Elephants on Acid – Psychological Science and Unethical Experiments

Learning Targets

- Review ethics in experiments with humans and non-humans
- Form opinions and argue them
- Work collaboratively in groups to summarize information

National Standards for high School Psychology Curricula
2.1 Identify ethical standards psychologists must address regarding research with human participants
2.2 Identify ethical standards psychologists must address regarding research with non-human participants

Directions:
Walk around the room and read the posted experiments from an article entitled "Elephants on Acid." On the back of this sheet you will find a list of each study. Summarize each study in one sentence (for reference)

When you are done summarizing all the studies, choose the top 5 WORST experiments (the ones you find most appalling). Rank these 5 on the lines next to the study on the back page. 1 = the absolute WORST, 2 = a little less worse

Next in a group, please come up with a group top 5 for the worst. Discuss each other's lists. Give insight as to why you agree or disagree. Talk it over. Debate. (This should take more than 5 minutes)

Be ready to discuss and debate your opinion, your group's opinions and what the class thinks.

Quick Ethics review to remember

- **Animal testing**
  - Purpose
    - Must answer a specific, important, scientific question
    - Animals must be best suited to answer that question
  - Care
    - Animals must be cared for and housed in a humane way
  - Acquisition
    - Animals must be acquired legally
  - Design
    - Must cause the least amount of suffering feasible
    - Euthanasia may be required after study

Human Research

- Informed Consent
  - Agreed to study
  - Can drop out no questions asked
- Confidentiality
- No significant Risk
  - Temporary discomfort/stress okay
- Debriefing
  - Given results
  - If used deception – explain true purpose
- IRB
  - Both animal and human testing

Write one summary sentence for each study. When done rank the 5 WORST studies

_____ 1. Elephants on Acid

_____ 2. Obedience

_____ 3. Two headed Dogs

_____ 4. Heterosexual Behavior

_____ 5. Isolated Dog Head

_____ 6. Human Ape Hybrid

_____ 7. Stanford Prison Experiment

_____ 8. Facial Expressions

_____ 9. Vomit-Drinking Dr.

_____ 10. Beneficial Brainwashing

_____ 11. Monkey-Head Transplant

_____ 12. Remote Controlled Bull

_____ 13. The Ape and the Child

_____ 14. Fingernails

_____ 15. Electrified Corpse

_____ 16. Seeing through the Cat's Eyes

_____ 17. Turkey Sex

_____ 18. Wanna Sleep with Me?

_____ 19. Shock the Puppy

_____ 20. Heartbeat at Death

Which Study did your group rate as the WORST? Why???

#1: Elephants on Acid

What happens if you give an elephant LSD? On Friday August 3, 1962, a group of Oklahoma City researchers decided to find out.

Warren Thomas, Director of the City Zoo, fired a cartridge-syringe containing 297 milligrams of LSD into Tusko the Elephant's rump. With Thomas were two scientific colleagues from the University of Oklahoma School of Medicine, Louis Jolyon West and Chester M. Pierce.

297 milligrams is a lot of LSD — about 3000 times the level of a typical human dose. In fact, it remains the largest dose of LSD ever given to a living creature. The researchers figured that, if they were going to give an elephant LSD, they better not give him too little.

Thomas, West, and Pierce later explained that the experiment was designed to find out if LSD would induce musth in an elephant — musth being a kind of temporary madness male elephants sometimes experience during which they become highly aggressive and secrete a sticky fluid from their temporal glands. But one suspects a small element of ghoulish curiosity might also have been involved.

Whatever the reason for the experiment, it almost immediately went awry. Tusko reacted to the shot as if a bee had stung him. He trumpeted around his pen for a few minutes, and then keeled over on his side. Horrified, the researchers tried to revive him, but about an hour later he was dead. The three scientists sheepishly concluded that, "It appears that the elephant is highly sensitive to the effects of LSD."

