Dr. Bob Bailey in Copenhagen

Practices Of Operant Conditioning,
or Animal Training,
as taught by Dr. Bailey

All of Dr. Bailey's training programs were based on these practices

1

My generalization:
Any trainer, using
any method, can train
any animal, to do
any behavior,
given enough time!

2

Bob Bailey core beliefs
Training is a mechanical skill!
The basics:
Timing! Criteria! Rate!
Think! Plan! Do!
Review! (added by Susan Garrett)
Learn and apply simple training principles and laws
Change your behavior!

3

My working definition of training:

WHAT DO I HAVE?

WHAT DO I WANT?

Training describes the path from what I have to what I want.

4

Training may be:

Suggest thinking of training as making it worthwhile for the animal to play our silly little games!

How often do cattle earn a living playing a harmonica?

This cow also raised a flag and rang a school bell.

5

Simple vs. Advanced training

My goal is to make all training simple

My training, and my company's training, employed the precise and appropriate application of a few simple behavior principles to change and maintain behavior to high performance specifications

Whether called simple or advanced, training should be worthwhile for all involved, animal and trainer

6

Training practices presented and discussed:

Precise timing
Observing behavior
Quick decisions
Fast trials
More trials
More reinforcement
Higher expectations
   if you want more,
   expect more
Changing your behavior

Walt Disney
and
Marian Breland

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The TWO Forms of Conditioning (learning) that are of great and immediate importance to trainers:

Respondent Conditioning

Commonly called Pavlovian or Classical

Operant Conditioning

Commonly called Skinnerian or instrumental

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Very generally speaking…

VOLUNTARY behavior is changed through
Operant Conditioning

   AND

REFLEXES are changed through
Classical Conditioning

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Pavlov
is always on your shoulder!

10

Operant Conditioning Principles
(Few & Simple) – Memorize and understand them:

1) **Stimulation**
   Animals respond to stimuli

2) **Reinforcement**
   Increases rate of behavior

3) **Extinction (non-reinforcement)**
   Decreases rate of behavior

4) **Punishment**
   Decreases rate of behavior

5) **Generalization**
   Stimulus generalization
   Response generalization

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Applying The Principles:

Presented by
Bob Bailey, Sc.D

   First dolphin EKG studies
   Ridgeway- Bailey 1962

It's not just KNOWING principles and practices well that counts, it is the DOING them well that makes the difference!

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Stimulation

Animals respond to stimuli

Responses may be learned, instinctive, or both

Responses may change with maturation or circumstances

Don't be surprised when an animal responds to environmental stimuli

Animals were built by nature to respond to stimuli

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REINFORCEMENT
The procedure of providing consequences for a behavior that *increase or maintain* that behavior

A REINFORCER

Any stimulus or event, made contingent on a behavior that strengthens that behavior

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Primary & Conditioned Reinforcers

Both primary reinforcers and conditioned reinforcers strengthen behavior

Conditioned reinforcers can lose strength with improper use
(ie: when not paired with a primary reinforcer)

Bob Bailey with many whistle "Bridges" 1962

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You get what you **reinforce,**

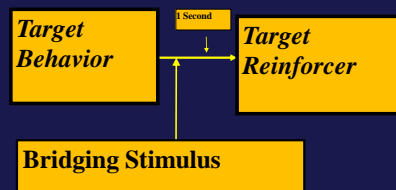not what you **want!**

Not all behavior change is good!

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Reinforcement is a process, not a single, isolated event

The process begins with the first stimulus indicating reinforcement is on its way, and ends sometime during the acquisition and assimilation of the reinforcer
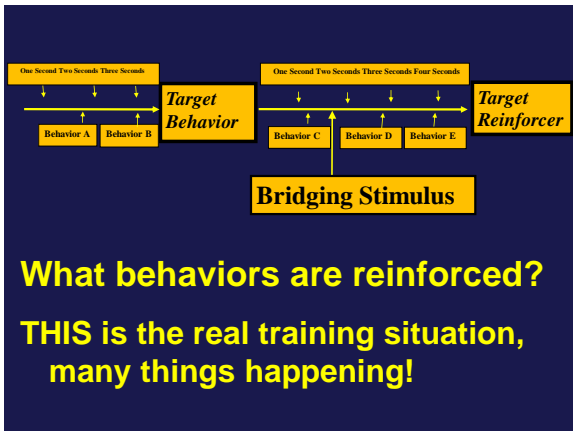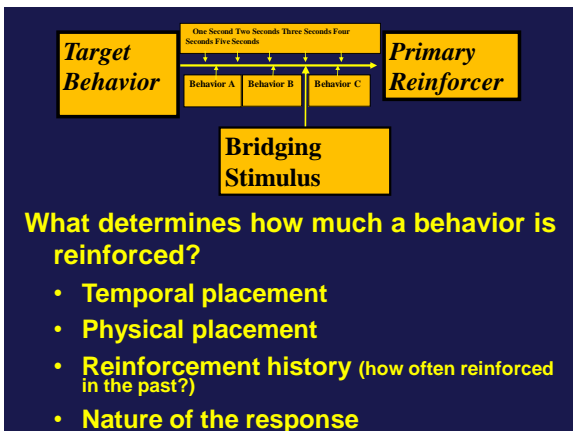
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Reinforcement is a process

