VSA Learning Guide
Module 3: Canine Cognition

Before the module lessons:

Overview

Understanding how dogs think, feel, and perceive the world is an important part of becoming a professional dog trainer. How dog's minds process the world around them, or **cognition**, helps trainers understand the different types of dog intelligence, dog emotion, and how to develop the human-animal bond.

Canine cognitive scientists are uncovering new findings every year told help us understand the five cognitive dimensions, dogs' intellectual strengths, and their limitations. The latest research indicates that dogs display abilities such as empathy, memory, communication, reasoning, and cunning. By understanding cognition we are closer to understanding the canine experience from the dog's point of view. Through cognition games, we may be able to help clients witness their dog's individual genius in the comfort of their own home.

In addition to the five cognitive dimensions, scientists have also investigated emotions such as: happiness, love, jealously, guilt, sadness, fear, and phobia. Do dogs experience all of these emotions? Using what we know of cognition, humans are able to provide care and build relationships to develop the human-animal bond.

? Module Problem

A client calls and complains about her dog's behavior. She reports that, "the dog steals food from the counter, runs and hides when she talks to her ex-partner on the phone, and gets into the trash can when she's gone but knows better.

Answer these questions in your head before proceeding to the module lessons:

- What types of behavior is the dog displaying when he "steals food from the counter"?
- What might the dog be experiencing when she talks to her ex-partner on the phone?
- Why might the client believe the dog "knows better" when he gets into the trash can?

Learning Objectives
- Summarize canine cognitive abilities and their applications to training
- Describe canine emotions
- Explain the importance of the human-animal bond

Key Terms
- Cognition
- Cognitive science
- Empathy
- Communication
- Memory
- Reasoning
- Cunning
- Feeling
- Emotion
- Theory of mind
- Human-animal bond

Module Outline
- Chapter 1: Introduction to Canine Cognition
- Chapter 2: The Five Cognitive Dimensions
- Chapter 3: Activities to Explore Cognition
- Chapter 4: Canine Emotion & Behavior
- Chapter 5: The Human Animal Bond

Chapter Summary

Thousands of years of domestication have played a significant role in the human/dog relationship and as dogs have evolved with humans, they have adapted and acquired the abilities needed for successful cohabitation. These abilities are part of how your dog perceives the world, also known as his **cognitive** abilities. Knowing your dog's cognitive abilities can help shed light on how she sees the world, what she is capable of and where she might need your help. In the last twenty years, the study of animal cognition has exploded, particularly the study of canines.

Cognitive scientific research is revolutionizing our understanding of dogs and providing vital data that can be used to go deep into the canine mind. Through the use of modern technology, like fMRIs, humans have been able to research the cognitive abilities of dogs; and such studies celebrate many types of intelligence. Intelligence is relative to environment and is dependent on skills that a particular species needs to survive. There are many different types of intelligence and they vary greatly in the animal world. Dogs can understand some human communicative intentions, learn new words, solve problems, make inferences, copy the actions of others, and recruit help. Comparing intelligence is not an easy task, and species appropriate tests should be employed.

Key Concept Questions

- Recall the factors related to intelligence. What could you say to a client who does not believe that their dog is intelligent because the dog "does not listen"?

- Domestication has produced dogs that have a high tolerance for coping with novelty, adaptability to different environments, and the ability to form relationships with other species. What is one way that your dog has demonstrated one or more of these abilities?

- Recall the different types of intelligence: spatial, kinesthetic, inter/intrapersonal, linguistic, crystallized, and fluid intelligence. Which type(s) of intelligence do you believe your dog demonstrates?

- Chaser learned more than 1000 words. How many words do you believe your dog understands? Remember these could be cues, name of toys, names of people, names of other animals, etc.

- Are there any other terms or ideas in this lesson that are new to you? Write down any unfamiliar terms and their definitions in your learning journal. Be sure to review these before module tests.

Summary Question

- What is this lesson about? What was the 'take-home' for you? Take a few minutes to write your own summary of this lesson:

Synthesis Question

- Consider the following statement: Intelligence is relative to environment and is dependent on skills that a particular species needs to survive. Based on your understanding of wolves and domestic dogs, compare and contrast the intelligence of dogs and wolves. Which species is "smarter"?