In the years that followed controversy lingered over whether it was the LSD that killed Tusko, or the drugs used to revive him. So twenty years later, Ronald Siegel of UCLA decided to settle the debate by giving two elephants a dose similar to what Tusko received. Reportedly he had to sign an agreement promising to replace the animals in the event of their deaths.

Instead of injecting the elephants with LSD, Siegel mixed the drug into their water, and when it was administered in this way, the elephants not only survived but didn't seem too upset at all. They acted sluggish, rocked back and forth, and made some strange vocalizations such as chirping and squeaking, but within a few hours they were back to normal. However, Siegel noted that the dosage Tusko received may have exceeded some threshold of toxicity, so he couldn't rule out that LSD was the cause of his death. The controversy continues.

#2: Obedience

Imagine that you've volunteered for an experiment, but when you show up at the lab you discover the researcher wants you to murder an innocent person. You protest, but the researcher firmly states, "The experiment requires that you do it." Would you acquiesce and kill the person?

When asked what they would do in such a situation, almost everyone replies that of course they would refuse to commit murder. But Stanley Milgram's famous obedience experiment, conducted at Yale University in the early 1960s, revealed that this optimistic belief is wrong. If the request is presented in the right way, almost all of us quite obediently become killers.

Milgram told subjects they were participating in an experiment to determine the effect of punishment on learning. One volunteer (who was, in reality, an actor in cahoots with Milgram) would attempt to memorize a series of word pairs. The other volunteer (the real subject) would read out the word pairs and give the learner an electric shock every time he got an answer wrong. The shocks would increase in intensity by fifteen volts with each wrong answer.

The experiment began. The learner started getting some wrong answers, and pretty soon the shocks had reached 120 volts. At this point the learner started crying out, "Hey, this really hurts." At 150 volts the learner screamed in pain and demanded to be let out. Confused, the volunteers turned around and asked the researcher what they should do. He always calmly replied, "The experiment requires that you continue."

Milgram had no interest in the effect of punishment on learning. What he really wanted to see was how long people would keep pressing the shock button before they refused to participate any further. Would they remain obedient to the authority of the researcher up to the point of killing someone?

To Milgram's surprise, even though volunteers could plainly hear the agonized cries of the learner echoing through the walls of the lab from the neighboring room, two-thirds of them continued to press the shock button all the way up to the end of scale, 450 volts, by which time the learner had fallen into an eerie silence, apparently dead. Milgram's subjects sweated and shook, and some laughed hysterically, but they kept pressing the button. Even more disturbingly, when volunteers could neither see nor hear feedback from the learner, compliance with the order to give ever greater shocks was almost 100%.

Milgram later commented, "I would say, on the basis of having observed a thousand people in the experiment and having my own intuition shaped and informed by these experiments, that if a system of death camps were set up in the United States of the sort we had seen in Nazi Germany, one would be able to find sufficient personnel for those camps in any medium-sized American town."

#3: Demikhov's Two-Headed Dogs

In 1954 Vladimir Demikhov shocked the world by unveiling a surgically created monstrosity: A two-headed dog. He created the creature in a lab on the outskirts of Moscow by grafting the head, shoulders, and front legs of a puppy onto the neck of a mature German shepherd.

Demikhov paraded the dog before reporters from around the world. Journalists gasped as both heads simultaneously lapped at bowls of milk, and then cringed as the milk from the puppy's head dribbled out the unconnected stump of its esophageal tube. The Soviet Union proudly boasted that the dog was proof of their nation's medical preeminence.

Over the course of the next fifteen years, Demikhov created a total of twenty of his two-headed dogs. None of them lived very long, as they inevitably succumbed to problems of tissue rejection. The record was a month.

Demikhov explained that the dogs were part of a continuing series of experiments in surgical techniques, with his ultimate goal being to learn how to perform a human heart and lung transplant. Another surgeon beat him to this goal — Dr. Christian Baarnard in 1967 — but Demikhov is widely credited with paving the way for it.

