clinical skills necessary to become competent practitioners. In many DVM programs, another stressor in addition to attending classes is assuming progressively greater, yet supervised responsibility for client communication and patient care (e.g., overnight wards duty, supervised clinical rotations). Multiple publications describe declines in student well-being associated with their progression through the veterinary curriculum. One way in which veterinary students’ stress, depression, and anxiety manifest themselves is as a decline in empathy toward clients, patients, and clinical staff.

Changes in students’ empathy level during medical curricula are well studied and described in the literature. Although there is evidence to the contrary, most published studies report a decline in medical students’ levels of empathy as they progress through their studies, from the beginning of medical school and continuing through internship and residency programs. We hypothesized a similar trend would be found for veterinary students.

What Is Empathy?
Clinical empathy is a multi-dimensional concept characterized by four dimensions in clinical settings: (1) affective (the capacity to share feelings with another); (2) moral (the motivation to seek good in others); (3) cognitive (the ability to identify and understand others’ emotions); and (4) behavioral (the ability to communicate the understanding of others’ emotions effectively with them). Related to our present study, the decline in empathy of health professionals is often attributed to experienced stressors of medical education—long hours, large quantity of information, and high performance requirements—and comorbid with heightened states of anxiety, anger, and depression. The connection between empathy and communication is rooted in the behavioral dimension of empathy, that is, empathy is not only felt or thought about—it is expressed. Acquiring empathy is a developmental process and experiences shape its development and expression. Bonvicini et al. found that intensive,
consistent communication training made a significant positive difference in the expression of empathy in physician–patient interactions.

**Relationship between Empathy and Clinical Outcomes**

Empathy plays a key role in clinical outcomes. The connections between empathy and client communication, adherence, and medical errors have all been well established. Extrapolated to a medical context, empathic communication can be seen as a healing form of medicine, both in terms of proximal outcomes (e.g., providing comfort, lessening anxiety) and intermediate outcomes (e.g., increased adherence).

**Measuring Empathy**

Changes in medical students’ levels of empathy are most frequently measured using either the Jefferson Scale of Physician Empathy (JSPE) or the Davis Interpersonal Reactivity Index (IRI). The JSPE is designed to be used with health care providers to measure attitudes toward empathy in patient care situations, while the IRI is intended for use with general populations, is grounded in a factor analysis of empathy as a construct, and provides a broader measure of empathy.

**Declining Empathy in Medical Students**

Neumann et al. conducted a meta-analysis on the empathy levels of medical students, interns, and residents, as measured by a variety of instruments. The majority of reviewed studies showed significant decreases in empathy as medical students progress through their training. This premise is supported by data from three longitudinal studies and six cross-sectional studies. Additional findings include one cross-sectional study with a non-significant trend toward a decrease, and one showing stability of scores. Studies of medical interns and medical residents also report a decrease in empathy. Neumann et al. postulated that the observed declines in empathy were linked to the assumption of clinical responsibilities as well as the distress caused by competing demands from the formal and informal (hidden) curriculum.

A few of these studies are worthy of more detailed analysis, as they establish a basis for our current investigation of veterinary students’ empathy. In a longitudinal study, Chen used the health professions student version of the JSPE (JSPE-S) and found a decline in empathy from pre-matriculation through completion of the fourth year of medical school. First-year medical students had the highest empathy scores, whereas the fourth-year class had the lowest empathy scores. The largest, statistically significant decline in empathy was observed between the second- and third-year classes. Students in this program begin clinical rotations in their third year, so the timing of the decline in empathy corresponds with the transition from pre-clinical to clinical coursework.

In a similar vein, Hojat et al. using the JSPE-S, conducted a longitudinal study of medical students’ self-reported empathy levels. They did not observe any statistically significant changes in empathy levels during the first two years of medical school. However, their subjects demonstrated a significant decline in empathy during their third year in medical school, and this trend continued through the rest of their medical training. This led us to hypothesize that a similar decline in overall empathy would be seen in veterinary students, with empathy starting to decline when students begin clinical rotations in their third year and face the challenge of juggling didactic and clinical learning and the associated demands of patient care. We expect this trend to continue with a further decline throughout the fourth year.

