DOWNLOAD PDF COGNITION THE THINKING ANIMAL

Chapter 1 : Willingham, Cognition: The Thinking Animal | Pearson

This book is a study of cognition: of how humans think. Topics covered include visual perception, attention, sensory and primary memory, memory encoding, memory retrieval, memory storage, motor control, visual imagery, decision making and deductive reasoning, problem solving, and language.

How can we characterize the human species? Here are some well-known definitions of "man. We are able to act politically, use tools effectively, understand nobility, and so on because of our ability to think. The book you are reading is a study of cognition--of how humans think. The usual strategy is to include "real world" examples and demonstrations, usually found in little boxes that appear every few pages. This strategy seems to confirm. I have explicitly stated the questions that motivate cognitive psychologists. We plunge right into the answers, which seem arcane. Each chapter in this book is organized around two or three straightforward questions that are easy to appreciate and explained in detail. To the extent possible, I have used a narrative structure. By that I mean that there are causal links within and across chapter sections, so that it is clear why you are reading something. Nothing is more boring than a list of unconnected facts. I have tried to write in a non-stilted, not-especially-academic style. Despite the light tone, this book is not light in content. An easy way to check the coverage is by examining the key terms section at the end of each chapter. A brief preview poses the broad questions and provides the broad answers covered in each section. Key terms are identified by boldface type and are defined immediately thereafter. They are also collected in a glossary. Each section closes with a series of questions. The "stand-on-one-foot" summary questions ask students to summarize what they learned in the section they just read. The name comes from the Talmudic story of the heretic who went to great sages, asking each to summarize all of the Torah during the time he could stand on one foot. He finally found a willing sage in Hillel, who quoted from Leviticus: The end of each section also includes questions that require considerably more thought; the student will need to apply what he or she has just learned to new situations, or go beyond the material in some way. I call these "questions that require two feet.

Chapter 2 : Cognition: The Thinking Animal by Daniel T. Willingham

Cognition: The Thinking Animal / Edition 3 This unique book helps readers understand why cognitive psychologists approach problems as they do. It explains the questions cognitive psychologists ask, gives clear answers, and provides interesting, lively, and comprehensive coverage of controversies in the field.

What is Animal Cognition? Animal cognition research examines the processes used to generate adaptive or flexible behavior in animal species. Much of the work on animal cognition is more appropriately described by the term comparative cognition, because the processes and capacities underlying behavior are compared between species Shettleworth In the context of animal cognition research, cognition research usually focuses on questions about the mechanisms involved in specific capacities, such as learning, memory, perception, or decision-making. Researchers also investigate animal concepts, beliefs, and thoughts. While the representational theory of mind is a common assumption among animal cognition researchers, there is also investigation into the role perception plays in animal learning, and interest in how much explanatory work can be done by nonconceptual content , sometimes inspired by work in embodied cognition e. And, while cognitive processes are often contrasted with associative processes, this distinction is often challenged e. Buckner ; Mitchell et al. As a part of cognitive science , research in animal cognition aims to uncover the different cognitive mechanisms at play across species, with the purpose of understanding the varieties of cognition, the similarities between humans and other species, and the evolution and function of cognitive processes. Foundational Issues The philosophical discussion of animal cognition has been traditionally focused on the metaphysics and epistemology of mind in creatures that do not have language. Philosophers have asked whether animals are minded or rational, and whether they have concepts or beliefs, but they have also struggled with the issue of how to answer such questions given the inherent limitations of the investigation. The early history of western philosophy reflects a tendency to see animals as lacking rationality. Aquinas believed that animals are irrational because they are not free Aquinas Summa Theologica. Centuries later, Descartes defended a distinction between humans and animals based on the belief that language is a necessary condition for rational mind; on his view animals are soulless machines Descartes Discourse on the Method. Locke agreed that animals cannot think, because words are necessary for comprehending universals Locke Essay Concerning Human Understanding. Following in this tradition, Kant concluded that since they cannot think about themselves, animals are not rational agents and hence they only have instrumental value Kant Lectures on Ethics. However, there were also dissenters. Three kinds of arguments for other species of mind are: The argument from analogy for animal minds can be formulated as: All animals I already know to have a mind i. Individuals of species y have property x. Therefore, individuals of species y probably have minds. Versions of the argument differ as to what they choose as the reference property x, and how they defend the choice of reference property. The reference property could refer to any number of things, such as a general capacity e. The argument from analogy for animal minds is in one sense stronger than the argument for other minds, insofar as the reference class is larger. Nevertheless, in another sense the analogical argument for animal minds is weaker, since the strength of the argument is a function of the degree of similarity between the reference class and the target class. Humans are probably more similar to one another than they are to members of another species. While some researchers working with great apes have expressed concern about the argument from analogy Povinelli et al. Furthermore, recent uses of analogical argument to defend animal consciousness have been based on careful investigation into the causal powers of the reference property Varner The inference to the best explanation argument for animal minds rests on the claim that the existence of animal minds is a better explanation of animal behavior and physiology than those offered by other hypotheses. A version of this argument can be formulated as: Individuals of species x engage in behaviors y. The best scientific explanation for an individual engaging in behaviors y is that they have a mind. Therefore, it is likely that individuals of species x have minds. The inference to the best explanation argument justifies the attribution of mental states to animals based on the robust predictive and explanatory power that is gained from such attributions. As the argument goes, without such attributions we would be unable to make sense of