#4: The Initiation of Heterosexual Behavior in a Homosexual Male

In 1954 James Olds and Peter Milner of McGill University discovered that the septal region is the feel-good center of the brain. Electrical stimulation of it produces sensations of intense pleasure and sexual arousal. They demonstrated their discovery by inserting wires into a rat's brain and then showing that when the rat figured out it could self-stimulate itself by pressing a lever, it would maniacally bang on that lever up to two-thousand times an hour. (The image at the very top of this page, third from the right, shows one of Olds and Milner's rats banging on its lever.)

In 1970, Robert Heath of Tulane University dreamed up a far more novel application of Olds and Milner's discovery. Heath decided to test whether repeated stimulation of the septal region could transform a homosexual man into a heterosexual.

Heath referred to his homosexual subject as patient B-19. He inserted Teflon-insulated electrodes into the septal region of B-19's brain and then gave B-19 carefully controlled amounts of stimulation in experimental sessions. Soon the young man was reporting increased stirrings of sexual motivation. Heath then rigged up a device to allow B-19 to self-stimulate himself. It was like letting a chocoholic loose in a candy shop. B-19 quickly became obsessed with the pleasure button. In one three-hour session he pressed it 1500 times until, as Heath noted, "he was experiencing an almost overwhelming euphoria and elation and had to be disconnected."

By this stage of the experiment B-19's libido was so jacked up that Heath decided to proceed with the final stage in which B-19 would be introduced to a sexually-willing female partner. With permission from the state attorney general, Heath arranged for a twenty-one-year-old female prostitute to visit the lab, and he placed her in a room with B-19. For an hour B-19 did nothing, but then the prostitute took the initiative and a successful sexual encounter between the two occurred. Heath considered this a positive result.

Little is known of B-19's later fate. Heath reported that the young man drifted back into a life of homosexual prostitution, but that he also had an affair with a married woman. Heath optimistically decided that this showed the treatment was at least partially successful. However, Heath never did try to convert any more homosexuals.

#5: The Isolated Head of a Dog

What could be more horrific than creating a two-headed dog? What about keeping the severed head of a dog alive apart from its body!

Ever since the carnage of the French Revolution, when the guillotine sent thousands of severed heads tumbling into baskets, scientists had wondered whether it would be possible to keep a head alive apart from its body, but it wasn't until the late 1920s that someone managed to pull off this feat.

Soviet physician Sergei Brukhonenko developed a primitive heart-lung machine he called an "autojector," and with this device he succeeded in keeping the severed head of a dog alive. He displayed one of his living dog heads in 1928 before an international audience of scientists at the Third Congress of Physiologists of the USSR. To prove that the head lying on the table really was alive, he showed that it reacted to stimuli. Brukhonenko banged a hammer on the table, and the head flinched. He shone light in its eyes, and the eyes blinked. He even fed the head a piece of cheese, which promptly popped out the esophageal tube on the other end.

Brukhonenko's severed dog head became the talk of Europe and inspired the playwright George Bernard Shaw to muse, "I am even tempted to have my own head cut off so that I can continue to dictate plays and books without being bothered by illness, without having to dress and undress, without having to eat, without having anything else to do other than to produce masterpieces of dramatic art and literature."

#6: Human-Ape Hybrid

For decades dark rumors circulated alleging that the Soviets had conducted experiments to try to create a human-ape hybrid by breeding chimpanzees and humans, but it wasn't until the collapse of the Soviet Union and the opening of Russian archives that the rumors were confirmed.

Dr. Il'ya Ivanov was a world-renowned expert on veterinary reproductive biology, but he wanted to do more in life than breed fatter cows. So in 1927 he traveled to Africa to pursue his vision of interbreeding man and ape.

