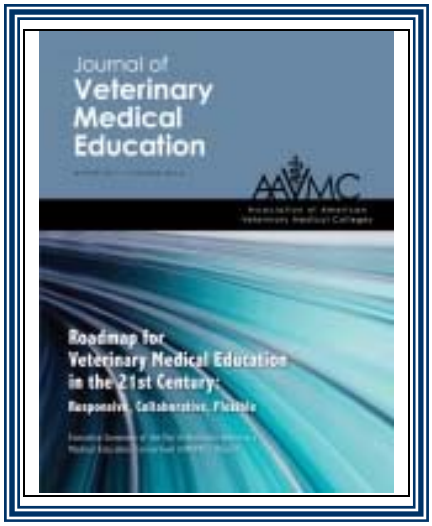


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# Using a Natural Abilities Battery for Academic and Career Guidance: a Ten-Year Study

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# Using a Natural Abilities Battery for Academic and Career Guidance: a Ten-Year Study

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**ABSTRACT**

Over a period of 10 years, first-year students from 11 consecutive veterinary classes conducted a self-assessment using a natural abilities survey. The present study analyzes the data compiled from students' self-assessment results. As a group, veterinary students are exceptional problem solvers, either through inductive or deductive reasoning, and have strong spatial relations capacities. Veterinary students have a range of learning styles with design memory being the primary vehicle for information delivery and tonal memory being the least frequently used style overall. Information gained on each student's natural abilities can be used to guide effective career decision making and enhance prospects for long-term career satisfaction.

**Key words:** career counseling, natural abilities, learning channels

## INTRODUCTION

As with most professional fields, education in veterinary medicine focuses primarily on the development of skills and knowledge related to the content of the field. Non-technical competencies, however, have been frequently discussed in recent years.[1–3] Currently, minimal training is provided to veterinary students on the selection and management of their careers, their ability to work with others, or communication. In addition, the typical educational background of most veterinary students does not include self-assessment in the areas of natural learning styles, problem solving, decision making, or interpersonal communication skills.

These "soft" skills are often what separate highly effective professionals from their counterparts. However, exposure to soft skills requires students to look inward and to think about themselves—something that the majority of veterinary students might not have been encouraged to explore or pursue. And, unfortunately, the demands of the veterinary curriculum limit the opportunities students have to focus on these ancillary topics.

The successful use of soft skills in career decision making is critical to a person's well-being. And career well-being, a term recently coined, is the most important of five interconnected elements (the other four elements are social well-being, financial well-being, physical well-being, and community well-being).[4] Career well-being includes opportunities to incorporate interests, personal purpose, and use of talents and may be the most underestimated element.

The University of Georgia's (UGA) College of Veterinary Medicine created a Careers Course for its students in 1998. The course is a combination of assessment of natural abilities using the Highlands Ability Battery (tHAB)[5] and exposure to 10–15 professionals representing a variety of career paths within veterinary medicine. Using the assessment at the beginning of the course is intended to assist students as they consider internships, externships, and careers that are a good "fit" with their natural abilities and personal style. The assessment also defines learning styles and is intended to help students use this information in their study techniques. The Highlands Ability Battery is an assessment tool divided into 19 "worksamples," and each worksample measures a different ability (talent) or style. Each worksample consists of an objective, hands-on measure that results in a percentile ranking. Information provided by this objective measure of talents enables a participant to make better informed decisions about the most efficient study methods, career selection, and career management. And, because talents identified by tHAB are stable throughout adulthood, individuals can use their assessment results over the entire course of their careers.