Chapter Summary

Part of exploring canine cognition is to understand its different dimensions. Scientists at Duke University defined five cognitive dimensions to describe canine cognitive abilities: empathy, communication, memory, reasoning, and cunning.

The ability to feel what someone feels, or empathy, can motivate cooperative behavior in humans and dogs. Dogs display empathy through consolation behavior, discriminating facial expressions and emotional states, and emotional contagion.

Key Concept Questions

- Recall the evidence for empathy in dogs. Have you seen a video or heard of a story in the media where a dog may be displaying signs of empathy? Describe the situation below.

- Do you have any non-verbal communication signals with your dog? If so, what are they and how does your dog respond? If not, be conscious of your movements and your dog's reaction for the rest of the day to be sure!

- Consider a client with a juvenile dog who jumps on people, barks at the doorbell, and pulls on leash. How might this dog's memory impact your training plan?

- If you were working with a dog who struggled to make the association between his/her behavior and its consequence (a treat during a training session), what factors might inhibit these reasoning skills?

- Imagine you are sitting with a client who is complaining about their dog's 'counter surfing' behavior. How might you help them see this behavior as a cognitive skill?

- Can you think of a game, story, or other way to discuss a dog's cognitive abilities with their humans? Showing off a dog's strongest cognitive dimension can be a great way to gain buy in from clients, and help them see their dog's intellectual strengths.

- Are there any other terms or ideas in this lesson that are new to you? Write down any unfamiliar terms and their definitions in your learning journal. Be sure to review these before module tests.

Summary Question
- What is this lesson about? What was the 'take-home' for you? Take a few minutes to write your own summary of this lesson:

Synthesis Question
- Recall the fallout of using aversive tools and techniques from the Positively Philosophy module. Which of the cognitive dimensions might be most affected by using such techniques?

Chapter Summary
By assessing your dog's responses to a variety of games that explore each of these cognitive dimensions, you are able to determine your dog's cognitive profile. The purpose of exploring such an assessment is to measure how your dog reacts to a variety of stimuli which may provide information about how he or she may solve problems in the future. This information could be helpful when developing a training plan, attempting to modify behavior, deepening your understanding of your own dog's cognition, and enriching the life of your dog or a client's dog.

Communication Games Activity Questions
- What went well during the Finger Pointing, Foot Pointing, Gaze Following, and Body Position games? Which gesture did your dog follow most reliably?
- What could have gone better? If not, how can you help set yourself or your dog up for success next time?
- What other knowledge or experience does it remind you of?
- How could you use this information during training?
- Do you see any value in playing these games with a client and their dog?

Attentional States Games Activity Questions
- What went well during the Blindfold game? Which person did your dog choose? Did the blindfold make a difference?
- What could have gone better? Did your dog display any signs of stress? If so, how can you help set yourself or your dog up for success next time?
- What other knowledge or experience does it remind you of?
- How could you use this information during training?
- Do you see any value in playing these games with a client and their dog?

Reasoning Games Activity Questions
- What went well during the Cup, Barrier, and Box games? Did your dog search for the treat every time? Did he/she ever look to you for help? Which game was the most difficult for him/her?
- What could have gone better? Did your dig display any signs of stress or frustration? If so, how can you help set yourself or your dog up for success next time?
- What other knowledge or experience does it remind you of?
- How could you use this information during training?
- Do you see any value in playing these games with a client and their dog?

Empathy Games Activity Questions
- What went well during the Yawning game? Did you dog 'catch' your yawn?

- How did this response make you feel? Just because your dog did not yawn, does not necessarily mean that he/she is not empathetic (especially toward you!). Consider how a client might feel after playing this game with their dog.
- If you could somehow play the game in reverse, or with a friend, how do you think you would respond as the subject of the game?
- What other knowledge or experience does it remind you of?
- How could you use this information during training?
- Do you see any value in playing these games with a client and their dog?

Memory Games Activity Questions
- What went well during the Short Term and Long Term Memory games? Did your dog remember where the treat was hidden?
- What could have gone better? If not, how can you help set yourself or your dog up for success next time?
- What other knowledge or experience does it remind you of?
- How could you use this information during training?
- Do you see any value in playing these games with a client and their dog?