Thankfully his efforts weren't successful. To a great degree this was due to the native staff of the West Guinea research facility where he worked, from whom he constantly had to conceal the true purpose of his experiments. If they had found out what he was really doing, he wrote in his diary, "this could have led to very unpleasant consequences." The necessity of carrying out his work in secrecy made it almost impossible to do anything, although he did record two unsuccessful attempts to artificially inseminate female chimpanzees with human sperm.

Frustrated, Ivanov eventually returned to the Soviet Union. He brought an orangutan named Tarzan back with him, hoping to continue his research in a more accepting environment. Back home he advertised for female volunteers willing to carry Tarzan's child, and remarkably he got a few takers. But then Tarzan died and Ivanov himself was sent off to a prison camp for a couple of years. This ended his research. There are vague rumors suggesting that other Soviet scientists continued Ivanov's work, but nothing definite has been proven.

#7: The Stanford Prison Experiment

Philip Zimbardo was curious about why prisons are such violent places. Is it because of the character of their inhabitants, or is it due to the corrosive effect of the power structure of the prisons themselves?

To find out, Zimbardo created a mock prison in the basement of the Stanford psychology department. He recruited clean-cut young men as volunteers — none had criminal records and all rated "normal" on psychological tests — and he randomly assigned half of them to play the role of prisoners and the other half to play guards. His plan was that he would step back for two weeks and observe how these model citizens interacted with each other in their new roles.

What happened next has become the stuff of legend.

Social conditions in the mock prison deteriorated with stunning rapidity. On the first night the prisoners staged a revolt, and the guards, feeling threatened by the insubordination of the prisoners, cracked down hard. They began devising creative ways to discipline the prisoners, using methods such as random strip-searches, curtailed bathroom privileges, verbal abuse, sleep deprivation, and the withholding of food.

Under this pressure, prisoners began to crack. The first one left after only thirty-six hours, screaming that he felt like he was "burning up inside." Within six days, four more prisoners had followed his lead, one of whom had broken out in a full-body stress-related rash. It was clear that for everyone involved the new roles had quickly become more than just a game.

Even Zimbardo himself felt seduced by the corrosive psychology of the situation. He began entertaining paranoid fears that his prisoners were planning a break-out, and he tried to contact the real police for help. Luckily, at this point Zimbardo realized things had gone too far. Only six days had passed, but already the happy college kids who had begun the experiment had transformed into sullen prisoners and sadistic guards.

Zimbardo called a meeting the next morning and told everyone they could go home. The remaining prisoners were relieved, but tellingly, the guards were upset. They had been quite enjoying their new-found power and had no desire to give it up.

#8: Facial expressions while decapitating a rat

In 1924 Carney Landis, a graduate student in psychology at the University of Minnesota, designed an experiment to study whether emotions evoke characteristic facial expressions. For instance, is there one expression everyone uses to convey shock, and another commonly used to display disgust?

Most of Landis's subjects were fellow graduate students. He brought them into his lab and painted lines on their faces so that he could more easily see the movement of their muscles. He then exposed them to a variety of stimuli designed to provoke a strong psychological reaction. As they reacted, he snapped pictures of their faces. He made them smell ammonia, look at pornographic pictures, and reach their hand into a bucket containing slimy frogs. But the climax of the experiment arrived when he carried out a live white rat on a tray and asked them to decapitate it.

Most people initially resisted his request, but eventually two-thirds did as he ordered. Landis noted that most of them performed the task quite clumsily: "The effort and attempt to hurry usually resulted in a rather awkward and prolonged job of decapitation." For the one-third that refused, Landis eventually picked up the knife and decapitated the rat for them.

Landis's experiment presented a stunning display of the willingness of people to obey the demands of experimenters, no matter how bizarre those demands might be. It anticipated the results of Milgram's obedience experiment by almost forty years. However, Landis never realized that the compliance of his subjects was far more interesting than their facial expressions. Landis remained single-mindedly focused on his initial research topic, even though he never was able to match up emotions and expressions. It turns out that people use a wide variety of expressions to convey the same emotion — even an emotion such as disgust at having to decapitate a rat.

