

# The Psychology Of Learning (Pt. 2)



PSYCH 1101: DAY 18

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# Behaviorism

- **Primary Claim:** Because behavior is the only thing that can be observed, studying behavior is only way to build an objective science of psychology.
- Rejection of internal states (like thoughts and feelings) as valid objects of scientific inquiry.
- **Goal:** To **predict** and **control** human (or animal) behavior

# Can Behaviorism Explain The Scope Of Psychology?

- Three basic learning mechanisms proposed to explain everything (yes, *everything*)
  1. Habituation
  2. Classical (Pavlovian) Conditioning
  3. Operant (Instrumental) Conditioning

# Can Behaviorism Explain The Scope Of Psychology?

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  1. Habituation
  2. **Classical (Pavlovian) Conditioning**
  3. Operant (Instrumental) Conditioning

# 2. Classical (Pavlovian) Conditioning

- The learning of an association based on repeated presentation of paired stimuli
  - An *Unconditioned Stimulus* (US or UCS) such as food or shock that causes a reflexive response
  - Paired with a neutral stimulus that does not normally cause a reflexive response, the *Conditioned Stimulus* (CS)
  - After enough pairings, the *Conditioned Stimulus* causes the response without need for the *Unconditioned Stimulus*



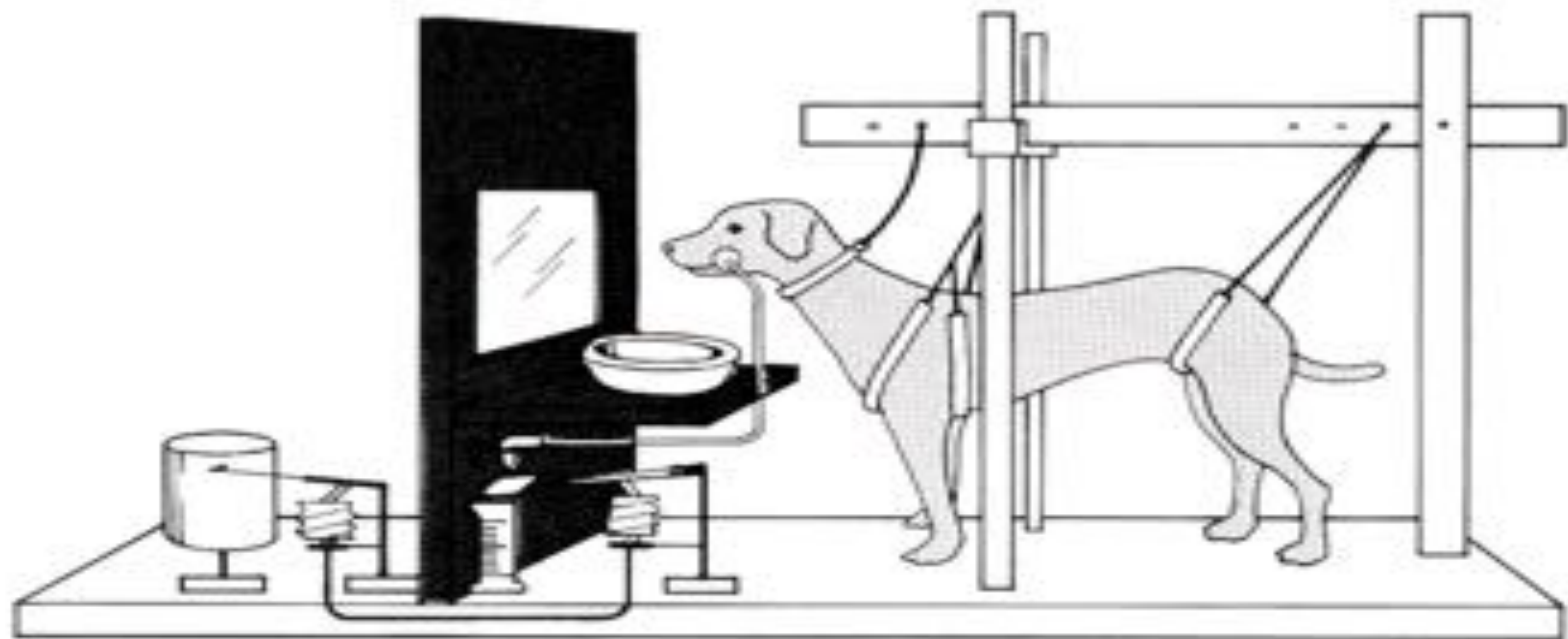
VIDEO TOOL KIT  
FOR INTRODUCTORY PSYCHOLOGY

## Pavlov's Discovery of Classical Conditioning

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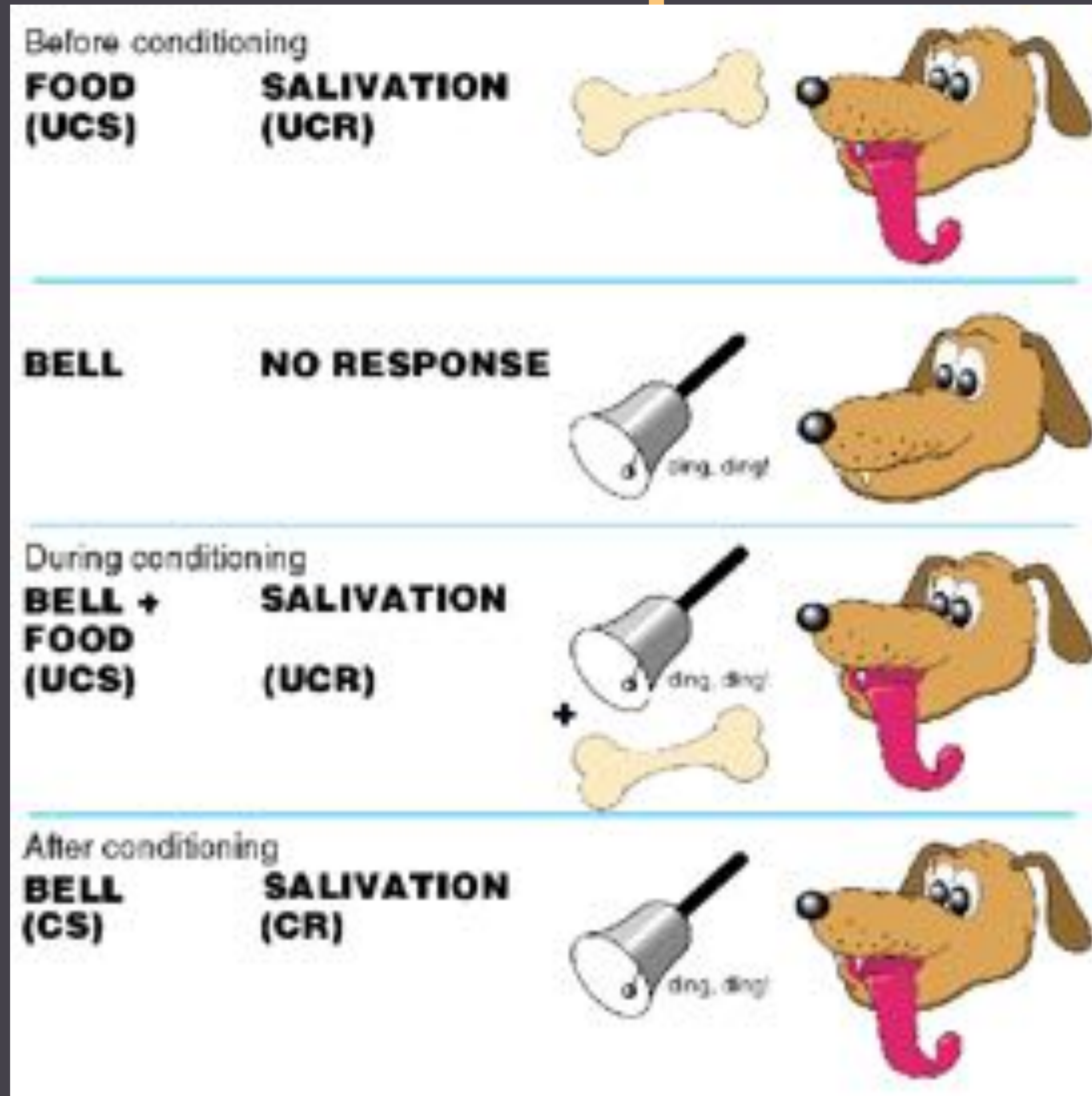
Source: BBC Motion Gallery



