

Pilot Study of Veterinary Student Mindset and Association with Academic Performance and Perceived Stress

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ABSTRACT

Individuals with a growth mindset believe that all failures are opportunities and that their baseline intelligence and talent can be used for continuous improvement. Individuals with a fixed mindset believe that baseline intelligence and talent cannot be developed. A growth mindset is associated with greater academic success and greater resilience in the face of failure or stress. Second-year veterinary students completed three surveys to determine mindset, perceived levels of stress, and life change score. Of 57 students, 70% had a strong growth mindset or a growth mindset with some fixed ideas. No students had a strong fixed mindset. Mindset was not correlated with GPA or perceived stress level. Colleges of veterinary medicine can assist students by providing resources and training for stress management, including training in how to further develop a growth mindset.

Key words: mindset, wellness, stress management

INTRODUCTION

Stress is not unique to veterinary students or veterinary practitioners. Stress triggers in the general population include things as broad as poverty and malnutrition, as specific as loss of a loved one or chronic illness, and as seemingly innocuous as poor time management skills. Veterinary students potentially suffer from any of these triggers but with an overlay of high personal and family expectations and a challenging academic load.^{1,2} Stress is positively correlated with anxiety and depression.³ In a survey of college students across a wide range of disciplines in other health professions, veterinary students had the highest perceived level of stress and the greatest frequency of psychological symptoms in one country.⁴ In one study, the percentage of veterinary students reporting anxiety and depression was higher than the percentage of medical students, with increasing levels of depression and stress through the first three semesters of the curriculum.^{3,5} Some hypothesize that this is because veterinary medical students have always been high-achieving students and may not readily be able to change their study habits or personal management to accommodate the lack of autonomy of the traditional lockstep curriculum and the huge amount of information with which they are expected to be familiar.²

Specific stressors for health science students can be broken down into several categories. Academic stressors include high volume of curricular content; the need to learn new study skills; and the need to learn unfamiliar skills, such as client communications, business management, and advanced clinical skills.^{1,6-10} Personal stressors

can include moving and the change in living conditions; loss of personal support networks and changes in personal relationships; lack of sleep; lack of emotional intelligence and subsequently inability to handle personal crises or conflict situations well; financial concerns; and homesickness.^{1,5,7,9-11}

Some question the increasing concern about student stress, recognizing that veterinarians have historically needed to learn about multiple species and have worked long hours during school and after graduation. This is reflected in research demonstrating that veterinarians are less likely than the general public to recognize the value of treatment of mental health concerns and may be more likely to consider mental health issues a form of weakness.^{12,13} However, veterinary colleges report an increasing percentage of students suffering mental health issues and greater severity of the issues described.¹⁴ Students may respond to stressors in unhealthy ways, including excessive use of caffeinated or alcoholic beverages with subsequent negative health consequences.¹⁵⁻¹⁸ Physical responses to stress include lack of appetite, binge eating, and insomnia.⁴ Academic consequences arise from anxiety, difficulty concentrating, and procrastination.^{2,4} Students may negatively compare themselves to their peers and may be unwilling to participate in class discussions or to try learning new skills, which impairs their learning.² In general, stressed students report lower life satisfaction and greater concerns about their physical health and mental well-being.⁵

Veterinary schools can attempt to ameliorate some of these stressors by providing academic coaching and

other student mentoring, making students aware of readily available counseling services, and teaching students specific coping skills.^{5,6,14,19} Students must be at a point where they are receptive to this information or they are unlikely to heed advice. In one study, students trained in healthy behaviors early in the curriculum failed to demonstrate good coping skills, citing time constraints and lack of motivation.²⁰ Scheduling of coursework, use of student-centered learning, attention to amount of work required outside of class, use of assessment tools such as open-book examination, and use of study guides or “crib sheets” may also decrease student stress.²¹ Student stress can also be decreased by providing review sessions before major assessments or tasks, such as providing a clinical skills laboratory to review surgical skills before a surgery laboratory.²²

With or without specific training, students identify ways to manage stress. These include club activities, intramural sports, surfing the Internet, listening to music, sleeping, seeking out social interactions, and organizing their time so they can optimally prepare for coursework.^{11,23–25} In one study, despite 60% of surveyed students identifying physical activity as a means to manage stress, many students reported decreased physical activity during periods of stress.²⁶ Similarly, students often report avoidant activities, such as cleaning, spending time on social media, shopping, eating, and using recreational drugs.¹¹ Religion, specifically prayer, was described by one researcher as an avoidant strategy used by students, while religious practices and positive reframing of situations was described by another researcher as stress relieving.^{8,11}

