

# Chapter 2: Basic Concepts

# Definition of Behavior

- “the behavior of an organism is that portion of an organism’s interaction with the environment that is characterized by detectable displacement in space through time of some part of the organism and that results in measurable change in at least one aspect of the environment”
  - Johnston & Pennypacker (1980, 1993a)

# Definition of Behavior

- Behavior of an organism
- Portion of the organism's interaction with the environment
- Displacements in space through time
  - Temporal locus
  - Temporal extent
  - Repeatability
- Results in a measurable change in some aspect of the environment

# Behavior or Response

- Behavior in reference to a larger set or class of responses sharing certain
  - Physical characteristics
  - Functions
- Response
  - Specific instance of behavior

# Descriptions of behavior

## Structural and functional

- Response topography
  - Form
  - Physical characteristics
- Functional
  - Effects of behavior on environment

Saying the word fire while looking at the letters f-i-r-e different than saying FIRE! When smelling smoke in a crowded theater.

# Response Class

- A group of responses with the same function
  - Each response in the group produces the same effect on the environment

# Repertoire

- All behaviors a person can do
- Set or collection of knowledge and skills a person has learned that are relevant to a particular setting or tasks
  - Repertoires with respect to language skills, academic tasks, everyday routines, recreation, & APPLIED BEHAVIOR ANALYSIS

# Environment

- All behavior occurs within an environmental context;
- Behavior cannot be emitted in an environmental void or vacuum

# Environment

- Johnston & Pennypacker (1993a) definition
- Complex, dynamic universe of events that differ from instance to instance
- Stimulus
  - “an energy change that affects an organism through its receptor cells”
    - Michael, 2004, p. 7

# Description of Stimulus Events

- Formally
  - Physical features
- Temporally
  - Occur with respect to a behavior of interest
- Functionally
  - Effects on behavior

# Stimulus Class

- Any group of stimuli sharing a predetermined set of common elements in one of more of these dimensions
  - Formal dimensions of stimuli
  - Temporal locus of stimuli
  - Behavioral functions of stimulus changes

# Formal dimensions of stimuli

- Descriptions, measurements, manipulations based on
  - Size, color, intensity, etc.
- Stimuli can be
  - Social
  - Nonsocial

# Temporal locus of stimuli

- Behavior is affected by stimulus changes that
  - occur prior to (Antecedent)
  - Immediately after the behavior (Consequence)

# Temporal locus of stimuli

- Antecedent
  - Environmental conditions or stimulus changes that exist or occur prior to the behavior
    - Play a critical part in learning and motivation
    - Learners do not need to be aware of antecedents for antecedents to effect behavior

# Temporal locus of stimuli

- Consequence
  - Stimulus change that follows a behavior of interest
    - Especially those that are immediate
    - Relevant to current motivational states
    - Influence on future behavior
      - Other consequences have little effect

# Temporal locus of stimuli – Big Idea

- Consequences combine with the antecedent conditions to determine what is learned
  - True, whether or not individual is aware or systematically plans the consequences
    - It's happening all around us!

# Behavioral functions of stimulus changes

- Stimulus changes are best understood through a functional analysis of their effects on behavior
  - Immediate control
  - Delayed, or no apparent effect

# Behavioral functions of stimulus changes

- Stimulus changes
  - An immediate but temporary effect of increasing or decreasing the current frequency of the behavior
  - A delayed but relatively permanent effect in terms of the frequency of that type of behavior in the future

Michael (1995)

# Stimulus Changes: Social & Nonsocial

**Table 2.1** Antecedent (Situation) and Consequent Events Can Be Nonsocial (Italicized), Social (Boldface), or a Combination of Social and Nonsocial

| <i>Situation</i>                      | <i>Response</i>                | <i>Consequence</i>             |
|---------------------------------------|--------------------------------|--------------------------------|
| <i>Drink machine</i>                  | Deposit coins                  | <i>Cold drink</i>              |
| <i>Five cups on table</i>             | "One-two-three-four-five cups" | <b>Teacher nods and smiles</b> |
| <b>Friend says "turn left"</b>        | Turn left                      | <i>Arrive at destination</i>   |
| <b>Friend asks "What time is it?"</b> | "Six-fifteen"                  | <b>Friend says "Thanks"</b>    |

From "Individual Behavior, Culture, and Social Change" by S. S. Glenn, 2004, *The Behavior Analyst*, 27, p. 136. Copyright 2004 by the Association for Behavior Analysis. Used by permission.