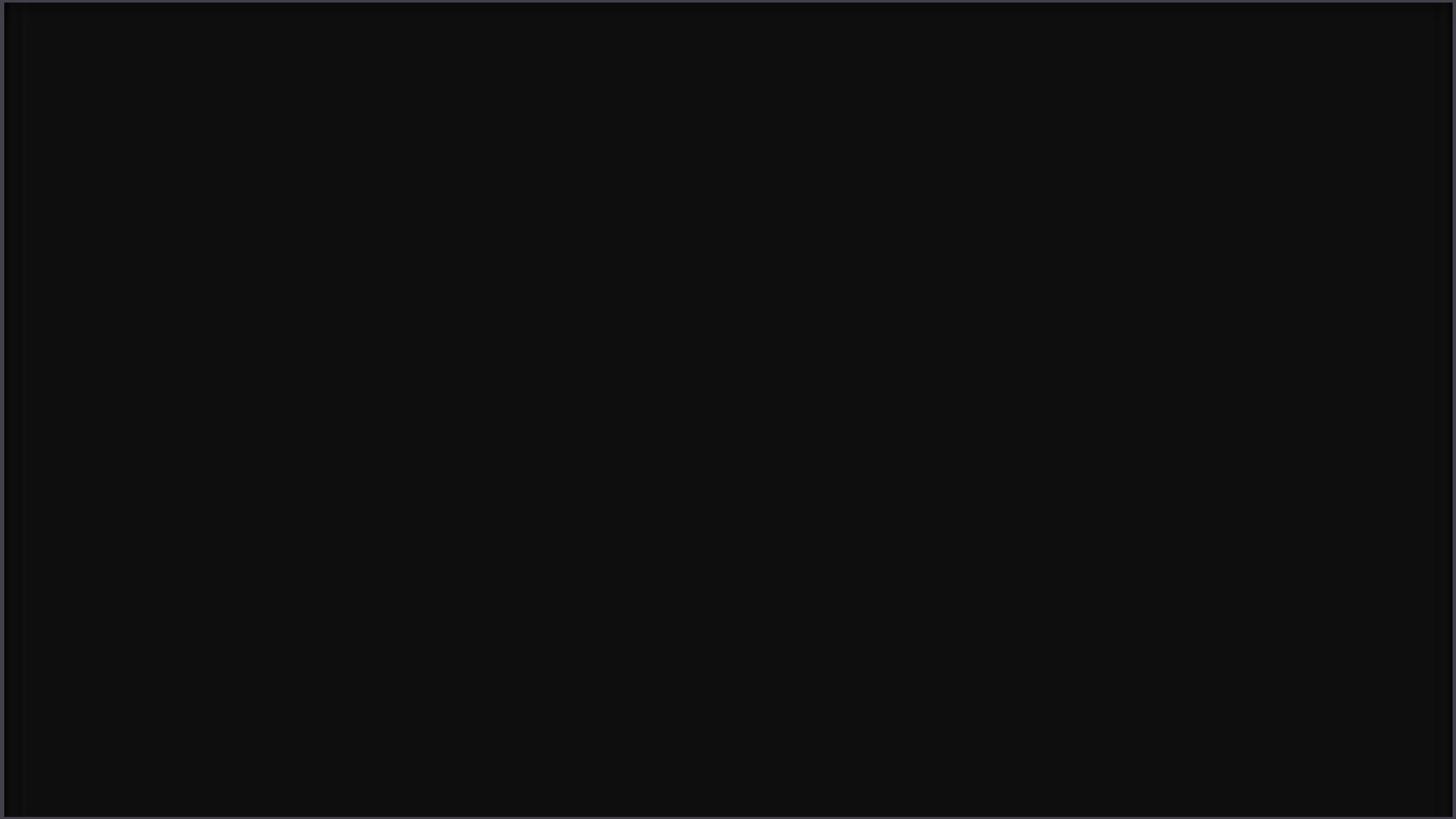


*Figure 4.3 (4.2) Apparatus for salivary conditioning*

# Pavlov's Experiment

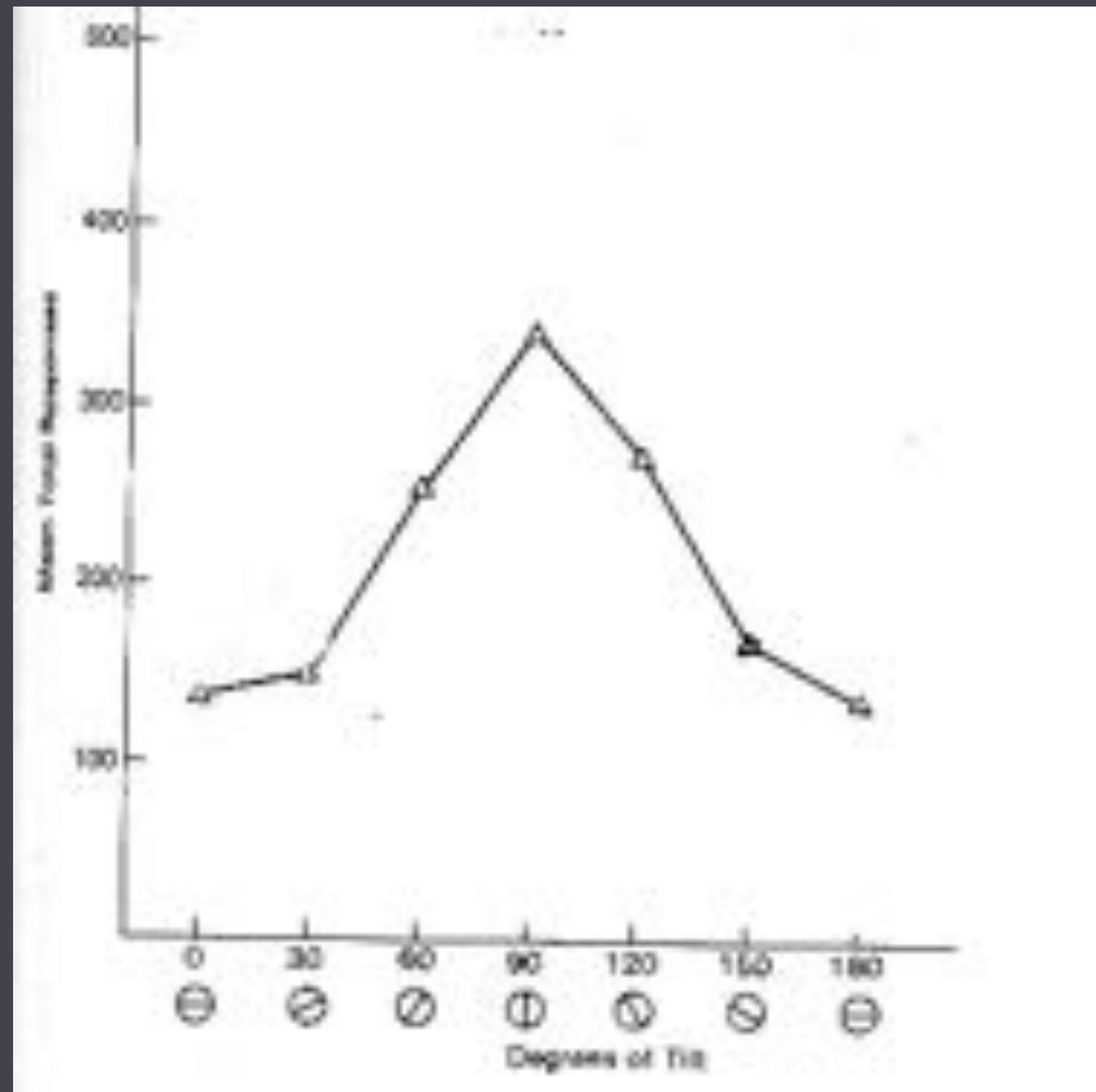






# Classical Conditioning

- Repeated pairings of Unconditioned Stimulus (UCS) and Conditioned Stimulus (CS) will give rise to a Conditioned Response (CR) with just the CS.
  - Requires optimal timing-right before (contiguous AND contingent)
- **Extinction**- if the CS occurs repeatedly in the absence of UCS, it will extinguish conditioned response.
- **Stimulus generalization**- stimuli that are similar to the CS will predictably cause the CR. The more dissimilar the less likely it will cause the CR.



Example Stimulus Generalization Curve

# Can An Infant Learn Via Classical Conditioning?: The “Little Albert” Experiment

- In 1920 John Watson and Rosalie Rayner conducted an experiment on 9-month old “Albert”
- Goal: use classical conditioning to “teach” the infant a novel fear
- Evidence that what seems instinctual and innate--a fear response--is actually *learned*