The IRI has been used to track empathy in medical students, with mixed results. Stratton et al. conducted a longitudinal study tracking a class of medical students from first-year orientation through completion of their third-year clinical training. They found a statistically significant decline in Empathetic Concern (EC) and a significant increase in Personal Distress (PD) over time. In contrast, Thomas et al. conducted a multi-institutional, cross-sectional investigation of medical students’ empathy. They used the IRI EC and Perspective Taking (PT) subscales to represent the affective and cognitive dimensions of empathy, respectively. Pooled data from 1,098 subjects did not reveal any significant differences in empathy levels based on students’ year in medical school.

The IRI has also been used to examine changes in empathy among interns and residents. Bellini et al. followed a cohort of physicians as they completed their internship and residency in internal medicine, using the IRI and the Profile of Mood States (POMS) to assess changes in mood and empathy during these phases of medical training. They found that interns began their medical training with lower levels of PD and higher levels of EC and PT than a reference group composed of average college students and adults. Upon completion of the internship, participants showed significant changes in two of these measures, corresponding to the affective domain of empathy. PD increased and EC decreased, suggesting that interns were less able to demonstrate empathy and concern for their patients toward the end of their training, while also facing increased levels of PD when dealing with other people’s difficult situations. The same physicians-in-training were surveyed during their residency, and their PD levels had decreased, showing a gradual return to baseline. Yet the residents’ EC levels continued to drop, resulting in a self-assessment that was lower than their baseline, but still comparable to the general population. The authors also noted that both of these changes had a moderate effect size.

**Declining Empathy in Other Health Professions**

The observed declines in empathy are not unique to medical students, interns, and residents. Veterinary students and those in other health professions are just as susceptible. A 2011 study explored empathy in students enrolled in five different health disciplines: pharmacy, dentistry, veterinary medicine, nursing, and medicine.
Pharmacy and veterinary students were found to have the lowest empathy scores upon entering the first year of training, with little change in their empathy scores on completion of the first year. Using the JSPE-S, the authors found a slight, non-significant decline in veterinary students’ empathy over the course of their first year in the program. However, this was a short-term study, and no further follow up was conducted.

In a similar manner, a cross-sectional study of dental students’ empathy found that first-year dental students reported significantly higher levels of empathy than students in any of the subsequent years in the program. There were no significant differences between subsequent classes. Since dental students in this program began to provide patient care in their second year, the authors linked the observed declines to increased exposure to patients.

To better understand how curricular experiences affect veterinary student empathy, we selected the IRI as a tool to assess DVM students’ levels of empathy as they progressed through the didactic years of the curriculum. The IRI has been used commonly to assess empathy in medical students, and consists of four subscales that measure cognitive and affective components of empathy. This tool has been used to measure the effects of curricular interventions in human medicine, which is similar to the design of this study. The IRI was chosen to assess both the affective and cognitive components of empathy in keeping with the particular requirements of the veterinary–client–patient relationship, and to assess veterinary students’ empathy toward other people, which can be used as an indicator of their ability to relate to clients. Veterinarians need to be able to relate to clients in a way that supports the sharing of vital information about their animals, and be able to build rapport so as to ensure that clients adhere to medical recommendations and treatment plans.

**HYPOTHESES**

1. Veterinary students’ levels of empathy change over time as they progress through the didactic portion of the veterinary curriculum. These changes follow the declining trends displayed by medical trainees.

2. Veterinary students’ levels of empathy are comparable to those demonstrated by medical students at similar points in their educational process.

**MATERIALS AND METHODS**

**Study Design**

This is a longitudinal study to assess changes in veterinary students’ self-reported empathy as they progressed through the didactic portion of a DVM program. The IRI was used to measure self-reported levels of empathy among a class of veterinary students enrolled at Colorado State University. Students completed the assessment at three points in time: (1) at the beginning of the first year; (2) at the beginning of the fourth semester (second year); and (3) during the fifth semester (third year). The survey was administered online, via the university’s learning management system. All submissions were anonymous. The survey administration and data collection activities were coordinated by the first and last authors, with assistance from a staff member. This study received IRB approval for use of Human Subjects from Colorado State University and North Carolina State University.