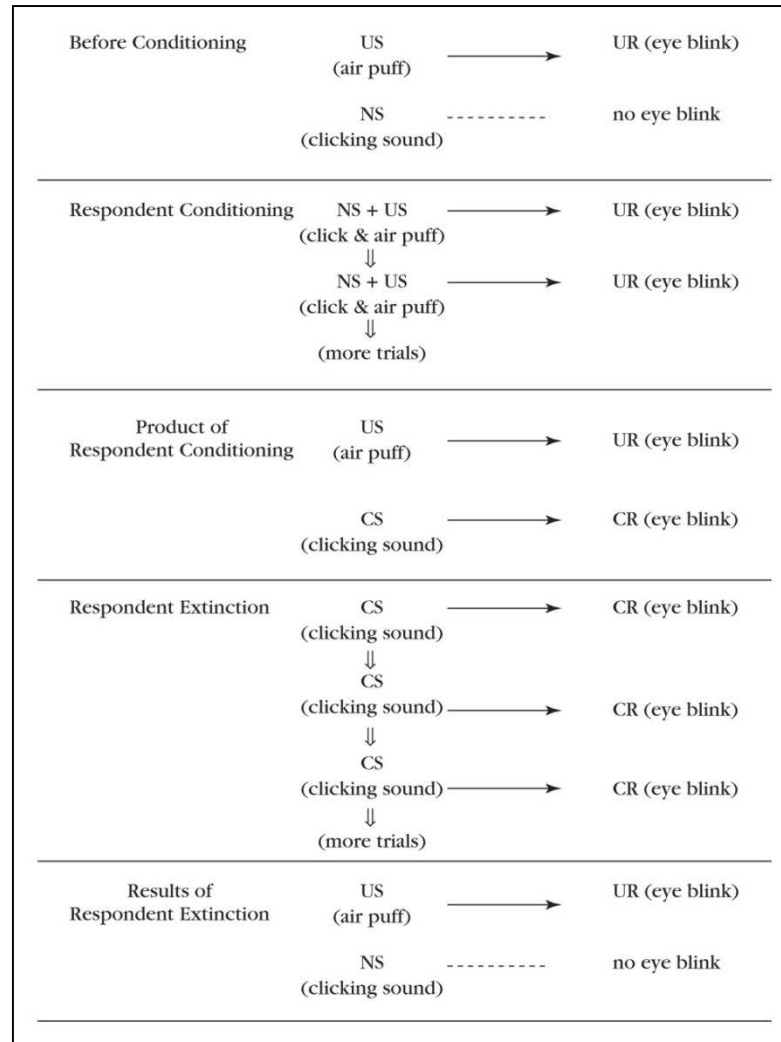
# Respondent Behavior

- Behavior that is elicited by antecedent stimuli
  - Induced, brought out by the stimulus that precedes it
    - Something in your eye elicits eye blink (reflex)
    - Ready-made behaviors protect against harmful stimuli
- Stimulus-response relations
  - Reflex
- Habituation
  - Gradually diminishing response strength

# Respondent Conditioning

- Experimental demonstrations of respondent conditioning
  - Ivan Petrovich Pavlov
  - Digestive systems of dogs
  - Animals salivated every time lab assistant opened the cage door to feed them

# Respondent Conditioning



# Operant Behavior

- Any behavior whose future frequency is determined primarily by its history of consequences
  - Selected
  - Shaped
  - Maintained by consequences
- Defined functionally, by their effects

# Selection by Consequences

- All forms of life, from single cells to complex cultures, evolve as a result of selection with respect to function

Pennypacker, 1994, pp. 12 -13

- Ontogeny
  - Operates during the lifetime of the individual
- Phylogeny
  - Natural selection in the evolution of a species

# Operant Conditioning

- Process and selective effects of consequences on behavior
- “Functional consequence”
  - Stimulus change that follows a given behavior in a relatively immediate temporal sequence and alters the frequency of that type of behavior in the future