Target Behavior → 1 Second → Target Reinforcer

Bridging Stimulus

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3

Slide 19

Target Behavior → [One Second Two Seconds Three Seconds Four Seconds Five Seconds] Behavior A | Behavior B | Behavior C → Target Reinforcer

Bridging Stimulus

What behaviors are reinforced?

19

Slide 20

Target Behavior → [One Second Two Seconds Three Seconds Four Seconds Five Seconds] Behavior A | Behavior B | Behavior C → Target Reinforcer

Bridging Stimulus

What behaviors are reinforced?

20

Slide 21

[One Second Two Seconds Three Seconds] Behavior A | Behavior B → Target Behavior → [One Second Two Seconds Three Seconds Four Seconds] Behavior C | Behavior D | Behavior E → Target Reinforcer

Bridging Stimulus

What behaviors are reinforced?

THIS is the real training situation, many things happening!

21

Slide 22

Target Behavior → [One Second Two Seconds Three Seconds Four Seconds Five Seconds] Behavior A | Behavior B | Behavior C → Primary Reinforcer

Bridging Stimulus

Are all behaviors reinforced equally?

Equipotentiation – Are all responses equally potentiated or in other words, equally likely to happen?

Don't you believe it!

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Slide 23

Target Behavior → [One Second Two Seconds Three Seconds Four Seconds Five Seconds] Behavior A | Behavior B | Behavior C → Primary Reinforcer

Bridging Stimulus

What determines how much a behavior is reinforced?

- **Temporal placement**
- **Physical placement**
- **Reinforcement history (how often reinforced in the past?)**
- **Nature of the response**

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Slide 24

Don't reinforce behavior you don't want!
Think: MATCHING LAW!

Usually better to miss reinforcing a wanted behavior than reinforce an unwanted behavior

"Better never than late!"
Devon Gaston
student 2013

"When in doubt, leave it out!"
Barbara Bingham Deutscher
student 2013

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4

Matching Law: when we apply it to training it means…

Reinforcing unwanted behavior reduces the power of the reinforcement for wanted behavior

"Bad" reinforcement weakens the power of "good" reinforcement!

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Data at ABE demonstrated clearly
Reinforcement of unwanted behavior was worse than failure to reinforce wanted behavior.

26

The SIMPLE, practical result of Matching Law:

Don't Reinforce Behavior You Don't Want!

Just clicking and feeding more is not the path to faster, better behavior

It is SIMPLE! You get what you click, not what you want

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Practical result of Matching Law:

Don't Reinforce Behavior You Don't Want!

When shaping, don't strengthen intermediate behavior unnecessarily!

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The Matching Law is another reason to know in ADVANCE what you WILL reinforce and what you WON'T reinforce

Don't train, "by the seat of your pants"

Think! Plan! Do!

29

**Breland/Bailey
3 Steps to getting behavior**

Think
This is the best time for novelty and creativity

Plan
This is the best time to define, describe, simplify, and make mistakes

Do
Don't waste your most precious resource TIME

30

5

Think!
Plan!
Do!
Don't mix them up!

don't …Plan or Do while Thinking!
don't …Think or Do while Planning!
don't…Plan or Think while Doing!

Focus! Focus! Focus! WHILE Doing

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Does the **Matching Law** say the animal will never learn an incorrectly reinforced behavior?

NO!