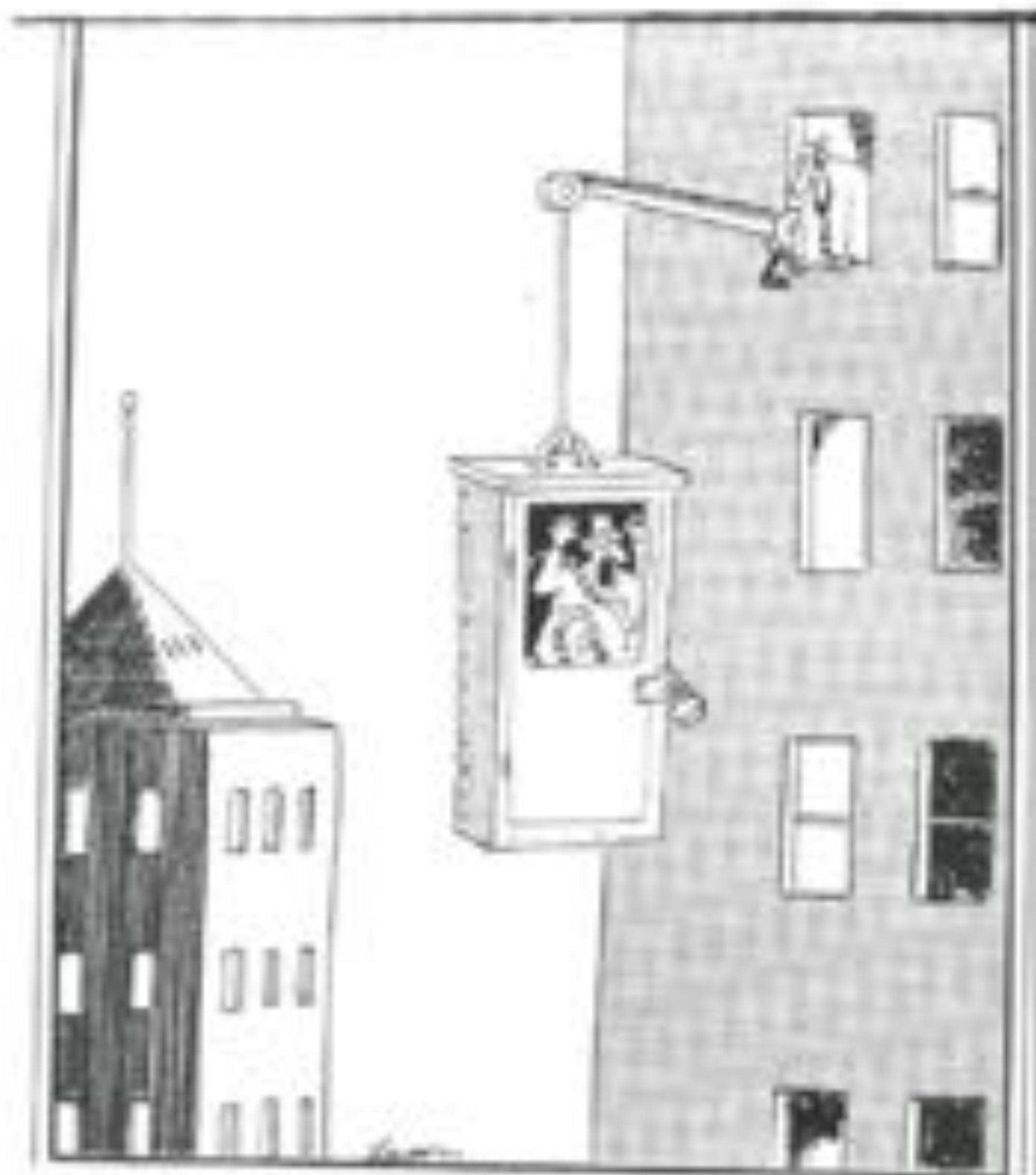


# The Scope And Power Of Classical Conditioning

- Crabs, fish, cockroaches, pigeons, rats, etc.
- Humans
  - Fear
  - Hunger
  - Sex

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Professor Gallagher and his controversial technique of simultaneously confronting the fear of heights, snakes, and the dark.



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FROM "THE OFFICE" S3E15

# The Scope And Power Of Classical Conditioning

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# Why Do We Learn This Way? What Makes It So Powerful?

- It is an adaptive response; it helps *prepares* the organism
  - e.g., salivating helps get the mouth ready for the presence of food
  - ability to predict and prepare is a good thing for an organism's survival



# When You Only Need Once To Learn: Taste Aversion

- The “Garcia effect”