# Operant Conditioning

- ‘Strengthen’ an operant
  - Response more probable, more frequent  
Skinner, 1953, p. 65
- Reinforcement has taken place when
  - Operant conditioning consists of an increase in response frequency

# Type of Stimulus Change

|   |   | Type of Stimulus Change                      |   |
|---|---|--|---|
|   |   | Present or Increase<br>Intensity of Stimulus | Withdraw or Decrease<br>Intensity of Stimulus |
| Effect on Future<br>Frequency of Behavior | ↑ | Positive Reinforcement                       | Negative Reinforcement                        |
|   | ↓ | Positive Punishment                          | Negative Punishment                           |

# Operant Conditioning

- Consequences can only affect future behavior
- Consequences select response classes, no individual responses
- Immediate consequences have the greatest effect

# Operant Conditioning

- Consequences select any behavior
  - Reinforcement and punishment are equal opportunity selectors
  - Importance of temporal relations
- Operant conditioning occurs automatically

# Reinforcement

- Most important principle of behavior
- Key element to most behavior change programs

# Reinforcement - Defined

- If behavior is followed closely in time by a stimulus event and as a result the future frequency of that type of behavior increases in similar conditions, reinforcement has taken place

# Stimulus Changes Functioning as Reinforcers

- Positive Reinforcement (Adding)
  - A new stimulus added to the environment (or increased in intensity)
- Negative Reinforcement (Withdrawing)
  - An already present stimulus removed from the environment (or reduced in intensity)

# Stimulus Changes Functioning as Reinforcers

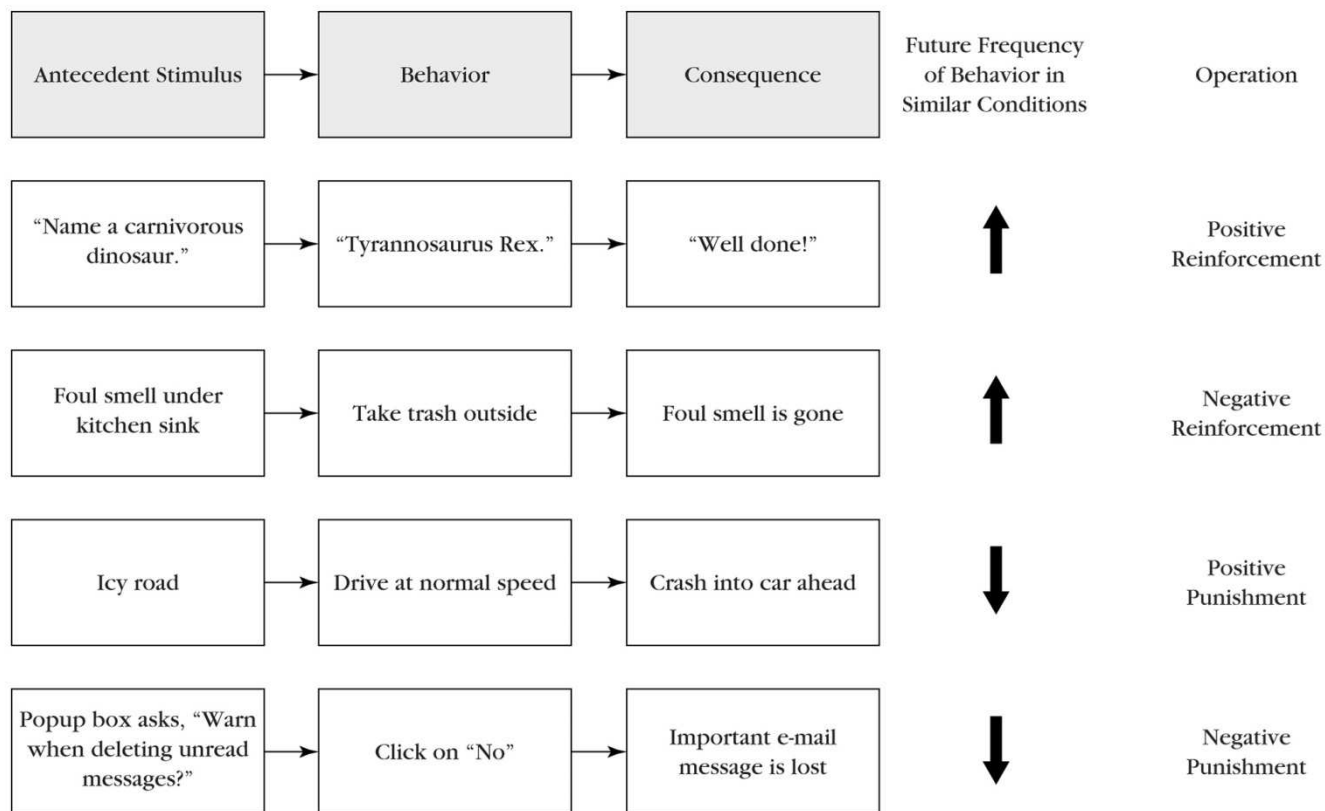
| Type of Stimulus Change                   |  |
|---|--|
| Present or Increase Intensity of Stimulus | Withdraw or Decrease Intensity of Stimulus |
| Positive Reinforcement                    | Negative Reinforcement                     |
| Positive Punishment                       | Negative Punishment                        |