Cunning Games Activity Questions
- What went well during the Deception game? Did you dog "deceive" you?
- How did your dog's response make you feel? Just because your dog "disobeyed" and took the treat does not mean that they do not love/respect/care for you. This is good data!
- If you could somehow play the game in reverse, or with a friend, how do you think you would respond as the subject of the game?
- What other knowledge or experience does it remind you of?
- How could you use this information during training?
- Do you see any value in playing these games with a client and their dog?

Imitation Games Activity Questions
- What went well during the Imitation game? Did your dog imitate your behavior?
- What could have gone better? If not, how can you help set yourself or your dog up for success next time?
- How did your dog's response make you feel? Just because your dog did not imitate your behavior does not mean that they are not intelligent. This is good data!
- Try and play the game with a friend, but just like with your dog, do not explain the rules ahead of time. Did your friend "get" the game and imitate your behavior?
- What other knowledge or experience does it remind you of?
- How could you use this information during training?
- Do you see any value in playing these games with a client and their dog?

Work Learning Games Activity Questions

- What went well during the Learning New Words game? Did your dog learn the names of the two objects/toys?
- What could have gone better? If not, how can you help set yourself or your dog up for success next time?
- What other knowledge or experience does it remind you of?
- How could you use this information during training?
- Do you see any value in playing these games with a client and their dog?

Summary Question

- What is this lesson about? What was the 'take-home' for you? Take a few minutes to write your own summary of this lesson:

Synthesis Question

- If you could pick one game to show a client their dog's cognitive skills, which one do you think would resonate the most?

Chapter Summary

There is a debate over whether animals have feelings or emotions. Cognitive scientists are working to test such hypotheses, and begin with defining these terms. An emotion is a mental state that arises spontaneously rather than through conscious effort, and if often accompanied by physiological changes. While emotions are biological reactions to situations and environments, feelings are human interpretations of emotion. While we can definitely say that animals have emotions because the physiological reactions are very similar, we can't exactly say how dogs feel. However the physical expression of emotion in dogs is very similar to the physical expression of humans, for example, jumping up and down when happy, curling up alone when sad. Humans can affect the emotions of dogs through the leash and via our emotional states.

Dogs display emotional states such as: happiness, love, jealousy, guilt, sadness, fear, and phobia. Signs of happiness in dogs include: relaxed, fluid body posture, playfulness, jumping, running back and forth, and a doggy smile. A recent study investigated dogs' reaction to the strange situation test, where dogs demonstrated an attachment, or love, to their owners as young children would. Another set of studies investigated jealous behaviors in dogs by giving dogs varying values of treats for easier and more difficult tasks. The researchers concluded that dogs displayed a form of jealousy, though they were not as sensitive to inequality as primates. Unlike jealousy, dogs are not thought to experience guilt due to a lack of self-awareness. When a dog cowers in the presence of a 'naughty' deed, it is more likely that the dog is responding to the owner's reaction rather than his own action. While dogs may not possess theory of mind, they do display signs of sadness and depression. Sadness is a 'normal' emotion that usually subsides within hours/day, whereas depression is 'abnormal' and can be treated by a professional. Dogs can also display signs of fear which is a healthy emotion compared to phobia which is harmful or maladaptive. If a dog displays signs of pain or sudden changes in behavior, seek medical help from a veterinarian. Dogs that are sick or in pain often struggle to learn new things.

Key Concept Questions

- Recall the example you thought about during the 'Your Emotions & Your Dog' activity. Imagine that you witness a client in the same situation. How might you explain to them that their emotions may affect their dog's emotional state?

- How can you use the findings from the Beagle study and apply them in your training?

- Recall your thoughts during the 'Happiness' activity. How could you use these stimuli during training?

- There is considerable debate in the dog training industry whether dogs should perform behaviors when cued out of respect or love. What are your thoughts regarding this sentiment?

- How might you explain jealousy to a client with multiple dogs in her household?

- How might you explain guilt to a client who claims their dog knows better?

Summary Question

- What is this lesson about? What was the 'take-home' for you? Take a few minutes to write your own summary of this lesson:

Synthesis Question

- Research suggests that the cognitive abilities of dogs are similar to those of a two year old child, and that dogs do experience emotional responses. Reflect on your key takeaways from the Positively Philosophy module: how is raising a child similar to raising a puppy? Think about specific teaching techniques that people use with their children. What parallels can you make between these methodologies and dog training?