#9: The Vomit-Drinking Doctor

How far would you go to prove a theory? Stubbins Ffirth, a doctor-in-training living in Philadelphia during the early nineteenth century, went further than most. Way further.

Having observed that yellow fever ran riot during the summer, but disappeared during the winter, Ffirth concluded that it was not a contagious disease. Instead, he theorized it was caused by an excess of stimulants such as heat, food, and noise.

To prove his theory, Ffirth set out to demonstrate that no matter how much he exposed himself to yellow fever, he wouldn't catch it. He started by making small incisions on his arms and pouring "fresh black vomit" obtained from a yellow-fever patient into the cuts. He didn't get sick.

Next he dribbled some vomit in his eyes. He fried some up on a skillet and inhaled the fumes. He fashioned some into a pill and swallowed it. Finally he took to drinking entire glasses of pure, undiluted black vomit. And still he didn't get sick.

Ffirth rounded out his experiment by liberally smearing himself with other yellow-fever tainted fluids: blood, saliva, perspiration, and urine. Healthy as ever, he declared his theory proven. Unfortunately, he was wrong. Yellow fever is very contagious, but it requires direct transmission into the blood stream, usually by a mosquito, to cause infection. But considering all Ffirth did to infect himself, it is a bit of a miracle he remained alive.

#10: Beneficial Brainwashing

Dr. Ewen Cameron believed he had come up with a cure for schizophrenia. His theory was that the brain could be reprogrammed to think in healthy ways by forcibly imposing new thought patterns on it. His method was to make patients wear headphones and listen to audio messages looped over and over, sometimes for days or even weeks at a time. He called this method "psychic driving," because the messages were being driven into the psyche. The press hailed it as "beneficial brainwashing."

During the 1950s and early 1960s, hundreds of Cameron's patients at Montreal's Allan Memorial Clinic became his unwitting test subjects — whether or not they actually had schizophrenia. Some patients checked in complaining of problems as minor as menopause-related anxiety, only to find themselves sedated with barbiturates, strapped into a bed, and forced to listen for days on end to messages such as "People like you and need you. You have confidence in yourself."

One time, to test the technique, Cameron placed patients into a drugged sleep and made them listen to the message, "When you see a piece of paper, you want to pick it up." Later he drove them to a local gymnasium. There, lying in the middle of the gym floor, was a single piece of paper. He happily reported that many of them spontaneously walked over to pick it up.

When the CIA learned of what Cameron was doing, it became interested and started surreptitiously channeling him money. But eventually the agency concluded that Cameron's technique was a failure and cut his funding, prompting Cameron himself to admit that his experiments had been "a ten year trip down the wrong road." In the late 1970s a group of Cameron's former patients filed suit against the CIA for its support of his work and reached an out-of-court settlement for an undisclosed amount of money.

#11: Monkey-Head Transplant

When Vladimir Demikhov unveiled his two-headed dogs in 1954, it inspired a strange kind of surgical arms race (or rather, head race) between the two superpowers. Eager to prove that its surgeons were actually the best in the world, the American government began funding the work of Robert White, who then embarked on a series of experimental surgeries, performed at his brain research center in Cleveland, Ohio, resulting in the world's first successful monkey-head transplant.

The head transplant occurred on March 14, 1970. It took White and his assistants hours to perform the carefully choreographed operation, separating a monkey's head from its body and reattaching it to a new body. When the monkey woke and found that its body had been switched for a new one, it angrily tracked White with its eyes and snapped at him with its teeth. The monkey survived a day and a half before succumbing to complications from the surgery. As bad as it was for the monkey, it could have been worse. White noted that, from a surgical point of view, it would have been easier to put the monkey's head on backwards.

