

*D*Concept**Punishment contingency**

- the immediate,
- response-contingent
- **presentation** of
- an aversive condition
- resulting in a *decreased* frequency of that response.

We'll concentrate on the definition of the contingency, but of course there is a corresponding principle behind the contingency.

Punishment principle: *A response becomes less frequent if an aversive condition or an increase in an aversive condition has immediately followed it in the past.*²

Like the principle of reinforcement, the principle of punishment is a fundamental principle of behavior, constantly governing our daily lives. And, on second thought, punishment isn't the dark side of life. It's our friend. Punishment protects us from the dark side of life. Suppose you're a middle-aged college professor. And suppose your favorite library is your bathroom. Suppose that for the last 40 years you've attained most of your book learning sitting on a toilet. Now suppose your toilet seat is cracked so that every time you get up from the toilet, the treacherous seat pinches your rear end.

What's the contingency? Only the most cautious or most kinky would question that the pinch is an aversive event. But it wasn't until we replaced the seat with a less vicious one that the college professor realized how effectively the pinch-punishment contingency controlled his incautious rising from the seat. Without thinking, he slowly shifted his weight, cautiously raising his rear end off the seat. On seeing how foolish his caution was with the new seat in place, he realized how effectively the friendly punishment contingency had protected his back side from the dark side of life.

Not only do you appreciate the value of aversive stimuli and punishment when you no longer need it, but you also appreciate it when you do need it but don't have it. Because of a damaged nerve, people sometimes lose the sense of pain from part of their body, such as from a finger. So the principle of punishment doesn't apply to that finger. That means they have a hard time keeping their finger from getting burned, cut, pinched, or further damaged. This loss of sensation occurs in certain forms of leprosy, where the main damage to the limbs doesn't result from gangrene. Instead, the limbs lack pain reception, so the principle of punishment can't protect them.

Remember this:

An aversive condition is one we tend to minimize contact with.

This is consistent with the principle of punishment—a response occurs less frequently if an aversive condition or an increase in an aversive condition has immediately followed it.

Comment: may be inconsistent with flash cards.

If the response that produces that aversive condition occurs less frequently, we'll minimize contact with that aversive condition.

Without the principle of punishment, we'd be constantly trashing our bodies. The principle of punishment does a good job of preventing us from scalding ourselves in the shower or when we drink a hot drink, from freezing ourselves in the winter, or even from walking into door frames instead of through them.

QUESTION

1. *Punishment contingency*—define it and diagram an everyday example.

²Here's a more elegant but less obvious statement of the *principle of punishment*: A response becomes less frequent if an increase in aversiveness has immediately followed it.

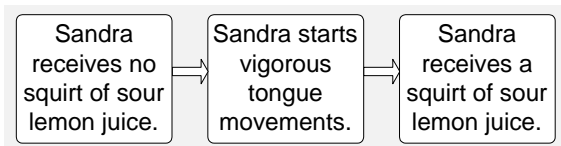
Example
Behavioral Medicine
**LEMON JUICE AND LIFE-THREATENING
REGURGITATION³**

Sandra was born with a cleft palate (split in the roof of her mouth) and a cleft lip, so for her first few days she had to be tube fed. She was from a poor family and was raised by her aunt. Actually, many different people, including neighborhood children, took care of her. There were indications of neglect.

When Sandra was 6 months old, her aunt had her admitted to the University of Mississippi Hospital. She was severely underweight, weighing less than she had when she was born. She regurgitated (threw up her food) and lay passively without smiling, babbling, grasping, moving, or hardly even crying. Sandra was seriously malnourished and dehydrated and in danger of dying. However, in spite of exhaustive examinations, the university physicians could find no medical cause for her problems.

The behavior analysts who worked with Sandra were Thomas Sajwaj, Julian Libet, and Stewart Agras. They observed that as soon as she had been fed, Sandra “would open her mouth, elevate and fold her tongue, and vigorously thrust her tongue forward and backward.” Soon she would be bringing up the milk and causing it to flow out of her mouth. She didn’t cry or show sign of pain during this regurgitation.

They started a mild punishment procedure. They squirted some unsweetened lemon juice into Sandra’s mouth as soon as she started the vigorous tongue movements.