Chapter Summary

Do dogs love us? Dog lovers often ask this question and present anecdotal evidence. The connection between a human and a pet is known as the human-animal bond. The American Veterinary Medical Association defines the Human-Animal Bond as "a mutually beneficial and dynamic relationship between people and animals that is influenced by behaviors that are essential to the health and well-being of both." The human-animal bond includes the development of emotional attachment to a pet, genuine feeling of affection, along with a sense of responsibility for the well-being of the animal.

To demonstrate the human-animal bond, researchers have found evidence for a rise in oxytocin, also known as "the bonding hormone", when humans pet dogs. If there is damage to the human-animal bond, due to behavior issues, lack of time/resources, or if a dog was inherited, humans may relinquish their dogs to shelters. Signs of a damaged bond include the use of "labels", saying something is wrong with the dog, neglecting the dog's needs, and/or saying the dog is an inconvenience. People tend to attribute human characteristics, motivations, or behaviors onto their dogs. This is known as anthropomorphization and can sometimes lead to misinterpreting dog behavior. A strong human-animal bond, on the other hand, tends to promote good health and well-being, and healthy interpersonal relationships are characterized by mutually felt positive sentiments. Developing such a bond requires caregiving and building a relationship.

Key Concept Questions

- Have you ever attributed human characteristics/motivations/behaviors, or anthropomorphized, onto your dog? If so, when? How could you describe his or her behavior in an observable and measureable way?

- Does your dog seek your presence when stressed? What specific triggers elicit this response?

- How do you bond with your dog? What activities, games, relaxation techniques, or other ways do you use strengthen your bond? When do you think your dog's brain releases the most oxytocin?

- How do you refer to your dog? What label do you use for yourself when referencing your relation to your dog? Have you thought about the definitions of these terms, and/or what they mean to you? Is this the best word for your relationship? If not, what word or words would you use instead?

- Have you noticed signs of a damaged bond either in your own relationship with your dog or in others? If so, what are the signs?

Summary Question

- What is this lesson about? What was the 'take-home' for you? Take a few minutes to write your own summary of this lesson:

Synthesis Question

- A client calls you for help with their newly adopted street dog from a far-away country. This dog has had limited interaction with humans, yet has a short flight distance. What activities, strategies, and games might you play to 1) get to know the dog, 2) care for the dog, and 3) build a relationship with the dog?

Module Summary

In order to understand the canine experience from the dog's point of view, or the Fourth Pillar of Positive Training, trainers should understand how dog's perceive the world. We can learn about how a dog's mind processes the world around them, or cognition, my reading the latest in canine cognitive science. Researchers are constantly updating our understanding of canine intelligence, and the many different types of intelligence in the animal world. Dogs have many cognitive abilities including inference, recognizing novel stimuli, interpreting symbols, and categorizing input. While amazing, the dogs in research like Chaser are not unique: most dogs are capable of this level of cognition.

To study canine cognitive abilities, scientists have identified five canine cognitive dimensions: empathy, memory, communication, reasoning, and cunning. Empathy allows dogs to react to human emotional states, memory is important for survival, communication allows dogs to read our gestures, reasoning helps dogs learn, and cunning helps dogs solve problems. Unfortunately, many dog owners consider such cognitive feats to be a nuisance; however, playing cognition games may also show clients their dog's individual genius.

In addition to cognitive dimensions, dogs also display emotional states. An emotional state can play a role in changing behavior, and dog emotional states can be impacted by humans. When handling dogs it is important to remember that your overt behavior can affect the dog's emotional state both at the time and impact his/her behavior in the future. Scientists have studied happiness, love, jealousy, guilt, sadness, fear, and phobia in dogs. Happiness in canines can be measured by observing the dog's body language and response to stimuli. Studies show that dogs do experience positive emotional response to certain familiar stimuli. In fact, increased happiness was associated with reinforced intellectual accomplishment rather than random reinforcement alone. Jealousy also appears to be a social function in dogs. During inequity aversion trials, unrewarded dogs refused to work if another dog was rewarded for the same work. Research suggests that dogs display behaviors related to jealous tendencies, but do not show as strong of a reaction as primates. While dogs do display behaviors related to jealousy, research supports the hypothesis that dogs display "guilty" behaviors in order to avoid unpleasant consequences (rather than the expression of "guilt"). Most people would wholeheartedly agree that dogs display fear. Fear is a normal, healthy emotion used to ensure survival and avoid dangers. Fears usually form as a result of an unpleasant experience whether brought on by the environment or by an outside stimulus. Dogs display fear through a variety of signals and it is important for handlers to learn this body language in order to help prevent fears from forming to environmental stimuli. While fear is considered a "healthy" response, phobia is not. Phobia is a maladaptive, or harmful response that can be treated by a professional. Similar to the difference between fear and phobia, sadness and depression are another example of a normal emotion that can be taken to the extreme. Because physical and emotional imbalances can impact training and wellbeing, getting a veterinary checkup is an important step in the training process. Behavioral changes and signs of pain are good indicators of a medical issue.