White thought he should have been treated like a hero, but instead the public was appalled by what he had done. Nevertheless, White soldiered on, campaigning to raise support for a human head transplant. He toured with Craig Vetovitz, a near-quadriplegic, who volunteered to be the first to undergo the procedure. The public is still a long way from accepting the idea of human head transplants, but if White has his way, one day it will happen.

#12: The Remote-Controlled Bull

Yale researcher Jose Delgado stood in the hot sun of a bullring in Cordova, Spain. With him in the ring was a large, angry bull. The animal noticed him and began to charge. It gathered speed. Delgado appeared defenseless, but when the bull was mere feet away, Delgado pressed a button on a remote control unit in his hand, sending a signal to a chip implanted in the bull's brain. Abruptly, the animal stopped in its tracks. It huffed and puffed a few times, and then walked docilely away.

Delgado's experience in the ring was an experimental demonstration of the ability of his "stimoceiver" to manipulate behavior. The stimoceiver was a computer chip, operated by a remote-control unit, that could be used to electrically stimulate different regions of an animal's brain. Such stimulation could produce a wide variety of effects, including the involuntary movement of limbs, the eliciting of emotions such as love or rage, or the inhibition of appetite. It could also be used, as Delgado showed, to stop a charging bull.

Delgado's experiment sounds so much like science fiction, that many people are surprised to learn it occurred back in 1963. During the 1970s and 80s, research into electrical stimulation of the brain (ESB) languished, stigmatized by the perception that it represented an effort to control people's minds and thoughts. But more recently, ESB research has once again been flourishing, with reports of researchers creating remote-controlled rats, pigeons, and even sharks.

#13: The Ape and the Child

History contains numerous accounts of children raised by animals. The children in such cases often continue to act more animal than human, even when returned to human society. The psychologist Winthrop Kellogg wondered what would happen if the situation were reversed. What if an animal were raised by humans — as a human. Would it eventually act like a human?

To answer this question, in 1931 Kellogg brought a seven-month-old female chimpanzee named Gua into his home. He and his wife then proceeded to raise her as if she were human, treating her exactly the same as they treated their ten-month-old son Donald.

Donald and Gua played together. They were fed together. And the Kelloggs subjected them both to regular tests to track their development. One such test was the suspended cookie test, in which the Kelloggs timed how long it took their children to reach a cookie suspended by a string in the middle of the room.

Gua regularly performed better on such tests than Donald, but in terms of language acquisition she was a disappointment. Despite the Kelloggs's repeated efforts, the ability to speak eluded her. Disturbingly, it also seemed to be eluding Donald. Nine months into the experiment, his language skills weren't much better than Gua's. When he one day indicated he was hungry by imitating Gua's "food bark," the Kelloggs decided the experiment had gone far enough. Donald evidently needed some playmates of his own species. So on March 28, 1932 they shipped Gua back to the primate center. She was never heard from again.

#14: “My Fingernails Taste Terribly Bitter”

In the summer of 1942 Professor Lawrence Leshan stood in the darkness of a cabin in an upstate New York camp where a row of young boys lay sleeping. He spoke aloud, repeating a single phrase over and over, "My fingernails taste terribly bitter. My fingernails taste terribly bitter."

Nowadays that kind of behavior could get one locked away, but Leshan wasn't mad. He was conducting a sleep-learning experiment. All the boys had been diagnosed as chronic nail-biters, and Leshan wanted to find out if nocturnal exposure to a negative suggestion about nail biting would cure them of their bad habit.

Leshan initially used a phonograph to play the message. It faithfully repeated the phrase 300 times a night as the boys lay sleeping. But five weeks into the experiment, the phonograph broke. Leshan improvised by standing in the darkness and speaking the message himself.

At the end of the summer, Leshan examined the boys' nails and concluded that 40% of them had kicked the habit. The sleep-learning effect seemed to be real. However, other researchers later disputed this conclusion. In a 1956 experiment at Santa Monica College, William Emmons and Charles Simon used an electroencephalograph to make sure subjects were fully asleep before playing a message. Under these conditions, the sleep-learning effect disappeared.