Ignoring the matching law simply means training is *less efficient and less accurate*

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Applying The Principles
Reinforcement - Key to effective training

An effective reinforcer is:
1) Immediate
2) Contingent
3) Valued

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Applying The Principles
Reinforcement - Key to effective training

The factors of reinforcement
Timing - the when
Criteria - the what
Rate - the how much
(how often)

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Timing, Timing, Timing
Reinforce precisely WHEN
Criteria
Reinforce only desirable behavior
Reinforce One criterion at a time
Rate of reinforcement
High rate decreases distractibility
Low rate increases distractibility
But, don't just feed the animal (see criteria)

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Criteria:
Know precisely what you will and will not reinforce.
Remember:
Criteria too high, low rate of reinforcement.
Criteria too low, you are feeding the animal for non-contingent behavior.
You are teaching unwanted behaviors

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Rate of Reinforcement

Trainer must make it worthwhile for the animal to play the game.

Too low of a rate of reinforcement and the animal finds other activities more worthwhile.

37

At ABE, we found the single most common error made by trainers was imprecise timing of the reinforcement (secondary and primary).

Trainers should perfect their timing.
Know the animal
Anticipate the response
Use video!

38

The two-edged sword:

sloppy use of operant conditioning is easy and still teaches behavior.

Some think sloppy behavior is as good as it gets!

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"Getting" behavior – How to start behavior and minimize animal error:

Remember the Matching Law – minimize reinforcement of unwanted behavior

Remember what training is – "what do you want, what do you have": ask the animal what behavior it has.

Observe the animal in the training environment. What does it offer that might be useful? CAPTURE BEHAVIOR!

40

"Getting" behavior – How to start behavior and minimize animal error:

Remember the Matching Law – minimize reinforcement of unwanted behavior

Next, change the surroundings to maximize the chance the animal will give you the behavior, or something close, and minimize the opportunity for error.

ENVIRONMENTAL MANIPULATION

41

"Getting" behavior – How to start behavior and minimize animal error:

Remember the Matching Law – minimize reinforcement of unwanted behavior

Targeting – the CAREFUL use of an object or a location to focus the animal's attention on the desired location or behavior.   --- FADE as needed

A target, and the touching or approximation of a target, can be a powerful training tool.

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"Getting" behavior – How to start behavior and minimize animal error:

Remember the Matching Law – minimize reinforcement of unwanted behavior

Luring – the CAUTIOUS and CAREFUL use of food or other wanted stimulus to focus and even move the animal to emit a behavior. ---- FADE quickly

The lure should be given but is not the final reinforcer.

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"Getting" behavior – How to start behavior and minimize animal error:

Remember the Matching Law – minimize reinforcement of unwanted behavior

Shaping – the use of successive approximations to achieve a final behavior   --- usually slow

Use a minimum number of steps to achieve the final behavior

Best demonstration of trainer skill

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"Getting" behavior hierarchy:

Capture – Trainer Observation & skill
Change environment – Trainer Cleverness
Specialized "prompts" – a stimulus that promotes a particular response
Targeting – A specialized "prompt" – easier to fade and requires skill
Luring – A specialized "prompt" – difficult to fade and requires skill
Shaping – Successive approximations: remember Matching Law, often inefficient
Best demonstration of trainer skill

45

Repeating a failure

Usually a <u>thought out</u> plan, or trial, that fails is worth another try, and maybe two
Two consecutive failed efforts at executing a plan, or trial, stop, reassess, then either try again or go back to THINK!
Three consecutive failures – trainer bangs head three times on nearest wall

Bailey saying: anything worth doing once is worth doing twice!
Have some confidence in yourself!

46

Training by sound alone

Consistently timed but delayed reinforcement may still work

A blind newspaper reporter training a chicken to peck a ping-pong ball very hard>>>>

47

Blind student -1998

Animals can learn what we want even when we are late with reinforcer.
Started with "hot" target on one tin – student learned sound of "hot" target.

48

8

Precise training using operant conditioning is simple but NOT easy!

49

Behavior Economics "counts" BOTH reinforcement and punishment

Animals may choose to change behavior to get reinforcement or to avoid punishment

It is always a CHOICE!

If an animal does not change its behavior then it does not perceive the stimulus as a reinforcer or a punisher

50

Practical issues of learning:
The question to ask is NOT…

"Did the animal learn the behavior?"

Instead, you should ask…

"Why did it take you so long to teach it?"

Don't get in the way of learning
Don't get in the way of behavior

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Practical Issues of Learning:

What is certain?