Understanding the canine experience through the dog's point of view is imperative as a professional trainer, and so is understanding the human-animal bond. The human-animal bond is a mutually beneficial relationship unless damaged or out of balance. To develop the human-animal bond humans need to provide care and build a relationship with the dog. As trainers, understanding a dog's history, meeting their needs, finding what motivates them, and beginning from where they are coming from is essential to a successful training plan.

Key Terms

Cognition – how the mind processes the world around it.

Cognitive science – the interdisciplinary study of mind and intelligence, embracing philosophy, psychology, artificial intelligence, neuroscience, linguistics, and anthropology.

Empathy – the ability to feel what someone else feels, or reading and responding to the emotions of others.

Memory – storing past experience to make future choices.

Communication – using information from others to learn about the environment.

Reasoning – inferring the solution to new problems, the ability to solve a problem when the answer cannot be seen and must be imagined.

Cunning – using information from others to avoid detection, developing environmental problem solving skills, adaptive intelligence.

Emotion – a mental state that arises spontaneously rather than through conscious effort and is often accompanied by physiological changes deriving from one's circumstances, mood or relationships with others.

Feeling – an emotional state or reaction.

Theory of Mind – human self-awareness, or the understanding of how human behavior influences or impacts others. Also, the ability to interpret one's own and other people's mental and emotional states, understanding that each person has unique motives, perspectives, etc.

Human-Animal Bond – a mutually beneficial and dynamic relationship between people and animals that is influenced by behaviors that are essential to the health and well-being of both.

❓ Module Problem & Solution

A client calls and complains about her dog's behavior. She reports that, "the dog steals food from the counter, runs and hides when she talks to her ex-partner on the phone, and gets into the trash can when she's gone but knows better.

Here are VSA's suggested answers to the questions asked at the beginning of this module. There are probably a variety of appropriate answers, so these are just a recommendation.

- What types of behavior is the dog displaying when "the dog steals food from the counter"?

It's important to note that the word "stealing" implies that the dog understands that the food belongs to someone other than himself. Using this word implies one or more the following: 1) a lack of understanding, 2) anthropomorphism, and/or 3) a damaged human-animal bond. The client also referred to her dog as "the dog" which may be an indication of a damaged bond. The act of seeking and consuming food from a high place is an example of cunning, a canine cognitive dimension. This behavior could also be an example of reasoning and/or memory since the dog had to imagine the solution to a problem, and/or remember the location of the food.

- What might the dog be experiencing when she talks to her ex-partner on the phone?

If the dog is running and hiding when the client talks to her ex-partner it is possible that she displays a certain emotional state when engaged in such conversations. This state may affect the dog's emotional state as well, resulting in running and hiding. The dog may be experiencing empathy and/or fear.

- Why might the client believe the dog "knows better" when he gets into the trash can?

When clients say that the dog "knows better", this could indicate 1) a lack of understanding, 2) anthropomorphism, and/or 3) a damaged human-animal bond. Normally when a client says the dog knows better than to get into the trash can, they say so because the dog displays a "guilty" look (which reinforces the client's beliefs!). This "guilty" look (or crouched posture, bowed head, averted gaze, paw lift, etc.) is most likely in response to or in case of the client's response. Most clients scold their dogs when they come home to a trash can in disarray, so the dog displays appeasement behaviors to avoid conflict. Thus the "guilty" look is displayed to decrease the frequency of the client's response behaviors rather than in response to the dog's previous actions, or because he "knows better".