  - Garcia (1955) found that rats given sweetened water, then exposed to radiation (to induce nausea)
  - rats avoided the sweet water after only one trial
- Organisms are *biologically prepared* to learn this association
  - conscious awareness is not necessary
  - sickness can occur hours later
  - only some kinds of stimuli work (pairing nausea with tones or lights has no effect)

# Learning Mechanisms

1. Habituation
2. Classical Conditioning
- 3. Operant (Instrumental) Conditioning**



You like it when a particular person sends you text messages. How often should you reply so that they keep texting you?



# Operant/Instrumental Conditioning

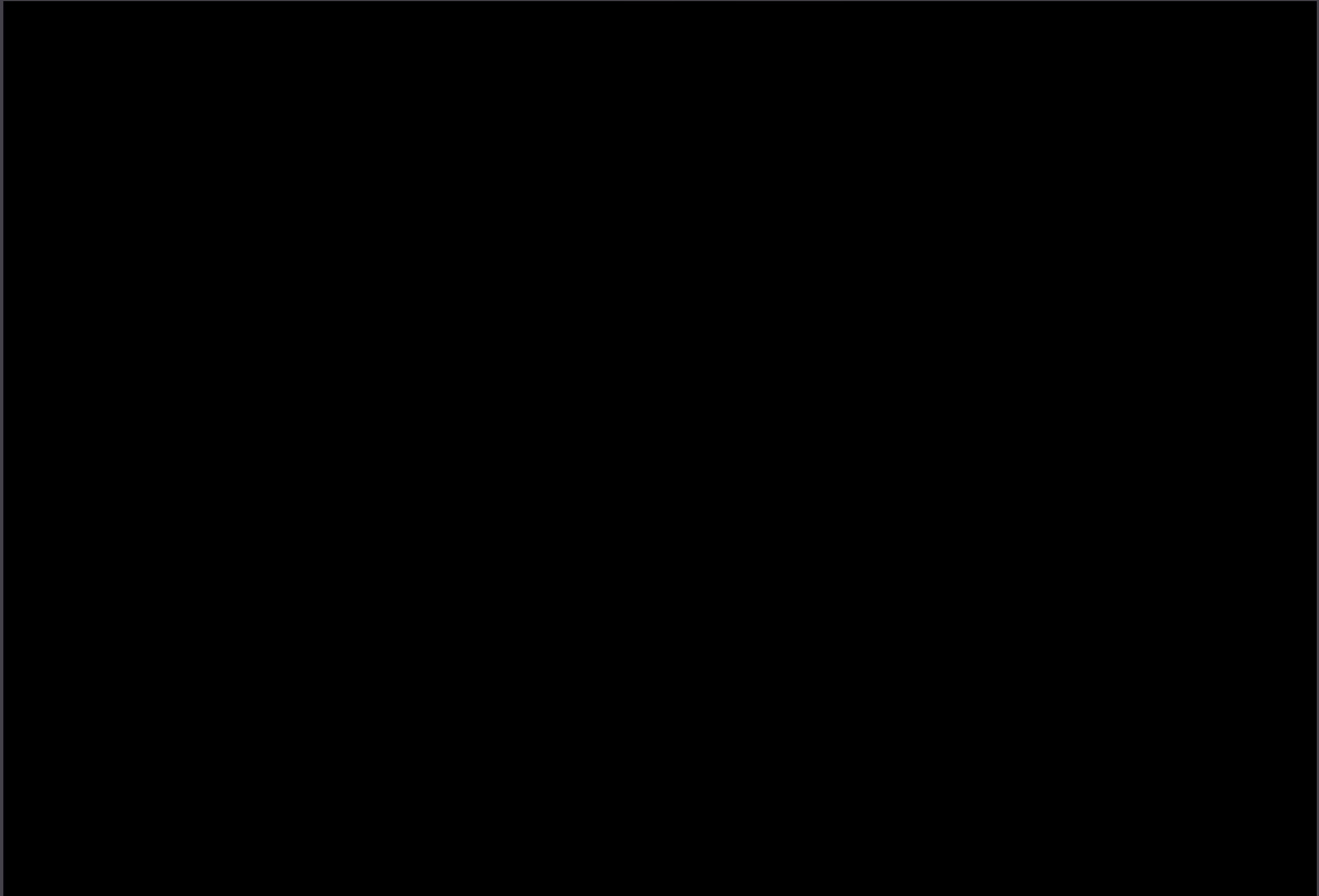
- Simple but powerful concept: organisms learn the relationships between actions and rewards/punishments
- learning occurs as the organism changes its behavior (increases or decreases a response) as a function of the *consequences* that follow from their behavior