animal behaviour. This argument relies on ordinary scientific reasoning; of two hypotheses, the one that better accounts for the phenomenon is the one to be preferred. Those who offer this sort of argument for animal minds are claiming that having a mind whatever that amounts to better explains the observed behaviour. While it is fair to say that most scientists working with animals think they have minds, they also have a tendency to use the inference to the best explanation strategy when they disagree about the cognitive mechanisms at play in a particular species at a particular time. The argument from evolutionary parsimony is based on the idea that closely related species share some physical traits, and this relationship can offer evidence in favour of a mentalistic causal explanation in certain cases. This argument can be formulated differently depending on the notion of parsimony Sober In general, such arguments suggest that the fact that we share some property with an animal is enough to establish the animal as probably minded if we assume a that we share a common ancestor with the animal and b that we should prefer the most parsimonious explanation of the emergence of that property de Waal ; Sober However, without knowledge of the mentality of the common ancestor, such arguments offer little additional evidence Sober Relying on an argument for other minds always opens the possibility that the argument turns out to be bad, and the conclusion false. But no matter what argument we run across, we will not be able to act as though we deny those minds we see in cats, dogs, and human infants Jamieson , ; Searle When researchers attribute mental content to other species, they open themselves to the charge of anthropomorphism. Sometimes the term is used to refer only to psychological traits, and sometimes it is used to refer to traits that are claimed to be uniquely human in which case anthropomorphism is an error by definition. One way of seeing an anthropomorphic error is as a category mistake, rather than as a false attribution. An anthropomorphic error must be logically false, because members of the target species are not the sorts of things to which the term can apply Keeley ; Fisher However, if the charge of anthropomorphism is the charge that the attributer is making a category mistake, then the charge is being made on conceptual, rather than empirical grounds. However, Sober also argues that the empirical methodology of psychology places a greater burden of proof on animal cognition research than it does on human cognition research. He suggests that comparative psychologists accept as the null hypothesis that different cognitive mechanisms are at work in humans and animals. Given that type 1 errors reporting a false positive and rejecting a possibly true null hypothesis are taken to be more serious errors than are type 2 errors reporting a false negative and not rejecting a null hypothesis when it is false , the practice of science results in a bias against attributing psychological traits to animals Sober The debate about how to interpret the results of animal studies in comparison to human studies can be viewed as a debate about an inconsistent application of what the psychologist C. Lloyd Morgan advanced as his Cannon. Some argue that anthropomorphism is a human tendency that must be overcome in order to do good science, because it relies an unjustified generalization from linguistic humans to nonlinguistic animals. These critics suggest that animals who lack language may not even have concepts, and without language scientists are not in a position to attribute content. Since we are barred from making attributions, scientific psychology ought not engage with questions about animal mentality e. As such, they are not empirical, but theoretical or methodological arguments. This can be seen in the way in which the debates sometimes result in an impasse. Such worries arise in the formulation of the null hypothesis in experimental research. One concern is that researchers may have a failure of imagination when it comes to hypothesis generation; they may make an inference to the best explanation argument without considering enough plausible explanations. According to Kennedy, the problem with this argument is that not all machines implement stimulus-response functions; some machines are complex and indeterministic, and if animals were machines, they would be machines of that sort Barlow ; Kennedy Similar concerns are put forward by those who stress, contra Darwin, the discontinuity between humans and other animals Penn et al. When one considers differences between humans and animals to be less joyful than similarities, it should not be surprising if more similarities are found. The idea that human cognitive capacities are often exaggerated and over-intellectualized is inspired by work in various fields, including approaches in cognitive science that focus on the power of simple rules and the emergence of complex behavior in self-organizing systems, emergent properties , mental representation , artificial life , robotics, as well as situated, distributed and dynamical approaches to cognition, the heuristics and biases literature in social cognition, as well as