Sandra decreased her regurgitation by half during the first 20-minute punishment session, following her feeding. By the 12th day, she stopped throwing up her milk. And what about instances of her vigorous tongue movements that had been part of her regurgitation? From that time on, they dropped out. So the important part of this punishment procedure lasted only 12 days. Comment: (See Fig. 4-2.)

Further, 2 months after the start of the punishment procedure, Sandra’s weight increased from 8 to 12 pounds, and a year later to 24 pounds. Also, Sandra became more attentive and started smiling, babbling, and grasping objects. When she was 19 months old,

³Based on Sajwaj, T., Libet, J., & Agras, S. (1974). Lemon juice therapy: The control of life-threatening rumination in a six-month-old infant. *Journal of Applied Behavior Analysis*, 7, 557—563. These behavior analysts were at the University of Mississippi Medical Center at the time of this work. Stewart Agras is a prominent researcher in our field and held the prestigious position of editor of the *Journal of Applied Behavior Analysis*.

tests showed that she had almost acquired the behavioral repertoire typical for her age.

QUESTION

1. Describe the use of a punishment contingency to get rid of regurgitation. What was the intervention and what were the results?

Example
Behavioral Medicine
SELF-INJURIOUS BEHAVIOR⁴

Nine-year-old Jack pounded his head on the concrete floor. He pounded his head so hard he had a serious concussion. When his parents brought him to the hospital ward of an institution for mentally handicapped human beings, bruises and cuts covered Jack's face and head. (One out of five mentally handicapped people do self-injurious behavior.⁵)

Jack had started his self-injurious behavior early in life. By now, it had become a threat to his welfare. The staff had to supervise him constantly. Often they had no choice but to restrain him or keep him in a crib. But this restraint and confinement prevented him from acquiring normal skills.

We would expect that the pain of the head banging would serve to punish Jack's self-injurious behavior and thus cause him to stop banging his head. It didn't. Why not? Jack may have acquired his dangerous head banging over a long period, gradually increasing the force of the banging. And, as he did so, his body adjusted to the stress. In that way he drifted into the pathetic state where the severe blows to his head were not aversive enough to punish his head banging.

In spite of Jack's seeming indifference to aversiveness and pain, we hoped we could get rid of his self-injury by presenting a mild aversive stimulus each time he banged his head. The difference would be that this new aversive stimulus would be novel to Jack. In spite of Jack's seeming indifference to punishment, we were betting on our intervention—punishment by the presentation of an aversive event.

To collect baseline data, we brought Jack to a special room fitted with a floor mat to protect him from hurting himself. We allowed him safely to bang his head as often as he wished for an hour. During this time he banged his head 1,440 times.

Then we taped a pair of small electrodes to his leg and delivered a mild electric shock each time he banged his head. The first time he banged his head and got a shock, Jack stopped and looked about the room in a puzzled way. He didn't bang his head for a full 3 minutes, and then he hit the padded floor three times in quick succession, receiving a mild shock after each time. Again he stopped banging his head for 3 minutes. He banged his head one more time and got the mild electric shock. After that, he didn't bang his head for the remainder of the 1-hour session.

During the next session, we had to shock Jack only once. And within a few sessions, he had completely stopped his head banging. Then we could remove the mat from the room. Later, we also got rid of Jack's head banging in other areas of the ward.

The staff no longer needed to restrain or confine Jack, and no one again saw him bang his head. We thought it was ethical to use punishment with this child because it was so effective in getting rid of the extremely dangerous behavior and involved only a few mild shocks, in comparison with the severe damage the self-injury was causing.

ANALYSIS

We have trouble understanding self-injury because it persists though the consequences are painful and harmful to the individual. You might ask, what reinforces and maintains such harmful behavior? Different contingencies could maintain self-injurious behavior, depending on the behavioral history of each individual. Sometimes it is escape from an aversive event; other times it is an automatic, built-in reinforcement contingencies (e.g., sensory stimulation). But often the contingent presentation of attention reinforces and maintains self-injury.