**Participants**

Students in the graduating class of 2016 (DVM 2016) were followed over the course of their first three years in the Doctor of Veterinary Medicine program at Colorado State University. The entering class consisted of 139 students at T1. Due to attrition, there were 133 students eligible to take the survey in spring of 2014 (T2), and 132 in fall of 2014 (T3). Varying numbers of students consented to participate during each survey administration.

Aggregate statistics show that the DVM 2016 class currently consists of 106 females (77%) and 32 males (23%). Students’ average age at admission was 25 years, with a median of 24. Most students (n = 117) held a minimum of a Bachelor’s degree at the time of matriculation, 20 had completed a Master’s degree, and one person had not completed a prior college degree.

**DVM CURRICULUM**

The DVM program consists of eight semesters of instruction. The first two years are devoted mainly to didactic courses, with students beginning part-time clinical rotations in the third year. The junior year is a mixed model with half of students’ time spent in didactic learning and the other half spent in clinical learning in the teaching hospital. The fourth year is devoted solely to clinical rotations in a variety of specialty areas. In addition to the typical content in basic and clinical sciences, there are several courses that teach professional skills. The courses most relevant to the development and maintenance of empathy, and their timing relative to survey administration, are described and illustrated in Figure 1.

**Freshman Orientation**

The initial data (T1) were gathered during students’ first month in the veterinary program, immediately after participation in an off-site orientation program. This orientation included team-building, stress management, and conflict resolution activities. The overall experience was designed to help students succeed in the DVM program and develop a social support network among classmates.

**Foundations of Veterinary Medicine I–III**

Students then completed three semesters of instruction before the second administration of the IRI survey (T2). This instruction included semesters 1–3 of a longitudinal Foundations of Veterinary Medicine course focusing on professional skill development, including ethics, communication, physical examination, animal handling, and clinical reasoning. During the first and second semesters, students participated in sessions pertaining to ethics (AVMA position statement, ethical problem solving, Aesculapian authority, influencing patients, and industry relationships), animal welfare, and client interview skills.
In the third semester, students received lectures in ethics (large-animal handling and ethical problem solving) and were asked to complete a group presentation on a topic of their choosing. They also attended a panel presentation on the topic of substance abuse in the veterinary profession. Even though empathy is not explicitly addressed during these courses, the activities encourage students to consider the viewpoints of other people (e.g., through the ethical problem-solving cases) and difficult situations they may be facing (e.g., substance abuse panel).

Foundations of Veterinary Medicine IV: Ethics/Communication Module

The second administration of the IRI (T2) was tied to the fourth-semester (second-year) Foundations of Veterinary Medicine course, and took place after students completed the Ethics/Communication module. During this semester, students interacted with a simulated client to practice communication skills and ethical decision making in the context of an integrative module. The scenario was designed to arouse students’ levels of empathy by focusing on a situation where a client presents a dog requiring immediate surgery to correct a gastric volvulus dilatation (GDV), but is unable to afford the procedure. The module consisted of class discussions on “ethical conversations,” where students received an overview of the case, and on “communication skills,” where students practiced skills related to delivering bad news and handling emotionally charged situations. These discussions were followed by a 60-minute communication laboratory where learners interacted, as teams of five, with the simulated client, who served as both coach and client. The closing exercise was a team debriefing session, focusing on the ethical issues and team communication. Prior to the laboratory, students completed a reflection assignment, discussing their personal reactions and constructive approaches to managing anger and ethical dilemmas.

Clinical Communication Skills, Part I

During the fifth semester (third year), students participated in a 20-hour Clinical Communication Skills rotation/course. This included 12 hours of interactive classroom activities and 10 hours in the communication laboratory working with simulated clients. The focus of the course is initiating the clinical interview, gathering information, and building a strong veterinarian–client–patient relationship. During this rotation, each student has an opportunity to interact with simulated clients in two clinical scenarios. The students completed the final IRI survey (T3) within one week of finalizing this rotation.