dual-process accounts of cognitive architecture. The concerns about anthropomorphism appear to be largely limited to western scientists. It has been argued that researchers from countries with a Buddhist rather than Christian orientation are not culturally encouraged to see a categorical distinction between humans and nonhuman animals Asquith ; Sakura ; Matsuzawa ; de Waal Unlike Christianity, the Buddhist doctrine does not claim that humans, but not animals, have immortal souls, and thus it does not allow humans to use animals for their own purposes in the ways Christianity does. The Buddhist tradition sees a connection between humans and other animals, and even states that humans can be reborn as animals. While often thought of as the result of logical reasoning, rational action might also be understood as teleological, causal, or probabilistic. The Stoic philosopher Chrysippus suggested that we can see logical reasoning in animal behavior in his story about the dog who, running nose to the ground, tracked a rabbit down a path. When the dog arrives at a three-way crossroads, he quickly sniffs the first two paths, and not finding the scent in either of the first two options, immediately runs down the third path, without sniffing first. However, the dog may have solved the problem without full-blown logical reasoning. Minimal theories of rationality offer alternatives. Some minimal theories of rationality stem from evolutionary thought. Because monarchs who eat toxic milkweed become toxic to birds and other predators, when a bird learns not to eat monarch butterflies after having formed an association between eating monarchs and vomiting, it has a reason for its avoidance behavior. The birds also have a reason to avoid eating a viceroy, given that it is visually almost indistinguishable from a monarch, though not poisonous. Other theories of rationality that take evolutionary considerations into account include those of Daniel Dennett , , Ruth Millikan , , and Joelle Proust , Causal accounts of animal rational action portray the animal as engaging in causal, rather than propositional reasoning. Rather, there are some behaviors that can only be explained in terms of propositional attitudes, informational states, or generalizations that go beyond the here and now. However, since animals cannot engage in metacognition by thinking thoughts about thoughts, they cannot have the concepts of inference needed for logical reasoning. Rather, we can describe their reasoning process in causal terms. Consider a gazelle who see a lion and then runs away. Gazelles can understand that lions cause them to run, and that since there is a lion here I run. This causal understanding is developed through experience with regularities in the environment, and while they are able to generalize to a certain extent, this ability is limited. Probabilistic accounts of animal rationality also are used to explain complex animal behavior. Predictive coding models of cognition that do not rely on the linguistic processing model associated with the computational theory of mind may be used to explain animal behavior as rational on par with human rationality. Rationality in other species has been explored in experimental and naturalistic studies. Psychologists have formally tested animals in Chrysippus dog type situations. There is evidence that monkeys, corvids, and dogs also can, in some cases, choose by exclusion. Certain naturalistic behaviors also suggest rational thought, given that they appear to be cases of problem solving that rely on cognitive flexibility and learning. Tool use, for example, is a behavior that suggests rational thinking. Because tool use involves finding or constructing an object that is utilized as an extension of the body to achieve a specific goal, tool use involves identifying a problem, considering ways of solving the problem, and realizing that other objects can be used in the manipulation of the situation. Naturalistic studies of tool use in animals took off in the s, when two independent research teams in Tanzania observed chimpanzees making and using tools. Goodall found chimpanzees in Gombe using grasses and twigs to fish for termites, and she observed chimpanzees modifying twigs by stripping off their leaves so they could be used for this purpose Goodall We now know that chimpanzees make and use tools for a number of different purposes. Chimpanzees also construct and use sets of tools that they subsequently utilize in a determinate order; Goualougo chimpanzees will manufacture a perforating tool to enlarge holes in a termite nest after an unsuccessful fishing attempt; as soon as the exit hole is enlarged, the chimpanzee then inserts a fishing probe Sanz and Morgan Tool use in the wild has been discovered across taxa, including invertebrates such as the octopus, birds, fish, amphibians, reptiles, non-primate mammals, monkeys, and great apes Shumaker et al. Reports of animal tool use offer evidence in favor of the claim that some animal behavior is functionally rational, in the sense that its behavior allows the animal to achieve a goal.