Ability to reframe things positively may be one component of what is variously called an incremental paradigm, an internal locus of control, or a growth mindset.^{27–31} People with a growth mindset are defined by Dweck as “people who believe their most basic abilities can be developed through dedication and hard work—brains and talent are just the starting point.”³² The opposite is an entity paradigm, external locus of control, or fixed mindset.^{27–31} People with a fixed mindset are defined by Dweck as “people who believe their basic qualities, like their intelligence or talent, are simply fixed traits.”³² People with a growth mindset see failure as an opportunity to learn and tend to be stronger academically and to be better problem solvers.^{28,29} They have an internal motivation to learn for learning’s sake and have resilience in the face of struggle.^{32,33} They are better at pattern recognition, counterfactual thinking, withstanding bias from emotion in decision making, seeking and accepting feedback, reflecting constructively on past experiences, and experimenting with new behaviors and strategies.³⁰ People with a fixed mindset are more prone to stress and unhealthy perfectionism.^{28,34} Having a growth mindset clearly would be advantageous for veterinary students as they work through the dense 4-year veterinary curriculum.

In this study, we researched the following questions:

- What is the predominant mindset in a cohort of second-year students in one veterinary school?
- Does mindset correlate with GPA?
- Does mindset correlate with self-assessed levels of stress?

MATERIALS AND METHODS

The Institutional Review Board at the author’s institution approved the study. Two electronic surveys were made available to student volunteers in the second-year class of the DVM curriculum. Both survey instruments are validated and freely available for use in research. The first was a mindset survey (Appendix 1) adapted from Dweck.³¹ The second was a perceived stress scale (Appendix 2).^a

Variation between groups was assessed by ANOVA. Correlations were evaluated using Pearson’s correlation coefficient.

RESULTS

The surveys were offered to second-year students at the beginning of the school year. This class contained 99 students with 13.1% males. The sample was 57 students with 10.5% males. Eight students from the sample group were in the upper quartile, 18 in the upper middle, 20 in the lower middle, and 11 in the lowest quartile of the class based on GPA at end of first year. Mean age of the sample group was 24.7 ± 2.5 years.

All data were normally distributed based on visual inspection. Eight students had a strong growth mindset, 32 had a growth mindset with some fixed ideas, and 18 had a fixed mindset with growth ideas. No students had a strong fixed mindset. Overall mean stress score was 16.1 ± 6.5 . There was no significant association between mindset group and either stress score or first-year GPA. Correlation between stress score and GPA was negligible ($r = .12$).

DISCUSSION

The primary limitation of this study was small sample size. Because there is recognized variation in student-reported stress across the curriculum, the author chose not to introduce variability by surveying students from all 4 years.⁹ Results may have been different if students had taken the surveys at a different year in the curriculum or in the spring instead of the fall.^{9,35,36}

The majority of the students who participated demonstrated a growth mindset. It is possible that students with a fixed mindset chose not to participate as they might have seen little opportunity for positive change based on their participation. However, this preponderance of the population having a growth mindset agrees with the distribution of mindset among gifted students.³⁷

Level of perceived stress was not correlated with overall student GPA from first year. This suggests either that the students who participated are not stressed, are good at managing stress, or do not address other aspects of their lives while working to maintain high academic performance. The last of these is most concerning. Institutions could monitor student stress but must be aware that simply completing a survey about stress is, in and of itself, a stressful experience for some students. For this reason, many colleges will assume students are stressed and will provide support without necessarily documenting levels of student anxiety to drive decisions. While it is possible that students in this population were not stressed, the author considers this unlikely considering

the large body of evidence detailing stressors in the lives of college students, especially those in professional degree programs.¹⁻¹¹

Veterinary colleges should offer a variety of types of support for students. Students would benefit most from being made aware of university-wide or college-level resources on a regular basis, or being presented with information “just in time.”^{1,14,19,20} Faculty and staff should be trained to recognize stress in students and to respond properly.¹ Pet therapy is commonly used in human populations under stress and has been demonstrated to decrease test anxiety among nursing students.³⁸ This could easily be introduced in a veterinary school setting. Students might also benefit from coursework in time management and development of better study skills, learning either from faculty or peer instructors.^{1,24,36} Elementary and junior high students who were taught how the brain takes in and stores information were more likely to adopt a growth mindset.^{39,40} Stress management techniques introduced could include healthy eating, physical activity, and mindfulness.^{20,41} Students enrolled in mindfulness courses offered at one school demonstrated better attention and greater self-awareness than their classmates who did not take these courses.⁴¹ Courses in individual student well-being and in well-being of relationships were offered by one school; those students who participated showed a decrease in depression scores.⁴² This offering was based on work showing that students with healthy relationships had fewer depressive symptoms, less stress, better physical health, and increased ability to cope with the academic load.⁴³