INSTITUTIONAL SUPPORT SERVICES FOR STUDENTS

Given the relationship between empathy and other indicators of student well-being, and given the report of the AAVMC Health and Wellness Summit,\textsuperscript{47} it is necessary to provide background on the DVM program analyzed in the current study. CSU has an on-site licensed professional available to provide counseling at no charge to veterinary students.\textsuperscript{48} CSU students may also choose to participate in an elective academic course, The Healer’s Art. This integrative course uses a discovery model to

Figure 1: Relationship between ethics/professional skills instruction and IRI survey administrations
encourage sharing of experiences to explore service, wholeness, grief and loss, and meaning in veterinary medicine. Thus, there are two different types of support available to promote students’ well-being, in either an individual or group setting, in addition to the professional skills modules all students are required to complete. All of these different types of interventions are hypothesized to support the development of empathy.

**INSTRUMENT SELECTION AND VALIDATION**

The IRI\(^{33,34}\) consists of four subscales that measure the cognitive and affective components of empathy. The cognitive elements are Perspective Taking (PT) and Fantasy (FS). The PT scale assesses a person’s tendency to spontaneously adopt the psychological point of view of others, using items such as “I try to look at everybody’s side of a disagreement before I make a decision.” The FS scale assesses participants’ tendency to transpose themselves into the feelings and actions of fictitious characters. An example item is “I really get involved with the feelings of the characters in a novel.” The affective components examine the participants’ emotional reactions to difficult situations. The Emphatic Concern (EC) scale assesses feelings of sympathy and concerns for others in unfortunate situations, such as “When I see someone being taken advantage of, I feel kind of protective towards them.” In contrast, the Personal Distress (PD) scale measures participants’ “self-oriented” feelings of personal anxiety and unease in tense interpersonal settings. This scale uses items such as “I sometimes feel helpless when I am in the middle of a very emotional situation.” Since this dimension is measuring a negative trait, higher scores correspond to greater distress.

The IRI instrument has been previously validated and widely used with medical students.\(^{12-14}\) However, since the IRI has not been previously administered to veterinary medical students, a validation of the instrument relative to the new sample frame was necessary to ensure the instrument functioned as intended. This was accomplished by surveying additional groups of veterinary students at two institutions, and examining the distribution of their responses.

For the instrument validation study, data from the first administration of the IRI to CSU students (T1) was pooled with data from two additional samples. Enrollees in the CSU graduating class of 2015 also completed the IRI at the beginning of their first year. This class consisted of 138 students, of which 106 (77%) were female and 32 (23%) male. This class had a similar age distribution to the treatment group: average age of 25 years at admission, with a median of 24 years. At the time of matriculation, 107 students held Bachelor’s degrees, 22 had Master’s degrees, 3 had Associate’s degrees, and 6 had not yet completed a degree. Veterinary students in the graduating class of 2018 at North Carolina State University were also surveyed. There were 100 students in this class: 77 (77%) females and 23 (23%) males. The average age of admission for this group was 24 years, with a median of 23. Within this group, 6 students held a Master’s degree at the time of enrollment, 89 reported a Bachelor’s degree as their highest completed degree, and 5 students had not yet completed a degree.\(^{49}\)

All initial survey responses from the combined sample frame (n = 361) were subjected to a psychometric analysis via the Rasch Rating Scale Model.\(^{50}\) This included 119 responses from the CSU DVM class of 2015, 144 from CSU DVM 2016, and 98 from the NCSU class of 2018, such that each participant only contributed one data point to the validation study. A series of psychometric analyses were performed using Winsteps measurement software,\(^4\) including tests for fit and local independence (content aspect of validity), rating scale functioning (communicative and structural aspects of validity), and reliability (generalizability aspect of validity).

**DATA COLLECTION**

For all time points, students were required to complete the IRI survey as a course requirement. At the end of the survey, students were asked to choose whether they would allow their data to be used for research purposes. Submissions were tracked via the anonymous survey feature of the online course management system, so instructors could assign completion points based on anonymous submissions. Once the data were downloaded for analysis, only responses from students who gave consent to participate were included in the statistical calculations. Data from those who did not consent were immediately deleted. Skipped questions were handled by excluding the specific subscale from analysis for the particular participant.

**STATISTICAL ANALYSES**

Descriptive and inferential statistics were performed using IBM SPSS Statistics version 22.\(^b\) A p value of .05 was selected as the cut-off for statistical significance. Descriptive statistics were used to calculate mean scores on each of the four IRI subscales for each group/test administration, based on participants’ institution and year of study. Since the Levene statistic showed unequal variances, a Welch ANOVA test was used to examine the longitudinal data for changes in scores over time. When significant differences were observed, a Tukey HSD test was used for post-hoc comparisons as appropriate.