Animals are built to learn

Animals are learning all of time, not just when we want them to

Animals learn some things faster than others

52

Practical Issues of Learning:

What is certain?

If the animal does not appear to learn, most likely the trainer is doing something wrong!

This Includes:
not defining behavior
not making it worthwhile
not controlling competing stimuli

53

Beware of training "Gimmicks!"

A "gimmick" is a colloquial English term for "stunt," or "trick," or a "device" that, claims to gain a goal or advantage

Animal training has many "gimmicks" some "old-school" or traditional training, and some from popular, or proprietary (money making), origins.

OPINION (my experience testing):

(Many) (Most) training gimmicks have little or not scientific support or validity

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Beware of training "Gimmicks!"

I teach novices few gimmicks, tricks, or short-cuts to get or stop behavior

There is no substitute for trainer knowledge, experience, and skill

Once a trainer masters the basics **then** come the short-cuts

55

Behavior Economics

Why animals do WHAT they do WHEN they do it!

Animals have made choices for billions of years

Animals alive today are the offspring of animals that made successful choices

56

Value of Reinforcement

Motivation:
How much does the animal want it?

One measure of motivation is *strength of response*

Strength of response measures include: rate, intensity, speed, energy output, latency, etc.

57

Value of Reinforcement

We can change the value of a particular reinforcer by manipulating the animal's motivation for that reinforcer

Food deprivation increases the animal's motivation to get food

A hungry animal will usually work harder to gain food than a sated animal

58

Behavior momentum describes behavior in physical and mathematical terms (Nevin)

IMPORTANT!
to use the concept of behavior momentum, trainers NEED NOT know about mathematics, physics, psychology, or science

59

In SIMPLE terms:
behavior momentum describes in physical and mathematical terms the effect of reinforcing and not reinforcing behavior

A high value reinforcer adds more behavioral "mass" per reinforcement than a low value reinforcer

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The More you reinforce a behavior, wanted or unwanted, the stronger that behavior

We say the "mass" of that behavior increases

The greater the "mass" of a behavior, the more extinction is needed to eliminate that behavior
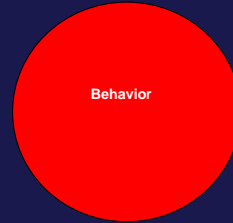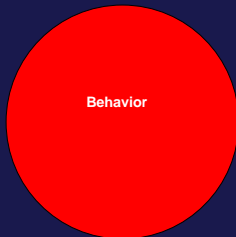
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Behavioral Momentum

Behavior

The greater the mass, the greater the inertia, the more the behavior will continue with no reinforcement

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Behavioral Momentum

Behavior

The greater the mass, the greater the inertia, the more the behavior will continue with no reinforcement

63

Behavioral Momentum

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64

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65

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Behavioral Momentum

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Behavioral Momentum

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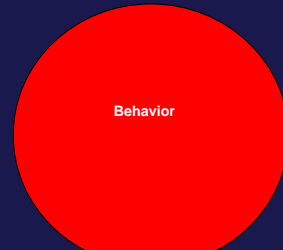
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Behavioral Momentum

The greater the mass, the greater the inertia, the more the behavior will continue with no reinforcement
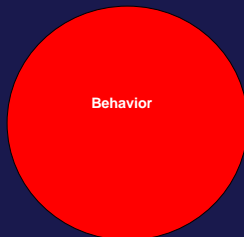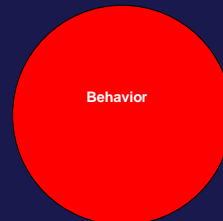
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Behavioral Momentum

The greater the mass, the greater the inertia, the more the behavior will continue with no reinforcement

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Behavioral Momentum

During extinction trials the "mass" (strength) of behavior decreases

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Behavioral Momentum

During extinction trials the "mass" (strength) of behavior decreases

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13

The application of Nevin's Behavior Momentum is SIMPLE!

All a trainer needs to know to make a behavior strong is to reinforce many times precisely what you want

It also means you will get more of ANY reinforced behavior, whether good or bad, wanted or unwanted

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An example of strong response strength

80

Question:

What should you do if you cannot precisely define the response you are training?

81

STOP TRAINING!

Define the response you will reinforce!

82

Suggestion:
Define new behavior for any training session in
One sentence!

If you can't define new behavior in one sentence it is too complicated for one session.

83

•Question:

•Are you better off now than when you started?

•Simple Yes or No!

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**THE END
of LECTURE**

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