The HAB was developed from Johnson O'Connor's testing and research, which began more than 80 years ago,[6] and it taps into different types of abilities, such as spatial abilities, design abilities, music abilities, reasoning abilities, and others. Each worksample is timed. Individuals who possess the highest natural abilities in a particular task are able to complete more of the worksample in the available time. The HAB is designed to assess natural abilities rather than learned skills and is not a measure of achievement. It also delineates learning channels. It has evolved into a computerized test administered over 3.5 hours. The instrument has been thoroughly evaluated for reliability and validity.[7–10]

The 19 dimensions assessed on the HAB fall into three categories: personal style, driving abilities, and specialized abilities (Table 1). Briefly, personal style includes measures that determine the degree to which one is a specialist or generalist, the degree of one's introversion or extroversion, and time-frame orientation. A specialist prefers to know many details whereas a generalist would rather see a bigger picture without so many fine points. An introvert is someone who derives strength and energy primarily from sole activities while an extrovert does so from being around others. Time-frame orientation is split

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**Table 1:** Brief overview of categories measured on the Highlands Abilities Battery

| **Personal style: brief descriptions of continuums measured** |
|---|
| **Specialist-Generalist**: a measure of the propensity to come up with unique responses/perspectives as opposed to common responses/perspectives. |
| **Introvert-Extrovert**: a measure of the preference to be alone as opposed to being with others. |
| **Time frame**: a measure of one's natural sense of the amount of time to take into account when thinking about the future (short = up to 1 year, mid = 1–5 years, long = 5+ years). |
| **Driving abilities: brief descriptions of continuums measured** |
| **Classification**: a problem-solving ability in which one must solve a presented problem using a non-logical, holistic, right-brained approach; inductive reasoning (low = implementer, high = rapid solution identifier). |
| **Concept organization**: a problem-solving ability in which one must solve a presented problem using a logical, linear, left-brained approach; deductive reasoning (low = decisive, high = linear, logical). |
| **Idea productivity**: a measure of the rate of production of ideas; not a measure of creativity or of the rate of flow of ideas (low = focused, high = brainstormer). |
| **Spatial relations theory**: a measure of the ability to visualize and manipulate 3D space and 3D objects in one's mind; particularly loads on the ability to visualize space (low = compartmental, high = systemic). |
| **Spatial relations visualization**: a measure of the ability to visualize and manipulate 3D space and 3D objects in one's mind; particularly loads on the ability to visualize and manipulate objects (low = abstract/intangible, high = concrete/structural). |
| **Specialized abilities: brief descriptions of continuums measured** |
| **Design memory**: a measure of the ability to visualize and remember two-dimensional design; visual learning including pictures, graphs, charts, visual patterns. |
| **Verbal memory**: a measure of the ability to remember material presented in written form; learning by reading. |
| **Tonal memory**: a measure of the ability to remember material presented aurally; learning by listening. |
| **Rhythm memory**: a measure of the ability to remember musical rhythm; kinesthetic learning. |
| **Number memory**: a measure of the ability to remember non-associatively; rote learning. |

into three spans—at one end are those who focus only on a future period that is up to one-year long and at the other end are those who focus on the next five years in the future or longer. The driving abilities category includes measures for two types of problem solving: classification and concept organization. Classification most closely resembles inductive reasoning and involves an ability to see relationships between seemingly unrelated events and situations; it is a kind of intuitive logic. In contrast, concept organization is more like deductive reasoning and entails the ability to arrange ideas in a logical order and explain that order. Individuals who score high in classification often get the right answer extremely quickly but cannot articulate their reasons whereas those who score high in concept organization may be a little slower in getting to the right answer but can communicate each step well. In addition, driving abilities measures include idea productivity, spatial relations theory, and spatial relations visualization. Spatial relations theory involves the ability to see theoretical relationships of physical structures whereas spatial relations visualization entails actually using physical structures to make connections, often mentally converting what is presented in two dimensions into three dimensions. Specialized abilities measures include five learning channels: design memory, verbal memory, tonal memory, rhythm memory, and number memory.

Individual HAB scores are reported as percentile rankings, which are relative to all other test takers' rankings and fall along a continuum divided into ranges. The low range includes scores that fall in and below the 35th percentile, the mid range includes scores between the 36th and 64th percentiles, and the high range includes scores in or above the 65th percentile.