End of Module Practice Test

1. How your dog's mind processes the world around it is known as:
    a) Canine body language
    b) Positive reinforcement
    c) Canine cognition
    d) Canine ethology
2. Crows are more intelligent than dogs.
    a) True
    b) False
3. Through domestication, dogs have developed (select all that apply):
    a) A higher tolerance for coping with novelty
    b) An ability to adapt to different environment and situations
    c) An ability to form relationships with humans, other dogs, and different species
    d) An ability to problem solve better than 5 year old children
4. Match the type of intelligence with its description:
    a) Spatial intelligence
    b) Kinesthetic intelligence
    c) Intrapersonal intelligence
    d) Interpersonal intelligence
    e) Linguistic intelligence
    f) Crystallized intelligence
    g) Fluid intelligence
    h) Body coordination
    i) Social skills
    j) Personal capacities
    k) Mental achievement
    l) Mental potential
    m) Organization of the world
    n) Response to cues
5. Dogs, like Chaser, are able to learn new concepts through (select all that apply):
    a) Inference
    b) Exclusion
    c) Association
    d) Imitation
6. Match the cognitive dimension with its description:
    a) Storing past experience to make future choices
    b) Using information from others to avoid detection
    c) Reading and responding to the emotions of others
    d) Inferring the solution to new problems
    e) Using information from others to learn about the environment
    f) Empathy
    g) Communication
    h) Memory
    i) Reasoning
    j) Cunning
7. What evidence suggests that dogs display empathy?
    a) Emotional contagion (catching yawns)

    b) Consolation behavior

    c) Discriminating facial expressions and emotional states

    d) All of the above

8. Left gaze bias, intention reading, and evaluating cooperative partners serve as evidence for which cognitive dimensions in dogs:

    a) Empathy

    b) Reasoning

    c) Communication

    d) Memory

9. Match the type of memory with an example:

    a) Olfactory memory

    b) Auditory memory

    c) Visual memory/mental mapping

    d) Working memory

    e) Social memory

    f) Metallic noise triggers cowering

    g) Smell of the vet's office elicits shaking

    h) Recognizing a playmate

    i) Finding a lost thrown ball in a field

    j) Dog pulling on leash along the same path everyday

10. Factors that might inhibit reasoning skills include (select all that apply):

    a) Frustration

    b) Poor social or environmental experiences

    c) Stubbornness

    d) Fear

11. While feelings are biological reactions to situations and environments, emotions are the human interpretation of feelings.

    a) True

    b) False

12. Dogs who display the "guilty" look are likely:

    a) Responsible for destroying something they know they should not

    b) Reacting to a stimulus in the environment

    c) Guilty of a crime

    d) Feeling shameful and know they've done something wrong

13. Fear is a normal, healthy emotion that helps keep an organism safe; whereas, a phobia is a maladaptive or harmful response.

    a) True

    b) False

14. The following behaviors may signify that a dog is in pain:

    a) Reluctance to play a favorite game

    b) Avoidance of slipper floors, getting in cars, or refusal to move

    c) Aggressive behavior during handling

    d) All of the above

15. Developing a bond with a dog generally requires (select all that apply):

    a) Spending time together

b) Knowledge about dog's care needs
c) Responding to needs
d) Being a pack leader

16. Challenges to relationship building include (select all that apply):
    a) Stereotyping dogs and/or breeds
    b) Comparing a new dog to a previous dog
    c) Expecting a dog to do things to please us
    d) A lack of understanding of why "undesirable" behaviors occur

End of Module Practice Test Answer Key

1. c
2. b
3. a, b, c
4. a:m, b:h, c:j, d:i, e:n, f:k, g:l
5. a, b, c, d
6. a:h, b:j, c:f, d:i, e:g
7. d
8. c
9. a:g, b:f, c:j, d:l, e:h
10. a, b, d
11. b
12. b
13. a
14. d
15. a, b, c,
16. a, b, c, d

Additional Resources

- The Genius of Dogs by Brian Hare
- Inside of a Dog by Alexandra Horowitz
- Do As I Do by Claudia Fugazza
- Canine Confidential by Marc Bekoff
- What It's Like to Be a Dog by Gregory Berns
- The Social Dog: Behavior and Cognition by Juliane Kaminski and Sarah Marshall-Pescini
- Animal Make Us Human by Temple Grandin