#15: The Electrification of Human Corpses

In 1780 the Italian anatomy professor Luigi Galvani discovered that a spark of electricity could cause the limbs of a dead frog to twitch. Soon men of science throughout Europe were repeating his experiment, but it didn't take them long to bore of frogs and turn their attention to more interesting animals. What would happen, they wondered, if you electrified a human corpse?

Galvani's nephew, Giovanni Aldini, embarked on a tour of Europe in which he offered audiences the chance to see this stomach-turning spectacle. His most celebrated demonstration occurred on January 17, 1803 when he applied the poles of a 120-volt battery to the body of the executed murderer George Forster.

When Aldini placed wires on the mouth and ear, the jaw muscles quivered and the murderer's features twisted in a rictus of pain. The left eye opened as if to gaze upon his torturer. For the grand finale Aldini hooked one wire to the ear and plunged the other up the rectum. Forster's corpse broke into a hideous dance. The London Times wrote, "It appeared to the uninformed part of the bystanders as if the wretched man was on the eve of being restored to life."

Other researchers tried electrifying bodies, with the specific hope of restoring them to life, but with no success. Early nineteenth-century experiments of this kind are considered to have been one of Mary Shelley's main sources of inspiration when she wrote her novel *Frankenstein* in 1816.

#16: Seeing Through Cat's Eyes

In 1999 researchers led by Dr. Yang Dan, an assistant professor of neurobiology at the University of California, Berkeley, anesthetized a cat with sodium pentothal, chemically paralyzed it with Norcuron, and secured it tightly in a surgical frame. They then glued metal posts to the whites of its eyes, and forced it to look a screen that showed scene after scene of swaying trees and turtleneck-wearing men.

This was not a form of Clockword-Orange-style aversion therapy for cats. Instead, it was a remarkable attempt to tap into another creature's brain and see directly through its eyes. The researchers had inserted fiber electrodes into the vision-processing center of the cat's brain. The electrodes measured the electrical activity of the brain cells and transmitted this information to a nearby computer which decoded the information and transformed it into a visual image. As the cat watched the images of the trees and the turtleneck-wearing guy, the same images emerged (slightly blurrier) on the computer screen across the room.

The commercial potential of the technology is mind-boggling. Forget helmet-cam at the superbowl; get ready for eye-cam. Or how about this — never carry a camera again. Take pictures by blinking your eyes. It would work great unless you had a few too many drinks on vacation.

#17: Stimuli Eliciting Sexual Behavior in Turkeys

Male turkeys aren't fussy. Give them a lifelike model of a female turkey and they'll happily try to mate with it as eagerly as they would with the real thing.

This observation intrigued Martin Schein and Edgar Hale of the University of Pennsylvania, and made them curious about what might be the minimal stimulus required to excite a turkey. They embarked on a series of experiments to find out. This involved removing parts from the turkey model one by one, until the male turkey eventually lost interest.

Tail, feet, and wings were all removed, but still the clueless bird waddled up to the model, let out an amorous gobble, and tried to do his thing. Finally, the researchers were left with a head on a stick. And surprisingly, the male turkey still showed great interest. In fact, it preferred a head on a stick over a headless body.

Schein and Hale subsequently investigated how minimal they could make the head itself before it failed to elicit a response. They discovered that freshly severed female heads impaled on sticks worked best, but if the male turkey had nothing else it would settle for a plain balsa wood head. Turkeys evidently adhere to the philosophy that if you can't be with the one you love, then love the one you're with.

Curious about the mating habits of other poultry, Schein and Hale performed similar tests on White Leghorn Cocks. For those curious, they published their results in an article that boasts one of the most evocative titles in all of science: "Effects of morphological variations of chicken models on sexual responses of cocks."