Chapter 3 : Animal cognition - Wikipedia

Suggested Reading from the Current Directions in Cognitive Science: Available to be packaged with Cognition: The Thinking Animal, the Current Directions reader provides students with additional cognitive research to explore.

In its developed form, it states that: In other words, Morgan believed that anthropomorphic approaches to animal behavior were fallacious, and that people should only consider behaviour as, for example, rational, purposive or affectionate, if there is no other explanation in terms of the behaviours of more primitive life-forms to which we do not attribute those faculties. From anecdote to laboratory[edit] The behavior of non-human animals has captivated human imagination from antiquity, and over the centuries many writers have speculated about the animal mind, or its absence. Thorndike brought animal behavior into the laboratory for objective scrutiny. Pavlov began his seminal studies of conditioned reflexes in dogs. Pavlov quickly abandoned attempts to infer canine mental processes; such attempts, he said, led only to disagreement and confusion. He was, however, willing to propose unseen physiological processes that might explain his observations. Watson [11] set the direction of much research on animal behavior for more than half a century. Probably the most explicit dismissal of the idea that mental processes control behavior was the radical behaviorism of Skinner. This view seeks to explain behavior, including "private events" like mental images, solely by reference to the environmental contingencies impinging on the human or animal. Inference to processes not directly observable became acceptable and then commonplace. An important proponent of this shift in thinking was Donald O. Hebb , who argued that "mind" is simply a name for processes in the head that control complex behavior, and that it is both necessary and possible to infer those processes from behavior. Methods[edit] The acceleration of research on animal cognition in the last 50 years or so has led to a rapid expansion in the variety of species studied and methods employed. The remarkable behavior of large-brained animals such as primates and cetacea has claimed special attention, but all sorts of mammals large and small, birds, fish, ants, bees, and others have been brought into the laboratory or observed in carefully controlled field studies. In the laboratory, animals push levers, pull strings, dig for food, swim in water mazes, or respond to images on computer screens in discrimination, attention , memory , and categorization experiments. Studies often focus on the behavior of animals in their natural environments and discuss the putative function of the behavior for the propagation and survival of the species. These developments reflect an increased cross-fertilization from related fields such as ethology and behavioral ecology. Also, contributions from behavioral neuroscience are beginning to clarify the physiological substrate of some inferred mental process. Some researchers have made effective use of a Piagetian methodology, taking tasks which human children are known to master at different stages of development, and investigating which of them can be performed by particular species. Others have been inspired by concerns for animal welfare and the management of domestic species: This individual is using a stick to get food. Human and non-human animal cognition have much in common, and this is reflected in the research summarized below; most of the headings found here might also appear in an article on human cognition. Of course, research in the two also differs in important respects. Notably, much research with humans either studies or involves language, and much research with animals is related directly or indirectly to behaviors important to survival in natural settings. Following are summaries of some of the major areas of research in animal cognition. Perception[edit] Animals process information from eyes, ears, and other sensory organs to perceive the environment. Perceptual processes have been studied in many species, with results that are often similar to those in humans. Equally interesting are those perceptual processes that differ from, or go beyond those found in humans, such as echolocation in bats and dolphins, motion detection by skin receptors in fish, and extraordinary visual acuity, motion sensitivity and ability to see ultraviolet light in some birds. Attention refers to mental processes that select relevant information, inhibit irrelevant information, and switch among these as the situation demands. A large body of research has explored the way attention and expectation affect the behavior of non-human animals, and much of this work suggests that attention operates in birds, mammals and reptiles in much the same way that it does in humans. More enlightenment comes from experiments that allow the animal to choose from several alternatives. For