Effect on Future Frequency of Behavior

↑

↓

# Stimulus Changes Functioning as Reinforcers



# Reinforcement – Big Ideas

- Always means an increase in response rate
- The modifiers positive (adding) and negative (withdrawing)
  - Describe the *type* of stimulus change operation that best characterizes the consequence

Additional information on schedules of reinforcement in Chapter 13

Principle of Extinction and its use as a behavior change tactic in Chapter 21

# Punishment

- If behavior is followed closely in time by a stimulus event and as a result the future frequency of that type of behavior decreases in similar conditions, punishment has taken place

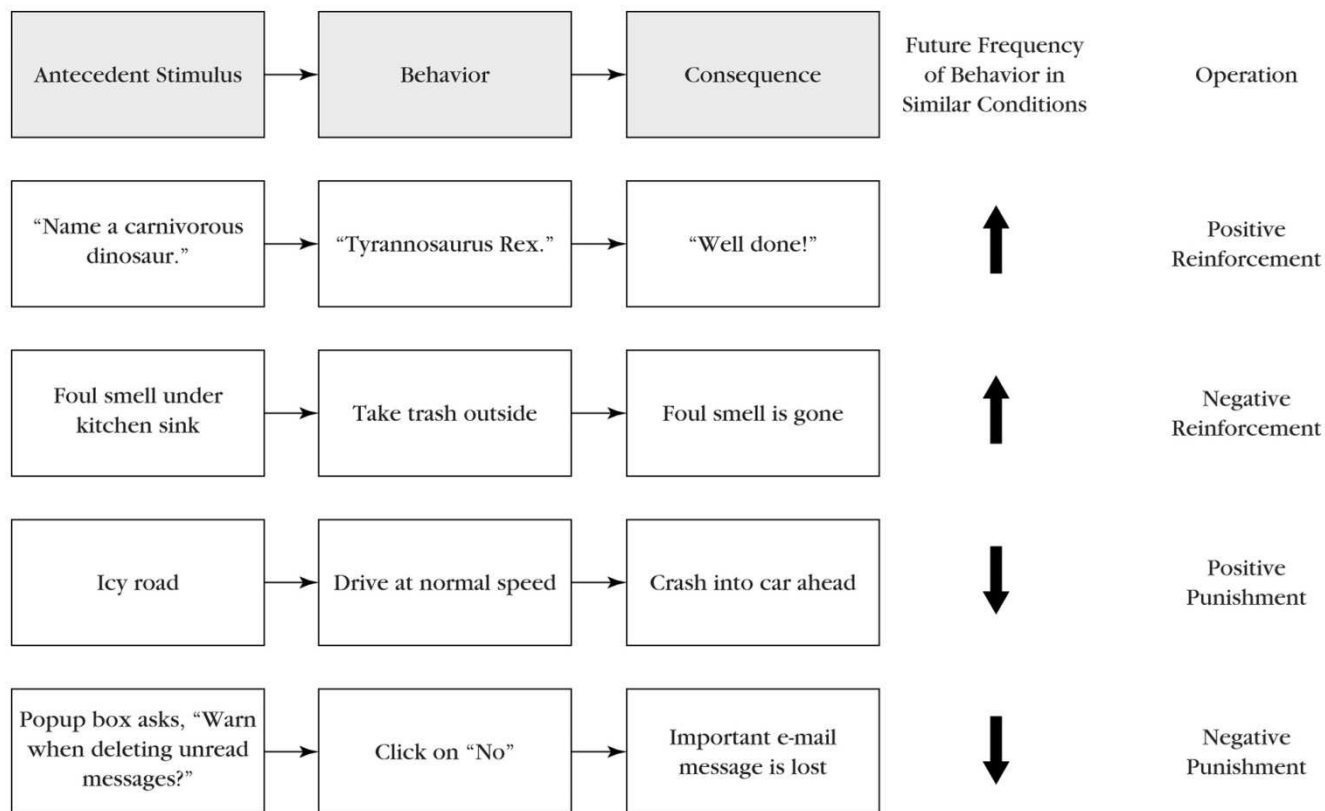
# Stimulus Changes Functioning as Punishers