Students in this sample generally had either a growth mindset or a fixed mindset with some growth ideas. It is the author’s belief that having a strong growth mindset benefits veterinary students, as growth mindsets are associated with resilience in the face of difficulty and improved opportunities for learning due to improved pattern recognition, better acceptance of feedback, greater likelihood of reflection on learning experiences, and experimentation with new learning strategies.^{28-30,32,33} Students and faculty could be trained to recognize their own mindsets and to move toward a stronger growth mindset. Faculty can model a growth mindset for students and can provide feedback that encourages a growth mindset by praising process instead of demonstrated knowledge.^{39,44,45} The following are four steps to developing a growth mindset⁴⁴:

1. Learn to recognize when you are thinking with a fixed mindset (“I failed this examination because I cannot learn this kind of material”).
2. Recognize that you have a choice (“I may have failed this examination because this is a difficult subject or because I didn’t spend enough time going over study questions”).
3. Talk back to the fixed voice with a growth voice (“I can learn this material by changing my study habits”).
4. Take the growth mindset action (“I will spend more time going over study questions before the next examination”).

Further research could include assessment of how institutions could formalize this kind of training for students, staff, and faculty; of whether change in mindset occurs after such training; and of whether identified change toward a strong growth mindset is associated with decreased stress and increased enjoyment in work and school. Training toward a growth mindset could provide students with a long-term, consistent method to control stress and enhance learning.⁴⁰ Concerns about such training include variation in mindset from one discipline to another (e.g., one might have a fixed mindset regarding one’s ability to dance but a growth mindset regarding intellectual pursuits) and student unwillingness to focus on topics that do not appear to them to be immediately relevant, especially if they can maintain a high GPA without such training.⁴⁶ Institutions may not provide such support because they ignore evidence that training in personal management helps students to navigate the 4 years of veterinary school beyond academics. Colleges and their faculty may not be aware of the extent of student stress until a crisis is reached.

CONCLUSIONS

This student population generally has a growth mindset. Student stress level was not correlated with GPA. Colleges should ensure that students are aware of and have ready access to support services and should help students develop good study skills and recognize the value of mindfulness and other personal management techniques to further build student coping skills.

NOTE

- a Perceived Stress Scale available at www.mindgarden.com

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APPENDIX 1: MINDSET SURVEY

To what extent do you agree or disagree with these statements?
(For each, choose *strongly disagree*, *disagree*, *agree*, or *strongly agree*)

1. Your intelligence is something very basic about you that you can't change very much.
2. No matter how much intelligence you have, you can always change it quite a bit.
3. You can always substantially change how intelligent you are.
4. You are a certain kind of person, and there is not much that can be done to really change that.
5. You can always change basic things about the kind of person you are.
6. Musical talent can be learned by anyone.
7. Only a few people will be truly good at sports—you have to be “born with it.”
8. Math is much easier to learn if you are male or come from a culture that values math.
9. The harder you work at something, the better you will be at it.
10. No matter what kind of person you are, you can always change substantially.
11. Trying new things is stressful for me and I avoid it.
12. Some people are good and kind, and some are not—it's not often that people change.
13. I appreciate when people (including parents, teachers, coaches) give me feedback about my performance.
14. I often get angry when I get feedback about my performance.
15. All human beings without a brain injury or disability are capable of the same amount of learning.
16. You can learn new things, but you can't really change how intelligent you are.
17. You can do things differently, but the important parts of who you are can't really be changed.
18. Human beings are basically good, but sometimes make terrible decisions.
19. An important reason why I do my schoolwork is that I like to learn new things.
20. Truly smart people do not need to try hard.

Scoring: questions 2, 3, 5, 6, 9, 10, 13, 15, 18, and 19 are “growth” questions. The rest are “fixed” questions. Growth questions are scored from 0 (*strongly disagree*) to 3 (*strongly agree*) and fixed questions are scored from 3 (*strongly disagree*) to 0 (*strongly agree*). Individuals who score 20 points or less have a strong fixed mindset, those scoring from 21 to 33 points have a fixed mindset with some growth ideas, those scoring from 34 to 44 points have a growth mindset with some fixed ideas, and those scoring 45 points and over have a strong growth mindset.

APPENDIX 2: PERCEIVED STRESS SCALE

The questions in this scale ask you about your feelings and thoughts *during the last month*. In each case, you will be asked to indicate by circling how often you felt a certain way.

	0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often				
1. In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the last month, how often have you felt you were unable to control the important things in your life?	0	1	2	3	4
3. In the last month, how often have you felt nervous and stressed?	0	1	2	3	4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
5. In the last month, how often have you felt that things were going your way?	0	1	2	3	4
6. In the last month, how often have you found that you could not cope with all of the things that you had to do?	0	1	2	3	4
7. In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
8. In the last month, how often have you felt you were on top of things?	0	1	2	3	4
9. In the last month, how often have you been angered because of things that were outside of your control?	0	1	2	3	4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Scoring: scores are obtained by reversing responses to the four positively stated items (items 4, 5, 7, and 8) and then summing across all scale items.