#18: “Would You Go To Bed With Me Tonight?”

If you were a man walking across the campus of Florida State University in 1978, an attractive young woman might have approached you and said these exact words: "I have been noticing you around campus. I find you to be attractive. Would you go to bed with me tonight?"

If you were that man, you probably would have thought that you had just gotten incredibly lucky. But not really. You were actually an unwitting subject in an experiment designed by the psychologist Russell Clark.

Clark had persuaded the students of his social psychology class to help him find out which gender, in a real-life situation, would be more receptive to a sexual offer from a stranger. The only way to find out, he figured, was to actually get out there and see what would happen. So young men and women from his class fanned out across campus and began propositioning strangers.

The results weren't very surprising. Seventy-five percent of guys were happy to oblige an attractive female stranger (and those who said no typically offered an excuse such as, "I'm married"). But not a single woman accepted the identical offer of an attractive male. In fact, most of them demanded the guy leave her alone.

At first the psychological community dismissed Clark's experiment as a trivial stunt, but gradually his experiment gained first acceptance, and then praise for how dramatically it revealed the differing sexual attitudes of men and women. Today it's considered a classic. But why men and women display such different attitudes remains as hotly debated as ever.

#19: Shock the Puppy

When Stanley Milgram published the results of his obedience experiment in 1963, it sent shockwaves through the scientific community. Other researchers found it hard to believe that people could be so easily manipulated, and they searched for any mistakes Milgram might have made. Charles Sheridan and Richard King theorized that perhaps Milgram's subjects had merely played along with the experiment because they realized the victim was faking his cries of pain. To test this possibility, Sheridan and King decided to repeat Milgram's experiment, introducing one significant difference. Instead of using an actor, they would use *an actual victim who would really get shocked*. Obviously they couldn't use a human for this purpose, so they used the next best thing — a cute, fluffy puppy.

Sheridan and King told their subjects — volunteers from an undergraduate psychology course — that the puppy was being trained to distinguish between a flickering and a steady light. It had to stand either to the right or the left depending on the cue from the light. If the animal failed to stand in the correct place, the subjects had to press a switch to shock it. As in the Milgram experiment, the shock level increased 15 volts for every wrong answer. But unlike the Milgram experiment, the puppy really was getting zapped.

As the voltage increased, the puppy first barked, then jumped up and down, and finally started howling with pain. The volunteers were horrified. They paced back and forth, hyperventilated, and gestured with their hands to show the puppy where to stand. Many openly wept. Yet the majority of them, twenty out of twenty-six, kept pushing the shock button right up to the maximum voltage.

Intriguingly, the six students who refused to go on were all men. All thirteen women who participated in the experiment obeyed right up until the end.

#20: Heartbeat At Death

On October 31, 1938, John Deering took a last drag on his cigarette, sat down in a chair, and allowed a prison guard to place a black hood over his head and pin a target to his chest. Next the guard attached electronic sensors to Deering's wrists.

Deering had volunteered to participate in an experiment, the first of its kind, to have his heartbeat recorded as he was shot through the chest by a firing squad. The prison physician, Dr. Stephen Besley, figured that since Deering was being executed anyway, science might as well benefit from the event. Perhaps some valuable information about the effect of fear on the heart could be learned.

The electrocardiogram immediately disclosed that, despite Deering's calm exterior, his heart was beating like a jackhammer at 120 beats per minute. The sheriff gave the order to fire, and Deering's heartbeat raced up to 180 beats per minute. Then four bullets ripped into his chest, knocking him back in his chair. One bullet bore directly into the right side of his heart. For four seconds his heart spasmed. A moment later it spasmed again. Then the rhythm gradually declined until, 15.4 seconds after the first shot, Deering's heart stopped.

The next day Dr. Besley offered the press a eulogy of sorts for Deering: "He put on a good front. The electrocardiograph film shows his bold demeanor hid the actual emotions pounding within him. He was scared to death."