**RESULTS**

The validation exercise indicated the IRI performed as expected and is suitable for use with veterinary medical students. Specifically, all 28 items fit the Rasch model’s expectations by way of acceptable fit statistics and showed local independence by way of sufficient point measure correlation values. The rating scale functioned well based on acceptable fit statistics and threshold calibrations that advanced in a stepwise manner.\(^{31}\) Collectively, the items demonstrated sufficient variance with regard to their difficulty to endorse, and reliability estimates ranged from .79 and .82, indicating moderate levels of statistical reproducibility. Collectively, these findings provided adequate construct validity evidence. Further support for the use of this instrument to measure empathy among veterinary
Table 1: Longitudinal comparison of IRI scores for one veterinary class (2016) over time

<table>
<thead>
<tr>
<th>Year in Program</th>
<th>EC</th>
<th>FS</th>
<th>PD</th>
<th>PT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>Range</td>
</tr>
<tr>
<td>First</td>
<td>143</td>
<td>20.17</td>
<td>4.298</td>
<td>11–28</td>
</tr>
<tr>
<td>Second</td>
<td>122</td>
<td>19.54</td>
<td>4.482</td>
<td>6–28</td>
</tr>
<tr>
<td>Third</td>
<td>127</td>
<td>19.30</td>
<td>5.397</td>
<td>0–28</td>
</tr>
</tbody>
</table>

Note: EC = Empathetic Concern; FS = Fantasy; PD = Personal Distress; PT = Perspective Taking
* p = .015
† p = .001
‡ homogeneous subset
§ homogeneous subset

Finally, during third year, when students began their clinical rotations, the mean score for PT was 18.65 (SD = 4.20), and mean scores on the FS subscale increased to 17.15 (SD = 6.19). Students’ PD scores showed a large increase to 8.82 (SD = 4.81), while EC scores declined even further to 19.30 (SD = 5.40).

A Welch ANOVA found significant differences over time, with PT (F[2] = 7.698, p = .001) decreasing, while mean PD scores (F[2] = 4.249, p = .015) increased. There were no statistically significant differences for mean EC and FS subscale scores.

PT scores were significantly higher for first-year students (T1) than either of the other two groups (T2 and T3). There were no differences between second- and third-year students. This shows a sharp decline early in veterinary students’ education, between T1 and T2.

PD scores were significantly higher for students in their third year of the DVM program (T3) as compared to their first year (T1). There was no significant difference between students in the first and second year (T1 vs. T2), or between students in second and third year (T2 vs. T3). Thus, the trend is for PD scores to increase gradually, with significant differences only evident over time.

DISCUSSION

While many studies have examined empathy levels of students advancing through medical curricula, this is the first study to investigate empathy among veterinary students. The survey response rates were greater than 92% at all three times of measurement, capturing most of the enrolled veterinary class at each time point. Examination of IRI for use in veterinary students indicated strong reliability and construct validity.

In support of our first hypothesis, a significant decline in self-reported level of PT and a significant increase in PD were noted as veterinary students completed the primarily didactic-based instruction in the first three years of the curriculum. In relation to our second hypothesis, the observed changes in empathy scores were similar to the patterns shown for medical students and interns.5,67

EMPATHY: INTERPERSONAL REACTIVITY INDEX

Results of the IRI for all three time points are summarized in Table 1. For first-year students, mean scores on the cognitive subscale were 20.29 (SD = 3.90) for PT, and 18.06 (SD = 4.99) for FS. In the affective domain, the mean scores for PD were 7.18 (SD = 4.32) and 20.17 (SD = 4.30) for EC.

During second year, the mean scores for both cognitive components decreased. The mean score for PT declined to 18.43 (SD = 4.73) and the mean FS score declined to 16.82 (SD = 6.19). On the affective scale, PD increased to 7.94 (SD = 4.68), while EC scores dropped to 19.54 (SD = 4.48).

students was provided by Paro,52 who addressed the potential limitations of using the PD scale with medical students, due to concerns that it measures items that might be characteristic of empathy in the general population (e.g., “I tend to lose control during emergencies”) but that would interfere with a physician’s performance. Paro and colleagues concluded that the IRI PD scale was appropriate for use with medical students, because it found the same decreases in empathy that were observed with other physician-specific empathy scales.