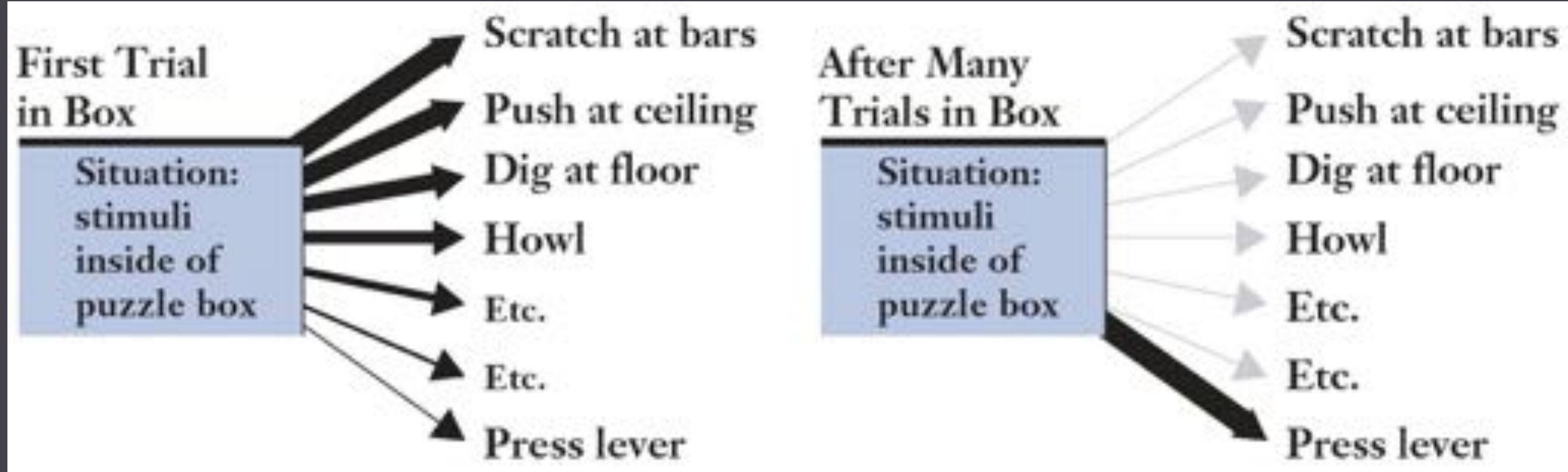
# The 'Law Of Effect'

Behaviors that are followed by a “satisfying state of affairs” tend to be repeated and those that produce an “unpleasant state of affairs” are less likely to be repeated



E.L. THORNDIKE (1874-1949)









# Radical Behaviorism

- “Big Theory” of psychology
- emphasized learning only through conditioning (rejected any “innate” skills or knowledge)
- rejected unobservable variables (thoughts, feelings) as unscientific
- learning mechanisms no different across species



# A "Skinner Box"





# The Pigeon As A Weapon



## Nose Cone, Pigeon-Guided Missile

1944

### From Pavlov's dogs to Skinner's pigeons

This experimental device was developed during World War II by behavioral psychologist B.F. Skinner, who experimented with harnessing pigeons' pecking movements to steer missiles. Skinner divided this nose cone into three compartments, and proposed strapping a pigeon in each one. As a bomb headed towards earth, each pigeon would see the target on its screen. By pecking at the image, the birds would activate a guidance system that would keep the bomb on the right path until impact. Skinner's idea received initial support, but the U.S. military finally dismissed it as impractical.

### Notes

- \* One Skinner-trained bird pecked at an image more than 10,000 times in 45 minutes.
- \* Burrhus Frederic Skinner, born March 20, 1904, Susquehanna, PA; died August 18, 1990, Cambridge, MA
- \* Web display only

### Related Images



Detail of the three screens of the nose cone. A pigeon was behind each screen.

# Shaping Behavior

- **Positive Reinforcement**

- A “reinforcer” is the thing that increases the behavior
- Can be “Primary” (e.g., food) or “Secondary” (e.g., money)

- **Negative Reinforcement**

- *rewarding* someone by removing a BAD thing (e.g., an umbrella stops the rain)
- (do not ever forget this, please.)