For example, other things had preoccupied Jack's parents; they had little time to spend with him. But if he had accidentally fallen down, his parents might have rushed over and picked him up, thus giving Jack more attention than he would otherwise get. Because his parents would have unintentionally reinforced falling down, Jack might fall down again. But after a few more falls, his parents might again ignore him, until he fell and hit his head. Again his parents might have rushed to shower him with love and attention. Then the gradual shift to ignoring him might begin again. After awhile Jack could be banging his head with such force that his parents could no longer ignore him. And he might continue hurting himself as long as his self-injury produced the immediate reward of attention.

Processes like this may occur with most children, but they have little lasting effect and don't lead to the learning of serious self-injurious behavior. When self-injurious behavior is learned, the parents must often place the child under physical restraint in a hospital.

QUESTION

1. Describe the use of a punishment contingency to prevent self-injurious behavior. What was the intervention and what were the results?
2. Explain how a child might gradually acquire self-injurious behavior reinforced by attention.

⁴ Based on Cowart, J., & Whaley, D. (1968). Punishment of self-mutilation behavior. Unpublished manuscript.

⁵ Bakke, B. L. (1990). *Self-injury: Answers to questions for parents, teachers, & caregivers*. Minneapolis: Institute for Disabilities Studies, University of Minnesota.

Example
Behavioral Medicine
THE SNEEZE⁶

You sneeze. A friend says, "God bless you." Or if your friend is supersophisticated, he or she says, "Gesundheit." You both find this mildly amusing. Not as amusing, or as embarrassing, as flatulence, but mildly amusing and ever so slightly embarrassing. Then you sneeze again, and again, and again. After a few minutes of constant sneezing, you start to realize what a violent activity it is, how it stresses your whole body. You realize how tiring and uncomfortable it can be. And after a few hours of sneezing once a minute, you start to develop this nightmare, this fantasy of torture—maybe you'll never stop sneezing. Maybe you'll sneeze every minute for the rest of your life!

But this was no joke for 17-year-old Ange. This was no neurotic fantasy. This was reality. She had been sneezing about once every 40 seconds for the last 6 months—ever since she had accidentally breathed some paint fumes.

Allergists and other medical specialists couldn't help. They tried hypnosis, drug therapy, minor operations involving packings in her nostrils and mouth cavities, psychiatry, and prolonged uses of sprays and antihistamine preparations. One physician administered a sleep-inducing drug that made her sleep for several days. During her big sleep she didn't sneeze; but she started again as soon as she woke up.

Then Dr. Kushner, a behavior analyst from a nearby Veterans Administration hospital, took on Ange's case. Kushner thought that, although sneezing had caused Ange 6 months of discomfort, something must have been reinforcing it. Besides providing some momentary relief from the irritation, the sneezing provided Ange with more attention than she had ever gotten in her life. Possibly the attention reinforced and maintained her sneezing.

So Kushner hung a special microphone from Ange's neck. Though she could talk and laugh normally, when she sneezed the microphone responded and caused a mild shock to sting her forearm. The shock began as soon as she sneezed and lasted for half a second after she stopped sneezing. The results? Within a few hours, Ange sneezed less often; and within 6 hours she had completely stopped sneezing. For the first time in 6 months, other than during her big sleep, Ange spent a full night and day without a single sneeze. Two days later she left the hospital. And her sneezing remained under control with the help of a follow-up punishment intervention once in a while.

Contingency Table (preliminary #2)		
Stimulus, Event, or Condition	Present	Remove
Reinforcer	Reinforcement ↑	Go to Chapter 5
Aversive condition	Punishment ↓	Escape ↑

⁶Based on Kushner, M. (1968). Faradic aversive controls in clinical practice, in C. Neuringer & J. L. Michael (Eds.), *Behavior modification in clinical psychology* (pp. 26-51). New York: Appleton-Century-Crofts.

A few brief, mild electric shocks applied at precisely the right moments allowed Ange to escape the months of extreme discomfort, the heavy medication, and the hours of painful and inconvenient treatment she had received. How much total electric shock did Ange receive during the entire intervention? Three minutes!