To assess longitudinal trends in levels of empathy, the class of 2016 was followed over time. To account for student attrition from the program, response rates were calculated based on the number of students enrolled during a particular semester, and thus eligible to participate in the study. Upon entry to the program (T1), 144 (of 139, or 103%) students completed the survey. During their second year (T2), 123 (92.5%) students participated, and 127 (96.2%) completed the survey during their third year (T3). The additional survey submissions at T1 were due to participation from students enrolled in combined programs, such as MBA/DVM and DVM/PhD. These students were invited to join their classmates for orientation even though they would spend their first year working on their MBA or PhD degrees.
which could be explained by the comparable expectations for graduating veterinarians and medical interns/residents. Unlike their counterparts in human medicine, veterinary students are allowed to enter practice immediately upon graduating from an accredited DVM program and passing the North American Veterinary Licensing Examination (NAVLE) exam. This places third-year veterinary students at a similar point in their professional development to interns and residents. Changes in each of the dimensions will be considered separately and compared to existing literature.

**Cognitive Elements of Empathy**

**Perspective Taking**

PT relates to an individuals’ capacity to understand another person’s perspective about a particular situation, and spontaneously adopt the point of view of the other person instead of solely focusing on themselves. PT scores are also positively correlated with better social functioning and higher self-esteem. In veterinary medicine, we observed a significant decline in levels of PT between T1 and subsequent administrations, showing that students lost the ability to see things from another person’s perspective very early in the DVM program. These observed changes are in contrast to studies done by Quince and Thomas, showing that PT did not change over time for medical students. Similarly, Bellini did not observe any statistically significant changes in PT over the course of internship or residency for physicians in training.

It is concerning to note that the decline in PT occurred during the first three semesters of the DVM program, immediately after matriculation. During this time, students have minimal contact with clients and patients, but they complete didactic instruction and a laboratory session on clinical interviewing skills. After the initial decline, there were no significant changes in PT between T2 and T3, corresponding to the period when DVM students participate in the bulk of the experiential interventions pertaining to ethics and client communication. Thus, the required Ethics/Communication module and standardized laboratories, plus the optional Healer’s Art course, were not sufficient to raise this parameter back to baseline levels upon entry to the program as measured by the IRI. However, these courses may have been sufficient to stop further declines.

The decline observed in PT between T1 and T2 could be due to the homogeneous peer support group veterinary students share, and/or the pressure students feel to succeed academically. Most veterinary students have similar values (e.g., love for animals) and goals, and this could have led to reinforcement of the view that there is one “correct” perspective for every situation.

These findings are worrisome as well, due to prior studies showing an association between higher PT scores and increased well-being for physicians in training, reinforcing the assertion that students’ well-being declines as they progress through the veterinary program.

**Fantasy**

The lack of significant changes on the FS scale is not surprising, because this scale assesses the tendency for respondents to transpose themselves into fictional settings, and is not directly related to clinical empathy. Because this measure is unrelated to social functioning, very few published studies include data for this subscale. Handford showed that the FS subscale was inversely related to age, but did not observe any differences between the medical and control groups.

**Affective Measures of Empathy**

**Personal Distress**

PD is a measure of participants’ self-oriented feelings of anxiety and unease in interpersonal settings. Higher levels of PD are associated with higher levels of social dysfunction and lower levels of social competence. Since the PD scale is measuring a negative trait, higher scores correspond to greater levels of distress. Veterinary students’ levels of PD were lowest at matriculation, and then gradually increased as they progressed through the program and assumed greater responsibilities for client communication and patient care. Even though the year-to-year difference was not significant, the overall difference between T1 and T3 was statistically significant.

The statistically significant increase in reported feelings of PD among veterinary students in the third year was observed at the time when students transition from the traditional, didactic curriculum, to a blended curriculum of clinical science courses and clinical rotations, some of which involve direct patient and client care. This is consistent with Stratton’s findings for medical students transitioning to clerkships. Thus, it is possible that the increased responsibilities and associated workload heightened students’ vulnerability or anxiety. For some students, these may be their first encounters with clients and authentic (ill) patients.