- Positive Punishment (Adding)
  - Punishment by contingent stimulation
  - A new stimulus added to the environment (or increased in intensity)
  - Type I
- Negative Punishment (Withdrawing)
  - Punishment by contingent withdrawal of a positive reinforcer
  - An already present stimulus removed from the environment (or reduced in intensity)
  - Type II

# Stimulus Changes Functioning as Punishers

| Type of Stimulus Change                   |   |  |   |
|---|---|--|---|
|   |   | Present or Increase<br>Intensity of Stimulus | Withdraw or Decrease<br>Intensity of Stimulus |
| Effect on Future<br>Frequency of Behavior | ↑ | Positive Reinforcement                       | Negative Reinforcement                        |
|   | ↓ | Positive Punishment                          | Negative Punishment                           |

# Stimulus Changes Functioning as Punishers



# Punishment – Big Ideas

- Always means a decrease in response rate
- The modifiers positive (adding) and negative (withdrawing)
  - Describe the *type* of stimulus change operation that best characterizes the consequence

# Principles and Behavior Change Tactics

- Principle of behavior
  - Describes a functional relation between behavior and one or more of its controlling variables ( $b = fx$ )
    - Thorough generality across individual organisms, species, settings, behaviors
    - Empirical generalization inferred from many experiments
    - Describe how behavior works
    - Reinforcement, punishment, extinction

# Principles and Behavior Change Tactics

- Behavior change tactic
  - Research-based, technologically consistent method for changing behavior that has been derived from one or more basic principles of behavior
    - Sufficient generality across subjects, settings, and or behaviors to warrant its codification & dissemination
  - Technological aspect of ABA

# Principles and Behavior Change Tactics – Big Idea

- Principles
  - Describe how behavior works
  - Lawful relationship between behavior,
    - An immediate consequence, and an increased frequency of the behavior in the future under similar conditions
- Behavior change tactics
  - Are how applied behavior analysts put the principles to work to help people learn and use socially significant behaviors

# What kinds of stimulus changes function as reinforcers and punishers?

- *Unconditioned* reinforcement and punishment
  - Function irrespective of prior learning history

# What kinds of stimulus changes function as reinforcers and punishers?

- Conditioned reinforcers and punishers
  - Function as such based on previous pairings with other reinforcers and punishers

# Motivating Operations

- Function
  - Alters the current value of stimulus changes as reinforcement or punishment
    - Satiation
    - Deprivation

# Discriminated Operant

- Occurs more frequently under some antecedent conditions than it does under others
- *Stimulus Control*
  - Differential rates of operant responding observed in the presence or absence of antecedent stimuli
  - Due to pairings (antecedent/consequence) in the past, antecedents acquire the ability to control operant behavior

# Three-Term Contingency

- *Antecedent (A) – Behavior (B) – Consequence (C)*
  - Basic unit of analysis in the analysis of operant behavior
  - All ABA procedures involve the manipulation of one or more components of the 3-term contingency

# The Complexity of Human Behavior

- Highly complex variables governing human behavior
- Human capabilities
  - Large repertoires of response chains, verbal behavior
- Analysis of control complicated by
  - Individual differences in histories of reinforcement
  - Practical, ethical, logistical, etc. issues