Individual test takers can have a combination of scores, with some scores falling in the high range, some in the mid range, and others in the low range. Unlike IQ or achievement tests (HAB is neither), there are strengths and challenges associated with all scores whether they are in the high, mid, or low ranges.

## MATERIALS AND METHODS

Over the course of 10 years, the HAB was offered to freshman students from 11 veterinary classes (in one year, we combined two classes). Initially, it was offered to the entire class. Subsequently, as it became apparent that not all students were interested in self-assessment (and also because of cost), 50 tests were offered to each class. Students who received the CD signed an agreement that they would complete the 3.5-hour assessment and attend a two-hour feedback session that would help them understand the meaning of their scores. A sample of student results is presented in Figure 1. Students were also offered follow-up guidance for the rest of their time in veterinary school and beyond.

Data on personal style, driving abilities, and learning channels were compiled using percentages for each category, and comparisons were drawn between veterinary



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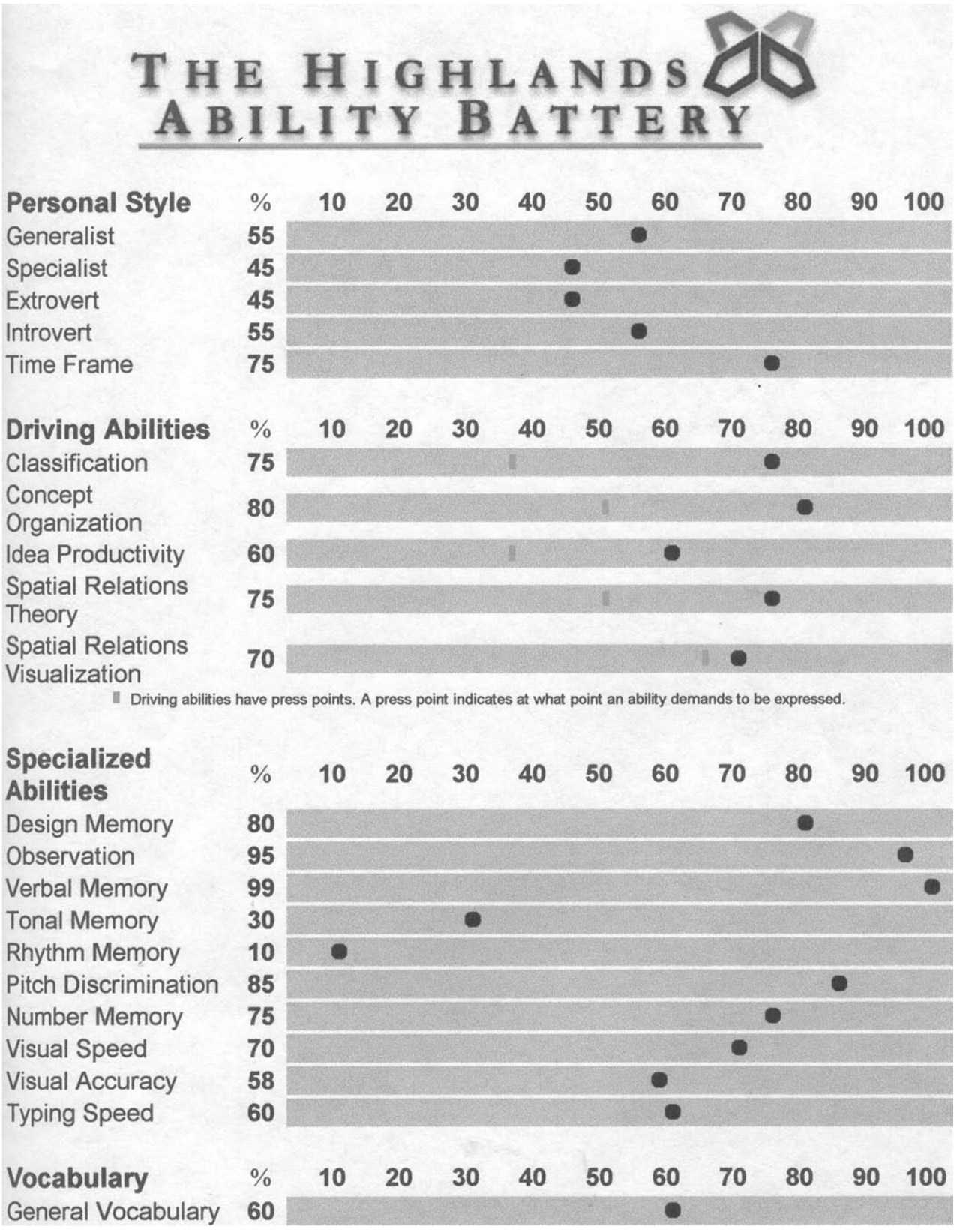