QUESTION

1. Describe the use of punishment to help a person stop chronic sneezing. *Compare and Contrast*

ESCAPE VS. PUNISHMENT

Escape—Reinforcement by the Removal of an Aversive Condition: You've just completed a major pig-out. Your jeans are so tight around your stomach you can't slip your palm between your waistband and you! As you've done so often in the past when in this condition, you secretly lower the zipper to half mast. The tight jeans were an aversive condition you removed by making the escape response of lowering your zipper. We suspect that the tight jeans were aversive, and removal of that aversive condition reinforced the escape response because you often unzip after a pig-out.

Punishment—Punishment by the Presentation of an Aversive Condition: You've just completed a major pig-out. Now it's time to dress for your evening on the town. You put on your favorite jeans—right, the tight ones. But because of the pig-out, you have to take a deep breath before you can zip them all the way. After you've repeated this fiasco on a few evenings, you find yourself preferring your old jeans, for some strange reason. We suspect that the tight jeans were an aversive condition, and we suspect that their tightness punished your putting them on after a big meal.

People often have a hard time distinguishing between reinforcement by the removal of an aversive condition and punishment by the presentation of an aversive condition. One problem is that both contingencies involve aversive conditions. And it may seem like aversive conditions always decrease performance, but it ain't necessarily so.

Remember that reinforcement makes a response occur more frequently, but punishment makes a response occur less frequently. Reinforcement by the removal of an aversive condition and punishment by the presentation of an aversive condition both involve aversive conditions. But for reinforcement to occur, we should remove that aversive condition; for punishment to occur we should present the aversive condition.

This contingency table summarizes the relations between the contingencies. We've added one new one since the last chapter. First select "present" from the white row and "aversive condition" from the white column. Then select the corresponding cell from the gray area—"punishment" (rate decreases). This means that *if you present an aversive condition, you have a punishment contingency that will decrease the rate of the response.* (By the way, the empty cell in the table may give you some hint about the contingency we'll cover in the next chapter.)

Remember: This \uparrow means the response becomes more frequent. So you don't need to be a rocket scientist to know what this \downarrow means.

Here's the other form of essentially this same table. If you present a stimulus (a cell from the white row across the top) and the response frequency decreases (a cell from the white column along the left), then you've got a punishment contingency (corresponding inside gray cell), which you can call *punishment by stimulus addition* or, more commonly, *positive punishment* (S^+P).

Contingency Table ((preliminary #2)

	Present Stimulus Event or Condition	Remove Stimulus Event or Condition
Response Frequency Increases \uparrow	Reinforcement Contingency Reinforcement by Stimulus Addition Positive Reinforcement (S^{+R})	Escape Contingency Reinforcement by Stimulus Subtraction Negative Reinforcement (S^{-R})
Response Frequency Decreases \downarrow	Punishment Contingency Punishment by stimulus addition Positive Punishment (S^+P)	

QUESTION

1. Use an example or two to compare and contrast the following (also construct and use a contingency table in doing your comparing and contrasting):
 - a. reinforcement by the removal of an aversive condition
 - b. punishment by the presentation of an aversive condition

Remember: To do well on the quizzes you must be able to construct or fill in any tables you see. And memo-

rizng without understanding won't get it, because the tables may be arranged differently on the quizzes.

Example
**The Mentally Handicapped
VISUAL SCREENING VS.
GENTLE TEACHING⁷**

David had lived in an institution for the mentally handicapped for the last 9 years. Although 21 years old, he scored as a 21-month-old infant on an appropriate behavior test. He frequently did stereotyped behavior such as weaving his head, staring at his hands, sniffing his hands, and repeatedly manipulating an object. This high rate of inappropriate behavior prevented him from taking part in vocational placement and embarrassed his family during their regular weekend trips to the community.

Jennifer Jordan, Nirbhay Singh, and Alan Repp tried several procedures to help David get rid of his problem behavior. They did this while providing special vocational training—sanding breadboards and assembling cardboard divisions for packing materials. The trainers who worked directly with David were experienced graduate and advanced undergraduate psychology majors from Northern Illinois University.

During baseline, the trainers would tell David what to do and then leave him alone, unless he left his seat. He spent almost all his time performing stereotyped self-stimulating behaviors and almost none doing his vocational training tasks.