- **Punishment**

- you all know this one—negative consequences in response to an unwanted behavior.

# Successive Approximation To Train Animals





# The Partial Reinforcement Effect

# Schedules of Reinforcement

**Fixed ratio reinforcement** - reward after every  $n^{\text{th}}$  response

**Variable ratio reinforcement** - reward *on average* once in every  $n$  responses

**Fixed interval reinforcement** - reward after every  $y$  seconds (or minutes, or hours, etc.)

**Variable interval reinforcement** - reward once in every  $y$  seconds (or minutes, or hours, etc.)

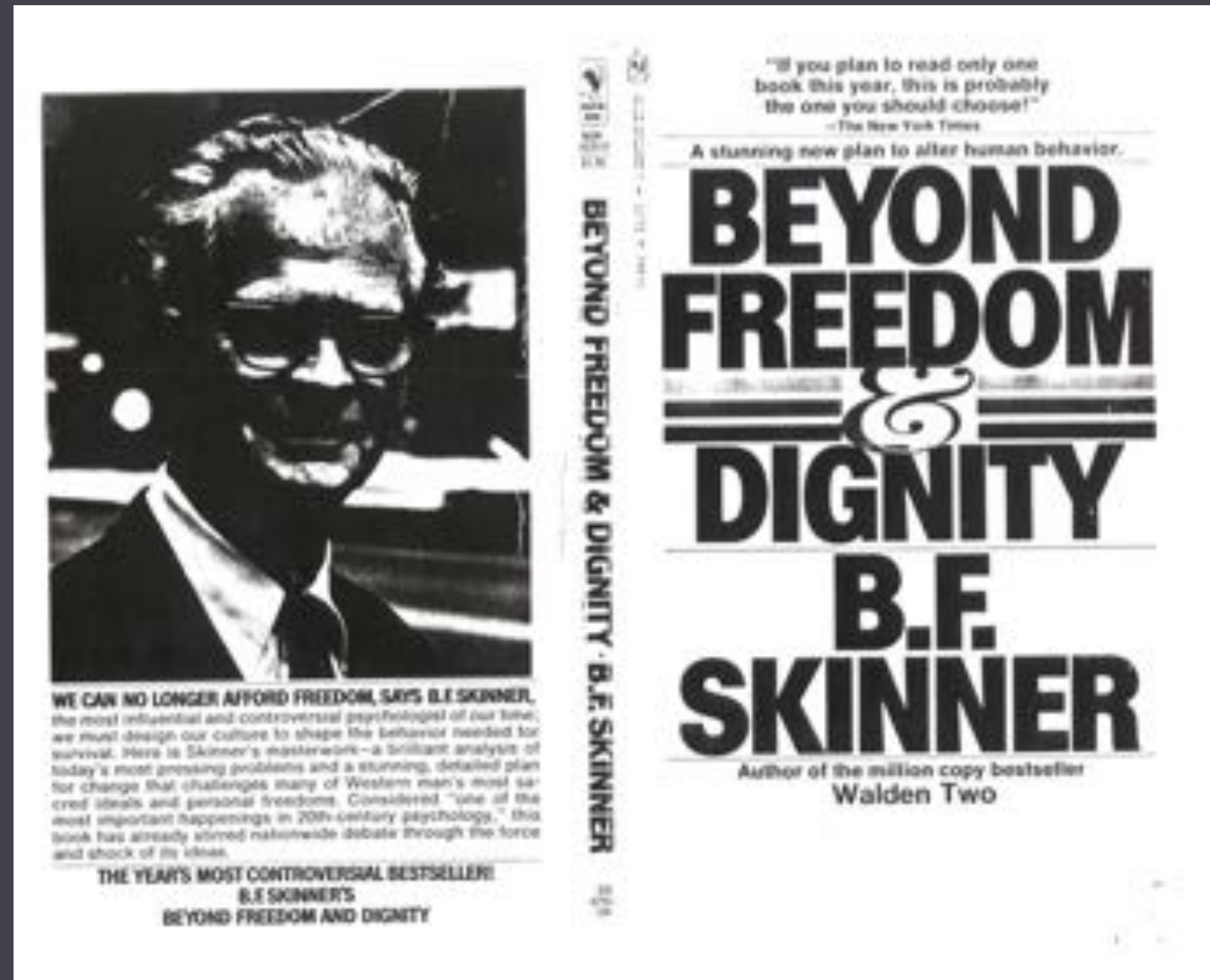








# The World As A Skinner Box





# How Successful Was Behaviorism?

- The family of theories emphasizing the basic principles of learning
  - Led to rigorous, scientific research that continues to this day
  - The principles of classical and operant conditioning are as close to fundamental laws of behavior as we have
  - We know, because *it just works*

# Behavioral Techniques For Helping Parents: Alan Kazdin, Child Conduct Clinic, Yale University



# Is It True That Everything Is Learned?

- There is considerable evidence for innate (unlearned) knowledge
  - this differs across species
  - it is easier to train pigs to dig, and pigeons to peck
  - we acquire fears for snakes, spiders, and tall heights much more easily than for, e.g., cars