**Figure 1:** A sample print-out of results that a student might receive. The percentile score for each category is represented by a dot.



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students' results and norms. Group results are reported as frequencies (percentage of the group) falling in the low, mid, and high ranges.

The numerical data presented here is representative of 544 first-year veterinary students from 11 consecutive classes. A "class" represents the graduation year of a group (e.g., class of 2011). The "norm group" consists of all test takers in the Highlands Ability Battery database (as of early 2011, $N = 18{,}264$). Briefly, the "norm group" consists of American adults and students who have decided to take the test (just like the veterinary students). In the norm group, 55% of test takers are male and 45% are female. The age breakdown is as follows: 24% are 15–21 years of age; 16% are 22–30; 22% are 31–39; 33% are 40–55; and 5% are 56 or older. The large majority of participants who are over the age of 21 are college graduates.

## RESULTS

### Personal Style

Personal style scores were divided as follows:

- 41% of the 544 veterinary students scored in the specialist range, 29% in the mid range, and 30% in the generalist range;
- 53% of students were introverts, 27% scored in the mid range, and 20% were extroverts;
- 22% were immediate time-frame planners, 23% were in the mid range, and the majority of test takers (55%) were decidedly long-term planners.

A comparison between veterinary students and the norm population is depicted in Figure 2. On average, more veterinary students than members of the norm population tended to be generalists (30% vs. 18%) and introverts (53% vs. 35%), and veterinary students had a greater tendency toward longer time frames (55% vs. 29%).

Data were also examined on a per-class basis and these annual variations are also represented in Figure 2. It is clear that personal styles vary significantly from one class to another. For example, one class consisted of 29% specialists while a class in another year consisted of 57% specialists. In addition, time-frame orientation also had a wide swing, from 29% to 70% in different years.

### Driving Abilities

There were more UGA veterinary students who scored in the high range than those who scored in the mid and low ranges on all of the driving abilities with the exception of idea productivity (Figure 3). In both classification and concept organization, two prominent methods of problem solving, scores were generally very high. An average of 69% of veterinary students received high scores in concept organization, making it the strongest driving ability for this group. For this ability, only 23% and 8% were in the mid and low ranges, respectively. The other problem-solving ability, classification, is also quite strong with an average of 49% of students in the high range, 26% in the mid range, and 25% in the low range. In terms of idea productivity, the largest percentage of students fell in the mid range (45%), with 29% in the high range and 26% in the low range.