example, several studies have shown that performance is better on, for example, a color discrimination e. The reverse effect happens after training on forms. Thus, the earlier learning appears to affect which dimension, color or form, the animal will attend to. In "blocking", for example, an animal is conditioned to respond to one stimulus "A" by pairing that stimulus with reward or punishment. After the animal responds consistently to A, a second stimulus "B" accompanies A on additional training trials. Later tests with the B stimulus alone elicit little response, suggesting that learning about B has been blocked by prior learning about A. Thus, in the experiment just cited, the animal failed to attend to B because B added no information to that supplied by A. If true, this interpretation is an important insight into attentional processing, but this conclusion remains uncertain because blocking and several related phenomena can be explained by models of conditioning that do not invoke attention. In one experiment, a tone and a light are presented simultaneously to pigeons. The pigeons gain a reward only by choosing the correct combination of the two stimuli e. The birds perform well at this task, presumably by dividing attention between the two stimuli. When only one of the stimuli varies and the other is presented at its rewarded value, discrimination improves on the variable stimulus but discrimination on the alternative stimulus worsens. Visual search and attentional priming[edit] As noted above, the function of attention is to select information that is of special use to the animal. Visual search typically calls for this sort of selection, and search tasks have been used extensively in both humans and animals to determine the characteristics of attentional selection and the factors that control it. Experimental research on visual search in animals was initially prompted by field observations published by Luc Tinbergen For example, he found that birds tended to catch the same type of insect repeatedly even though several types were available. Tinbergen suggested that this prey selection was caused by an attentional bias that improved detection of one type of insect while suppressing detection of others. This "attentional priming" is commonly said to result from a pretrial activation of a mental representation of the attended object, which Tinbergen called a "searching image". For example, Pietrewicz and Kamil , [32] [33] presented blue jays with pictures of tree trunks upon which rested either a moth of species A, a moth of species B, or no moth at all. The birds were rewarded for pecks at a picture showing a moth. Crucially, the probability with which a particular species of moth was detected was higher after repeated trials with that species e. These results suggest again that sequential encounters with an object can establish an attentional predisposition to see the object. Another way to produce attentional priming in search is to provide an advance signal that is associated with the target. For example, if a person hears a song sparrow he or she may be predisposed to detect a song sparrow in a shrub, or among other birds. A number of experiments have reproduced this effect in animal subjects. For example, the time taken to find a single target increases as the number of items in the visual field increases. This rise in RT is steep if the distracters are similar to the target, less steep if they are dissimilar, and may not occur if the distracters are very different in from the target in form or color. Concepts enable humans and animals to organize the world into functional groups; the groups may be composed of perceptually similar objects or events, diverse things that have a common function, relationships such as same versus different, or relations among relations such as analogies. The latter is freely available online. Alternatively, a subject may be offered a choice between two or more pictures. Many experiments end with the presentation of items never seen before; successful sorting of these items shows that the animal has not simply learned many specific stimulus-response associations. A related method, sometimes used to study relational concepts, is matching-to-sample. In this task an animal sees one stimulus and then chooses between two or more alternatives, one of which is the same as the first; the animal is then rewarded for choosing the matching stimulus. For example, a squirrel climbs a tree when it sees Rex, Shep, or Trixie, which suggests that it categorizes all three as something to avoid. This sorting of instances into groups is crucial to survival. Among other things, an animal must categorize if it is to apply learning about one object e. Rex bit me to new instances of that category dogs may bite. For example, bees or pigeons quickly learn to choose any red object and reject any green object if red leads to reward and green does not. In a classic study, Richard J. Herrnstein trained pigeons to respond to the presence or absence of human beings in photographs. In follow-up studies, pigeons categorized other natural objects e. An oft-cited study by Vaughan provides an example. Pigeons got food for pecking at pictures in set A but not for pecks at pictures in set B. After they had learned this task