# Is It True That Everything That Is Learned Is Learned Through Conditioning?

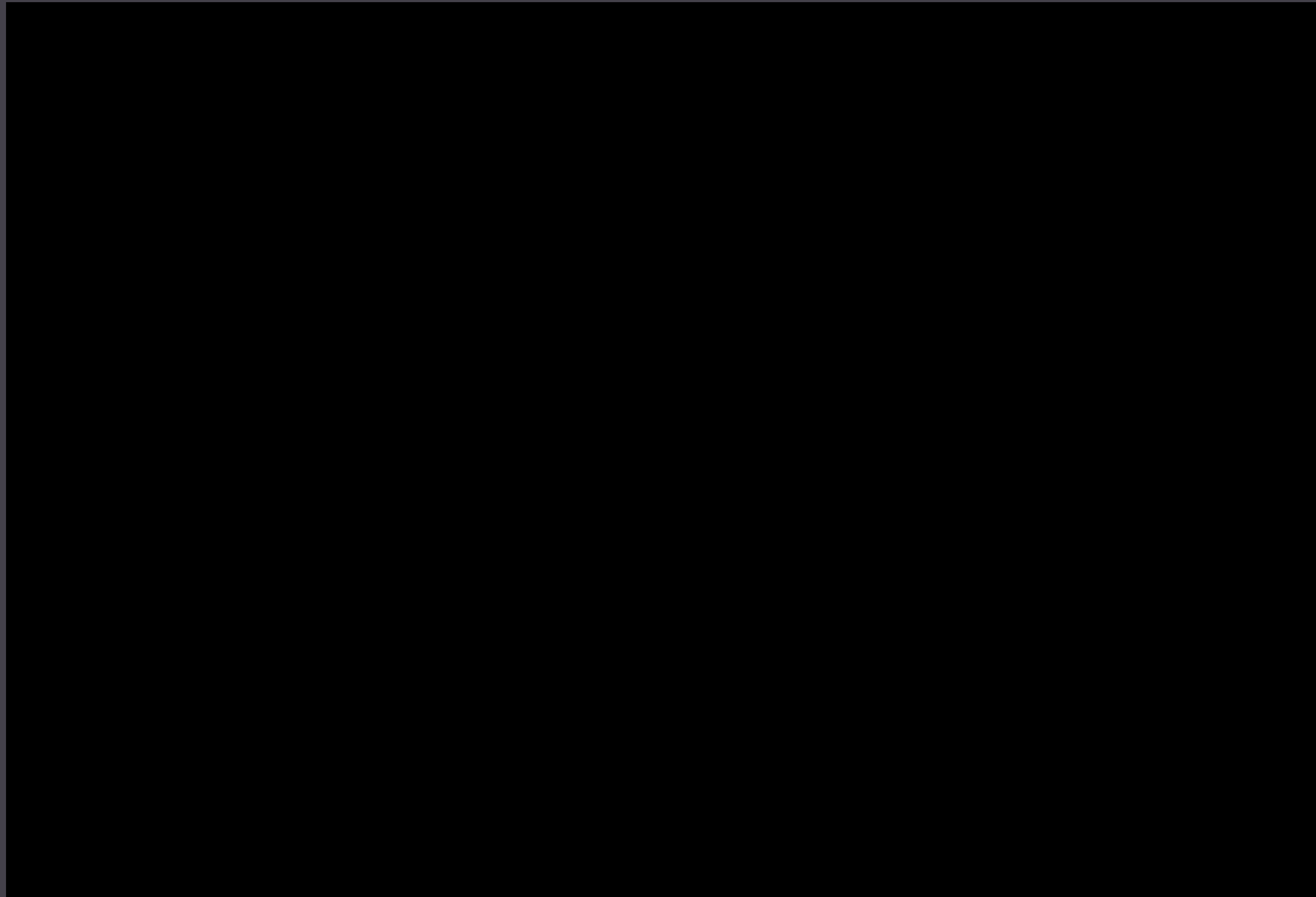
- Plenty of evidence that we learn a great deal through *observational* learning
- Children learn easily through the modeling of adults, but animals also:
  - Pigeons have used observational learning in eliciting reinforcement from pecking behavior.
  - Rhesus monkeys learn to fear snakes through observational learning
  - Chimpanzees learn to use a novel tool through observational learning (using a human model)

# Are “Unobservable” Psychological States Unscientific?

- Two reasons this is not the problem that Skinner believed it to be:
  - There is no problem with proposing unobservables as a way to explain the data
    - other sciences (e.g., physics) talk about unobservables
    - it makes sense to explain a complex and intelligent mechanism in terms of internal representations
  - Methodologies have been developed by researchers to actually measure things that Skinner believed to be “unobservable.” E.g.,
    - emotions
    - implicit memories and attitudes



# "Cognitive Maps": Internal Representations Not Learned Without Reinforcement



# The Legacy Of Behaviorism

- Powerful tools for understanding, predicting, and controlling human behavior
- Unsatisfying as a theory to capture the entirety of human (and probably animal) mental life
- In short, explains a LOT. It just cannot explain it ALL.