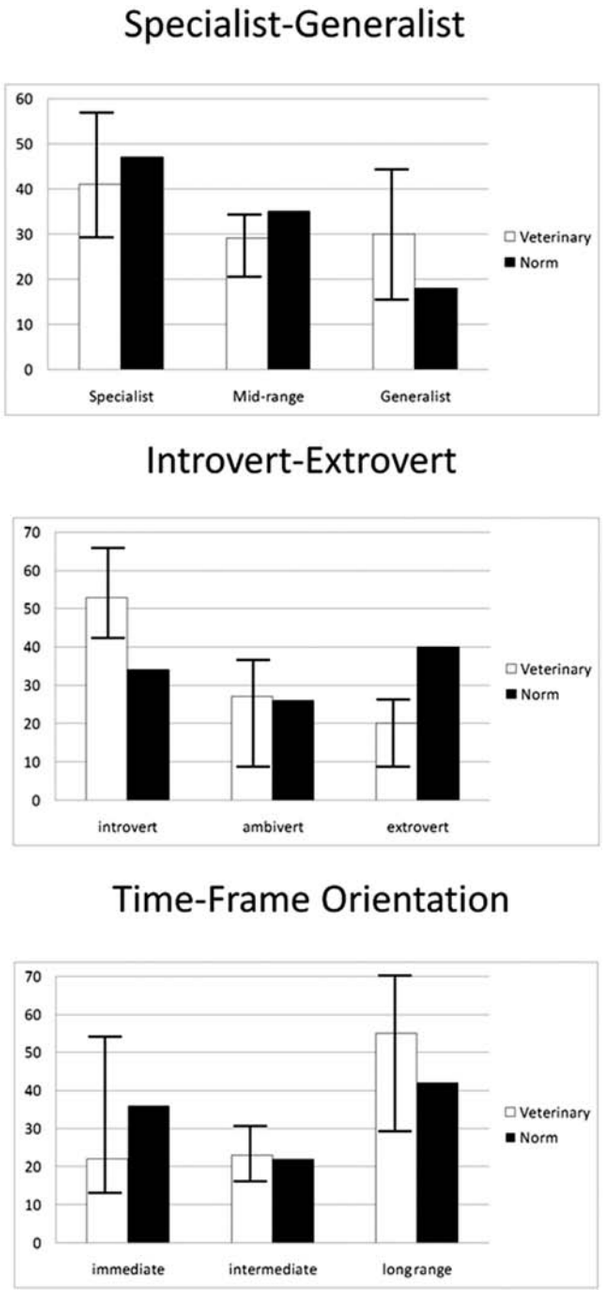


**Figure 2:** Bar chart comparing veterinary students' and norm group members' personal style traits. As a group, veterinary students are more likely to be generalists and introverts and oriented toward longer time frames. The range of averages of student high scores over the years is represented for veterinary students.

The average spatial scores for the group of veterinary students are also strong. An average of 50% of the students scored in the high range on spatial relations theory, 24% scored in the mid range, and the remaining 26%



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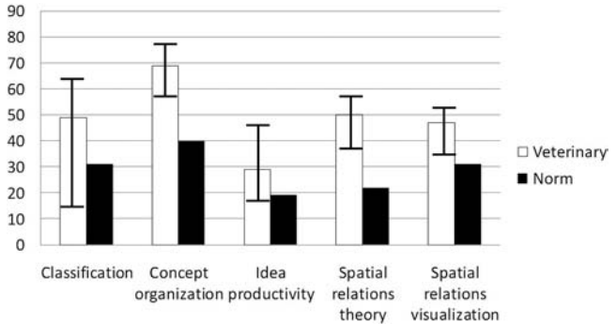


**Figure 3:** Bar chart comparing veterinary students' and norm group members' driving abilities. Each bar represents the percentage of the population scoring in the top third of that ability. As a group, compared to the general population, veterinary students have very high problem-solving abilities and excellent spatial-relations abilities. The range of averages of student high scores over the years is represented for veterinary students.