fairly well, the outcome was reversed: Then the outcome was reversed again, and then again, and so on. Vaughan found that after 20 or more reversals, associating reward with a few pictures in one set caused the birds to respond to the other pictures in that set without further reward, as if they were thinking "if these pictures in set A bring food, the others in set A must also bring food. Several other procedures have yielded similar results. Better evidence is provided if, after training, an animal successfully makes a choice that matches a novel sample that it has never seen before. Monkeys and chimpanzees do learn to do this, as do pigeons if they are given a great deal of practice with many different stimuli. However, because the sample is presented first, successful matching might mean that the animal is simply choosing the most recently seen "familiar" item rather than the conceptually "same" item. A number of studies have attempted to distinguish these possibilities, with mixed results. Much of the evidence has come from studies of sequence learning in which the "rule" consists of the order in which a series of events occurs. Rule use is shown if the animal learns to discriminate different orders of events and transfers this discrimination to new events arranged in the same order. For example, Murphy et al. Other stimulus triplets were not rewarded. The rats learned the visual sequence, although both bright and dim lights were equally associated with reward. More importantly, in a second experiment with auditory stimuli, rats responded correctly to sequences of novel stimuli that were arranged in the same order as those previously learned. Similar sequence learning has been demonstrated in birds and other animals as well. Memory has been widely investigated in foraging honeybees, Apis mellifera, which use both transient short-term working memory that is non-feeder specific and a feeder specific long-term reference memory. Tests of working memory evaluate memory for events that happened in the recent past, usually within the last few seconds or minutes. Tests of reference memory evaluate memory for regularities such as "pressing a lever brings food" or "children give me peanuts". Habituation This is one of the simplest tests for memory spanning a short time interval. If the second response differs consistently from the first, the animal must have remembered something about the first, unless some other factor such as motivation, sensory sensitivity, or the test stimulus has changed. Delayed response[edit] Delayed response tasks are often used to study short-term memory in animals. Introduced by Hunter , a typical delayed response task presents an animal with a stimulus such a colored light, and after a short time interval the animal chooses among alternatives that match the stimulus, or are related to the stimulus in some other way. For example, in the initial study with this task, a pigeon was presented with a flickering or steady light. Then, a few seconds later, two pecking keys were illuminated, one with a steady light and one with a flickering light.

Chapter 4 : Cognition: The Thinking Animal - Daniel T. Willingham - Google Books

This highly readable book offers comprehensive coverage of classic cognitive psychology and uptotheminute coverage of controversies in the field in an interesting, lively manner that assumes no prior knowledge of cognitive psychology.