Increased levels of PD are also correlated with increased frequency of self-perceived medical errors. Self-perceived medical errors lead to greater PD, while PD is also linked to increased odds of future medical errors, leading to a vicious cycle that is detrimental to both patients and caregivers. This lends support to the idea that developing curricular materials to explicitly discuss the topic of medical errors and prevention can improve students’ well-being and improve patient care.

PD is inversely related to overall health and well-being in medical interns, and it peaks during the internship year, before returning to baseline during residency. These results are a plausible explanation for the observed changes in PD among veterinary students, and give hope that students’ distress levels may return to baseline levels after they complete their education and gain confidence in their patient care skills.

PD decreases with age and clinical experience over time, as shown by Handford, who examined changes in empathy over time for medical students and physicians, and compared these scores to age-matched control
groups from the general population. The authors noticed a progressive decrease in PD scores with increasing levels of medical training/practice. They hypothesized that this decrease might be due to the coping mechanisms developed by older doctors in response to ongoing stressors. Thus, it is possible that veterinary students’ levels of PD could return to baseline at a later point in time, once they are able to establish routines and gain confidence in their ability to provide appropriate clinical care.

Anecdotally, it is common for veterinary students to demonstrate impostor syndrome at this transitional time in their professional development from student to clinician. Impostor syndrome is a psychological phenomenon in which people are unable to internalize their accomplishments. Despite evidence of competence, such as successfully completing their coursework and examinations, students feel inadequate to meet the expectations of clinicians, clients, and patients in the final clinical year.

Given the research evidence on depression in veterinary students, it is reasonable to generalize that PD may be inversely related to veterinary student well-being. Numerous studies have found that veterinary students exhibit high levels of psychological distress including anxiety, depression, and suicidal ideation. These findings have given rise to a growing number of resources and interventions that have given rise to a growing number of resources and programs designed to support veterinary students. These include individual counseling, wellness workshops, and a growing interest in mindfulness training. It is our hope that further development of wellness programs will also help students to maintain their empathy toward other people—most notably, their clients.

**Empathetic Concern**

The EC scale assesses “other-oriented” feelings of sympathy and concern for unfortunate others. Davis found a strong correlation between EC and PT scores when the IRI instrument was developed. Even though there were no significant differences found for EC in this study, an overall trend was noted for veterinary students’ scores to decrease over time, in parallel with their PT scores. However, the data on EC are not consistent and vary by country. Studies conducted in the US found significant decreases in EC for medical students between matriculation and clerkship, and over the course of a year-long internship. But Quince found no changes in cognitive empathy over the course of the six-year medical program in the UK. Thus, there may be cultural components involved in the perception of EC, even among English-speaking countries. A curricular explanation for the lack of change among veterinary students is that the targeted professional skills interventions helped students maintain their concern for others. Thus, the Ethics/Communication modules and laboratories may have served as moderators of negative influences and helped students to sustain their level of EC for others.

**IMPLICATIONS FOR INSTRUCTION**

It is important to note that the observed changes in decreasing PT and increasing PD were found alongside a curriculum that already incorporates standard best practices in veterinary education. The CSU DVM curriculum currently requires all students to complete communication training and discussions of veterinary medical ethics. Students also have the option of enrolling in an elective course, The Healer’s Art, which uses a discovery model to encourage sharing of experiences to explore service, wholeness, grief, and loss, and meaning in veterinary medicine. At a program level, the college provides student support services, including a full-time counselor dedicated to helping veterinary students who seek out assistance.

To support our students’ growth as competent, caring veterinarians, it is crucial for DVM curricula to evolve beyond the standard interventions and move toward supporting development of the whole person—including professional skills. There is a need to develop coordinated, integrated, developmental programs that foster the development and maintenance of empathy throughout the four years of the DVM program. These experiences should be designed in a purposeful manner, so that students build their skills over time in a variety of curricular and co-curricular experiences—laboratories, small-group activities, service projects, and clinical rotations.