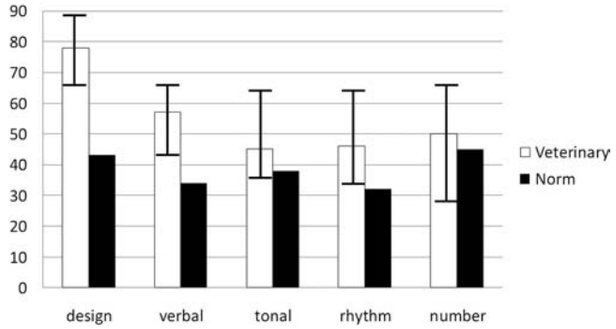


**Figure 4:** Bar chart depicting percentages of veterinary students scoring in the highest third of each of the learning channels. As a group, veterinary students use a range of learning styles, with design memory being the most frequently used. The range of averages of student high scores over the years is represented for veterinary students.

scored in the low range. Spatial relations visualization was also very strong, with an average of 47% of students scoring in the high range, 27% in the mid range, and 26% in the low range.

Figure 3 presents veterinary students' driving abilities in comparison to those of the norm group. More veterinary students score in the high range on all driving abilities. Specifically, problem solving is a significant strength with 18% more veterinary students than norm group members scoring in the high range on inductive reasoning (classification: 49% vs. 31%) and 29% more veterinary students than norm group members scoring in the high range on deductive reasoning (concept organization: 69% vs. 40%). Also, in comparison to the norm group, 10% more veterinary students exhibit a strong ability to generate ideas (29% vs. 19%).

Similar to the problem-solving abilities, as a group, veterinary students have strong spatial abilities. Half of all veterinary students were in the high range on spatial relations theory (visualizing 3D space) and almost half (47%) were in the high range on spatial relations visualization (manipulating 3D space). The differences between veterinary students' scores and those of the norm group are pronounced: 50% vs. 22% for spatial relations theory and 47% vs. 31% for spatial relations visualization. Figure 3 also presents the variations in average high scores from year to year, showing that considerable variations are possible.

### Specialized Abilities

Of the nine specialized abilities measured on tHAB, of particular interest to educators are the five learning channels through which people absorb new information: design memory (visual learning), verbal memory (reading), tonal memory (hearing), rhythm memory (kinesthetic learning), and number memory (rote learning).

The majority of veterinary students scored in the mid or high ranges on all of the learning channels (Figure 4), and, on average, more veterinary students than individuals in the general population scored in the high range. Visual learning (design memory) is a strong learning channel for more of the veterinary students (78%) than any of the other learning modalities. Only 15% of students were in the mid range and 8% were in the low range for this learning channel. Verbal memory (reading) was the second strongest learning channel with 57%, 25%, and 18% of students scoring in high, mid, and low ranges, respectively. In terms of number memory (rote learning), 50%, 23%, and 27% of students scored in the high, mid, and low ranges, respectively, and in terms of kinesthetic learning (rhythm memory) 56% of the veterinary students scored in the high range, 25% scored in the mid range, and 29% scored in the low range. Tonal memory (auditory learning) was the weakest learning channel for veterinary students: 32% had low tonal memory, 23% had mid-range tonal memory, and less than half (45%) had high-range tonal memory.

On average, veterinary students have stronger learning abilities than members of the norm group and more veterinary students score in the high range of all learning modalities. Figure 4 presents this finding as well as ranges of averages of high scores in these categories over the years. Based on the percentage of high scorers, the ranked order of the learning abilities from the most to least frequently used by veterinary students is as follows: design memory, verbal memory, number memory, rhythm memory, and tonal memory. This is in contrast to the ranked order of the learning modalities most frequently used by the norm group: number memory, design memory, tonal memory, verbal memory, and rhythm memory. The percentage of students who score in the high range of learning channels varies from one class to another (Figure 4). In one class, 89% of students scored in the high range for design memory and in another class only 66% fell into this category. Similarly, kinesthetic learners represented 63% of the class in one year, and in another year only 34% excelled using this learning channel.



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Students are encouraged to use their abilities profile as they move through the four-year curriculum to help strategize learning activities and to also think about optimal career fits. Each year, one of the authors (CB) counsels 10 to 20 students who seek more detailed information for their career decisions based on their abilities profile.