Heather Burgess Running head: It has been the relentless pursuit of not only how did the mind work but also what exactly constituted the mind that eventually led the foundations of cognitive theory. As psychologists examined how mental processes produced behavior, it was evident a different approach would be needed. Cognitive psychology developed primarily from the inability of the behaviorist approach to fully explain every form of behavior. While there were many things that drove its development, there were four main milestones in the development of cognitive psychology: Each of these four milestones contributed significantly to the search for a better model and the development of the cognitive approach, which we have today. Behaviorism had many shortfalls with its primary one being that it excluded the effect of genetics entirely. It only accounted for what had been learned through reward and punishment only. Questions were raised on different fronts and answers were missing when examining the question through the lens of behaviorism only. One area was where ethologists observed discrepancies were in fixed-action patterns and critical periods in animals. Another area in which behaviorism could not provide consistent answers was in language acquisition. Behaviorism posited that language was learned or imitated as modeled by someone else. However, there were points that the behaviorist perspective did not address. First, learning cannot account for the rapid rate children acquire language. Second, there are an infinite number of sentences and all cannot be learned by imitation. Next, children consistently make errors in things like verb tense. Since adults usually use correct form, this would not be learned by imitation. And last, children acquire their language skills even if adults do not correct their syntax Language and Cognition, These points show there must be other explanations such as innate language skills to further explain the acquisition of language. These points seemed best explained by the cognitive perspective using theories, such as innate language centers. The second milestone, the information processing model, was very influential in moving closer to a cognitive approach through the computer metaphor. There were many attempts to find a way to explain how the mind worked, including a switchboard and solenoids but these did not fully explain how the mental processes Willingham, In the computer analogy, the brain was likened to the hardware of a computer and thought processes were likened to computer software. This analogy was revolutionary in the way psychologists studied the mine and led to the information processing model. In the s, an artificial intelligence program was developed by Allen Newell and Herb Simon that proved theorems in formal logic using abstract constructs and representations. Through the artificial intelligence, it became apparent to researchers that the human mind processed information much like a computer, using representations and processes and this approach could help give deeper insight into the processes of the mind and the resulting behavior. The focus is on the brain and its impact on behavior as well as normal cognitive functions and the impact on the nervous system resulting from neurological, psychological, and neurodevelopmental disorders. Neuroscience began to show a clear connection between behavior and specific structures of the brain. This connection revealed the biological side of behavior that could not be ignored. Studying behavior from this aspect allows a clear picture of a how disorders affect the brain itself initiating behavior and can be compared to normal behavior to gain greater perspective. The observance of behavior affords cognitive psychologists the ability to test and evaluate theories about behaviors and the hypotheses developed from them. Self-reporting can present errors that can be confirmed or rejected through the use of behavioral observation tested using empirical means. Additionally, cognitive psychologists cannot personally observe and measure internal mental processes but in utilizing behavioral observation, the cognitive psychologist can arrive at logical conclusions of the existence of the behavior based on the observation of the behavior. In using the accepted standard of behavioral procedures, cognitive psychologists are able to examine the cognitive processes thought to be the source without inferring unproven causes Zentall, This removes much of the subjectivity that initially made the cognitive perspective suspect. Cognitive psychology developed the framework to test theories and further explain behavior using behavioral

observation. Using the scientific method, the theory predicts the behavior to be expected if the said theory is provable. There are several steps to take in order to this. First, develop alternative theories by having at least two possibilities to select from when testing the hypothesis. Second, derive specific predictions for each theory by providing a bridge between the observable and unobservable in order to accurately confirm or disprove. And lastly, the compilation of sufficient data by which to compare the theories to validate both the methods and the results. Research methods that are employed using behavioral observation to test cognitive theories are descriptive research, relational research, and experimental research. Descriptive research consists of naturalistic observation, case studies, and self-reporting, all of which are describing a behavior as found in the world Willingham, , p. Experimental research is testing what has been observed and determining if the theory can be confirmed or disproved using the scientific method. The development of cognitive psychology has been a momentous step toward greater understanding of how behavior develops. It has opened the doors to increased research that is measureable and theories that could be empirically tested to confirm or disprove cognitive theories. This has granted us innumerable insights into the connections between the brain and behavior and continues to be a source of learning. In the end, the ability to form and research theories has brought these two fields of behaviorism and cognitive perspective together through an understanding of the connection between observable behavior and mental processes. It has paved the way for artificial intelligence, which is used in almost every discipline, and neuroscience and promises to continue to improve treatments and shed light on behavior. Retrieved on January 24, from http: Implications of cognitive psychology for clinical psychology and psychotherapy. Journal Of Clinical Psychology, 60 4 , Retrieved June 24, from http: The thinking animal 3rd ed. Upper Saddle River, NJ: Journal Of General Psychology, 4 ,

Chapter 5 : Willingham, Cognition: The Thinking Animal, 3rd Edition | Pearson

For undergraduate courses or beginning graduate courses in Introductory Cognitive Psychology. Uses a unique question-and-answer format to help students understand why cognitive psychologists approach problems as they do. This text explains the questions cognitive psychologists ask, gives clear.

Chapter 6 : - Cognition : The Thinking Animal | theinnatdunvilla.com

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Chapter 7 : Animal Cognition (Stanford Encyclopedia of Philosophy)

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Chapter 8 : Cognitive Psychology Definition Paper | Heather Burgess - theinnatdunvilla.com

Animal cognition, or cognitive ethology, is the title given to a modern approach to the mental capacities of non human animals.

Chapter 9 : About - Daniel Willingham--Science & Education

Animal cognition describes the mental capacities of non-human animals and the study of those capacities. The field developed from comparative psychology, including the study of animal conditioning and learning.