It is important to investigate more in-depth instructional approaches to promote the development of the cognitive aspect of PT, because the communication skills interventions used in this study emphasized behavioral expressions of empathy, and not the cognitive skills associated with perceiving another’s perspective. Shankar found that completion of a medical humanities module led to significant increases in PT scores for first-year medical students in Nepal. The module consisted of activities (such as interpreting a painting) and role plays in which students were explicitly asked to see things from another perspective. However, participation in the module was optional, so students likely self-selected. Bonvicini et al. randomly assigned physicians to intervention and non-intervention groups involving intensive communication education, including didactic, practice sessions, and individual coaching. The physicians who participated demonstrated significantly more empathic statements. However, no administration of an empathy assessment such as the IRI or JSPE was given. Evans conducted a study with medical students, showing that participation in a lecture and workshop designed to improve communication skills led to increased expressions of empathy during a videotaped patient encounter. These increases were measured using two observational instruments: the Accurate Empathy Scale and History-Taking Rating Scale. Yet, there was no significant change in pre-post IRI scores for the same participants, most likely due to the specific communication strategies taught.

In the dental field, a didactic intervention, in the form of a behavioral science course, was shown to create short-term gains in the cognitive and affective aspects of empathy (as measured by the JSPE) and better prepared students for their first clinical encounter. Thus, it could be hypothesized that a course that explicitly addresses empathy in a focused manner might be a useful adjunct to the veterinary curriculum, perhaps even when paired with an experience involving aspects of diversity in the population.
Taking a broader view on the measurement of empathy, Stepien reviewed several interventions with medical students, and reported that communication skills workshops, accompanying and assisting a patient, or being hospitalized themselves increased medical students' self-reported perceptions of empathy, as determined by qualitative observations. Some of these interventions, such as shadowing a client, can be easily adapted to veterinary curricula.

The increase in PD underscores the need to provide enhanced support for student well-being as students transition into client and patient care responsibilities. While there were numerous didactic opportunities for students to role-play with simulated clients, perhaps a support group, in addition to the psychological counseling already available, could help students build personal resiliency and better meet the needs of their clients and patients. In being cared for themselves, students might be in a stronger position to care for others.

Support for the concept of co-curricular interventions can be found in Shanafelt's study, documenting that enhanced perceptions of quality of life and mental health were linked to higher levels of cognitive empathy among medical residents. Therefore, increased resources for student well-being (e.g., wellness instruction, activities, and facilities; increased emphasis on healthy eating, stress management, and regular exercise) may have the potential to increase or at least sustain levels of PT, which would in turn enhance client and patient care. At the same time, educators need to transform the hidden curriculum and create a cultural shift within institutions, such that empathy is modeled and valued in clinical settings.

STRENGTHS AND LIMITATIONS

This study provides detailed data for one cohort of students completing the didactic portion of the veterinary curriculum at one institution. Considering differing geographic and cultural factors, generalization of the findings to other veterinary colleges may be limited. A major strength was the high response rate: each survey was completed by 92% or more of the eligible participants. This suggests that the results are representative of the target population under study and reduces the impact of self-selection bias. Given the large sample size and high participation rate, we expect that these results may generalize to similar DVM programs with clinical exposure in the third year—assuming this cohort of veterinary students is representative of the greater population. The IRI measures cognitive and affective domains of empathy, so it is unknown how these precursors will translate into students’ actual expressions of empathy.

FUTURE DIRECTIONS

Given this backdrop, further research is suggested, including following this student cohort and tracking their levels of empathy through their fourth year. Further investigation is necessary to assess the impact of full-time clinical rotations on students’ empathy. It is possible that students’ empathy may return to baseline levels upon graduation and/or completion of post-graduate training, similar to what Bellini found for medical interns and residents. Thus, additional data on this specific cohort will be collected to examine the effects of full-time client and patient care responsibilities on students’ self-reported levels of empathy. Other instruments will also be investigated to assess students’ behavioral manifestations of empathy in clinical settings.

Considering that experience is critical in the development of empathy, development of this trait may be linked to cultural customs, faculty role-modeling, and aspects of the hidden curriculum of a particular institution. Further studies are necessary to determine whether the observed pattern is specific to a particular veterinary program, or if students from other schools display similar trends.

Lastly, it is critical to research how to support veterinary students within the DVM curriculum and to study connections between stress, anxiety, and depression and increased PD and lower PT to promote student well-being and capacity for empathy with clients and colleagues.

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