## DISCUSSION

Abilities define what a person does quickly and easily. They affect the ways in which people most instinctively learn, communicate, lead, make decisions, solve problems, and use their mental and creative talents. As opposed to skills, which by definition are learned, natural abilities are unaffected by education or experience and they remain unchanged throughout adulthood. By the time students begin veterinary studies, they have developed the skills necessary to perform well in a variety of academic fields. They can now master the skills to do almost anything in any veterinary field. But many have lost sight of where their highest natural abilities reside. It was our intent to help students learn more about their preferred learning channels to enhance scholastic endeavors, identify their natural abilities, promote more self-assessment, and improve their consideration of careers that would provide the greatest satisfaction.

The HAB is a tool that can discriminate differences between skills and abilities, primarily through the timing of the worksamples. If students could use an unlimited amount of time, they would likely score in the high range on every activity, but it is only those activities that reflect their natural abilities that they can complete quickly and accurately.

When students receive feedback on their HAB, they are frequently surprised by their natural abilities or lack thereof in certain areas. Admission to veterinary school is a rigorous process that entails years of dedicated hard work in multiple subject areas. Often, students who are not naturally talented in physical sciences have worked so hard to attain A grades in chemistry or physics that when they are told that their abilities to imagine and manipulate structural concepts are not very high, they respond in disbelief, saying that that is not possible because they have always received As in chemistry and physics. Such a response is the result of a tendency to equate skills with natural abilities. But it is natural abilities rather than learned skills that students will find easier to use in their careers and that will provide greater opportunities for satisfaction and professional growth. It is also helpful for students to recognize, as they do in the group feedback session, that people have differing sets of abilities. As they come to understand that an individual is a patchwork of varying talents, they begin to realize that "smart" comes in many different forms, and this realization relieves anxieties about not being able to excel in every single subject.

The abilities can fit together to create a constellation that is well suited to a specific career and microenvironment. However, students are always cautioned that there are many other factors that feed into job satisfaction, including economic, familial, social, and other environmental influences. Even so, students often want to know what job situations will use the greatest number of their natural abilities. Below are some examples of counseling offered to those students who make such inquiries:

- A student who is a strong specialist and a strong introvert and has a high score in concept organization (deductive reasoning) is encouraged to explore research opportunities to see if this might be a suitable avenue.
- A strong generalist, who is very extroverted and has a high score in tonal memory, could be very satisfied in a high-volume mixed practice where he or she can spend the day listening to and helping people with a variety of animals and a wide range of clinical problems.
- Someone with strong specialist tendencies, high design memory, and high classification ability is encouraged to think about some of the specialty disciplines that are particularly visual and require rapid problem-solving, such as pathology, radiology, and dermatology.
- An extroverted generalist with a very long time frame should consider corporate practice or some venture involving investment or policy development.
- An extroverted specialist who has very high scores in classification (inductive reasoning) and spatial relations theory but a low score in spatial relations visualization would be well suited for a specialty practice with a focus on internal medicine.

However, it is always emphasized that the abilities scores are not a magic formula for finding career satisfaction. Rather, awareness of their own abilities can help students narrow down their choices and understand why certain tasks have a better "feel" and are more satisfying.

From the authors' personal perspectives, gained from over 10 years of experience guiding students, it is apparent that it is not necessarily a good thing to have high scores in multiple abilities. These are the students who find it most challenging to find a career fit. Invariably, those students who choose to come for advice at the end of their third year, when specialization becomes more of a necessity than a choice, have multiple driving and specialized abilities. Making a choice is difficult because everything they try feels natural. So although they may have excelled in many courses throughout their veterinary program, they often experience the most anxiety as they approach their final school year because it seems to them that many of their classmates have found their niche whereas they are still unsettled about which path to pursue.

Some key points emerge from tHAB when examining the veterinary students as a large group. First, students have a variety of learning styles. In every case, the veterinary students as a group have higher scores at the high end of the learning channels than the norm group. As a group, veterinary students are remarkably capable of assimilating information. This ability should not be surprising because they have a proven aptitude for learning, which is evidenced by the academic success they attained



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in securing admission to veterinary school. But there are some trends and features that merit reflection. First, design memory is the most frequently used learning channel, with 78% of veterinary students scoring at the high end of this channel in comparison with 43% of the norm population. This channel involves using figures or drawings, using colors, and making graphic connections to facilitate learning. Faculty members who teach strictly with words (written or oral) need to think about incorporating more design-related cues. Second, tonal memory, although veterinary students as a group are still stronger than the norm (46% vs. 32%), is the lowest of the overall high learning channels for veterinary students. In fact, almost a third (32%) of veterinary students score in the lowest range for tonal learning, more than in any other low ranges for the learning channels. This means that on average a third of the class are not able to easily take in information presented only in an oral format, and so professors should be discouraged from relying heavily on that channel.

Studies done using another instrument (VARK [verbal, auditory, reading, kinesthetic])[11] administered to medical and dental students had some similar results. One study found that 64% of first-year medical students preferred learning using multiple channels.[12] In a sampling of 3,000 dental students, also using VARK, students' stronger preference for visual learning than the general population was evident.[13] Both of these studies emphasize the need to deliver information in a multi-modal format to enhance student learning.

There are wide variations in some categories from year to year. Many veterinary faculty often express generalizations about a particular class, as if each class has its own personality. For instance, "This freshman class is very quiet," or "This junior class just has so many questions." In looking at the percentages in personal style, it is apparent that generalizations such as these are probably the result of swings in personal style scores. For instance, the percentage of specialists from 11 classes varied from a low of 29% to a high of 57%. Specialists are inclined to ask many more questions and not be satisfied with broad brush strokes. Also, although most classes are predominantly made up of introverts, the percentage of extroverts has varied from 10% to 27%. It is easy to see how a big change in the percentage of specialists or extroverts can alter the overall questioning or conversation level of a class and can thus impart the "character" that many faculty seem to recognize. But it can also serve as a reminder that classes do not fall into a "one-size-fits-all" category and modifications in the delivery of information need to be considered on an annual basis.

There is no single test or survey battery for determining the best fit for and success of a person in any profession, including veterinary medicine. Nevertheless, the HAB profile provides some very useful insights for students and professionals within veterinary medicine. In studying decision-making strategies and person-job fit, researchers found that self-awareness enhanced job satisfaction among scientific staff at all levels in a large pharmaceutical firm as they transitioned to new positions; that is, they chose better.[14] Individuals who engaged in extensive rational decision-making chose jobs that were a better fit, as measured by defined standards such as career satisfaction, social interaction, and intention to quit.[14] Veterinary medicine is a large umbrella encompassing a wide range of specialty topics and work environments. What might turn out to be one veterinarian's dream job with total fulfillment could be a daily agony for another graduate. In fact, recent research has shown that job burnout is not primarily a function of the characteristics of the working situation itself or the time spent, but rather a dysfunctional relationship between the person and the work environment.[15,16] These studies mention the high predisposition to burnout in caregiving professions. Individual disposition, and particularly the ability to self-evaluate and self-analyze, are negatively correlated with burnout. It is also worth mentioning recent reports from several countries that reveal alarmingly high rates of substance abuse and suicide in the veterinary profession. In the UK and Australia, veterinarians are four times more likely to commit suicide than members of the general populace.[17,18] In Germany, 13% of veterinarians screened positive for problem drinking according to standardized scoring.[19] Psychosocial stressors associated with the workplace were cited in the German study as a strong risk factor. In the suicide studies, it was hypothesized that one contributing factor was a demanding veterinary course that does not lend easily to the corresponding development of emotional maturity and that the added work-related stressors after graduation prove overwhelming. A more comprehensive understanding of person-job fit will serve to decrease many of these stressors and promote lifelong career satisfaction.

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