Then they started an intervention combining several standard behavioral training procedures, including physical guidance and reinforcement with praise and touching. They continued to ignore his stereotyped behaviors. These behavioral procedures immediately reduced David's stereotyped behaviors by more than 50%, so that he was on task 68% of the time.

During the next phase they kept using the standard behavioral training procedures, but they alternated two added approaches. These approaches were *teaching quietly* and punishment with visual screening.

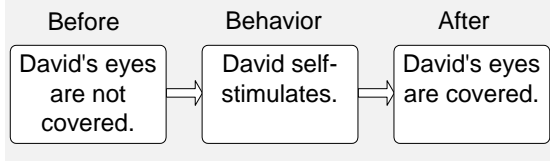
While *teaching quietly*, they used almost no vocal instructions, only gestures and signals. Why didn't they use vocal instructions? Because the advocates of teaching quietly assume that vocal praise would be more reinforcing if it were the only speech David heard during these training sessions. (The mere sound of the vocal praise might be more reinforcing because David had been recently deprived of hearing sounds. So he might be more "hungry" for sounds. Or the meaning of the vocal praise might be clearer and thus more reinforcing if the praise were not part of a confusing mishmash of instructions and chatter.)

⁷Based on Jordan, J., Singh, N. N., & Repp, A. C. (1989). An evaluation of gentle teaching and visual screening in the reduction of stereotypy. *Journal of Applied Behavior Analysis*, 22, 9–22. These behavior analysts were from the Templeton Hospital and Training Center, Educational Research and Services Center, Inc., and Northern Illinois University.

John McGee, from the Nebraska Psychiatric Institute, uses the quiet-teaching procedure as part of a general intervention package he calls *gentle teaching*. McGee's gentle-teaching program is a combination of standard behavioral training techniques with the teaching quietly technique. His standard behavioral techniques include the techniques mentioned—physical guidance, reinforcement of desirable behavior, and extinction of undesirable behavior. What they definitely do not include is punishment. McGee's main point is that you can prevent extreme forms of inappropriate behavior in the mentally handicapped without using punishment.⁸

The addition of quiet teaching gradually reduced David's stereotyped behavior more, and it increased his time on task to 81%. Not bad, but Jennifer and her colleagues wanted more than not bad. They wanted the best they could get. That's why they compared McGee's gentle teaching with a punishment contingency—to see which was more effective.

The alternating comparison sessions using the punishment contingency went like this: Each time David did a stereotyped behavior, such as sniffing his hands, the trainer would cover David's eyes with one hand and hold the back of his head with the other hand. Each use of this *visual screening* would last about 5 seconds. They assumed this visual screening would be a mildly aversive condition for David.



This visual screening immediately reduced David's stereotyped self-stimulation behaviors to 14% of the time, and his time on task increased to 88%. With a few more punishment sessions, David's stereotyped behaviors further reduced to 7%.⁹

QUESTION

1. Describe the use of a punishment contingency to prevent self-stimulation. What was the intervention and what were the results?

⁸McGee, J. J. (1985). Gentle teaching. *Mental Handicap in New Zealand*, 9, 13–24.

⁹Note that in the text we've reported the percentage of time David was on task, and in the graph we've reported the percentage of time he was doing his inappropriate stereotyped behavior. The two sets of data are not perfectly correlated with each other, because David could do some of his stereotyped behavior and still be on task. Those two response classes weren't completely incompatible.

Example Behavioral Clinical Psychology UNDESIRABLE HABITUAL BEHAVIOR ¹⁰

Sid had been staring at his writing on the computer screen for the last 10 minutes. Sitting, staring, his left elbow propped on the left arm of his swivel desk chair, his head propped by his left hand, his index finger rubbing his left eye. Pause . . . more rubbing, and rubbing, and rubbing.

Dawn stood in the doorway, observing but unobserved. "Sid, quit it!" Sid jumped and immediately pulled his finger from his eye and started typing. Then he stopped and laughed.

"You caught me that time. I know rubbing my eye bugs you. What's wrong with a little eye rub now and then?"

"Sid, it looks awful, and you do it all the time." She sat in the chair next to his desk, put her right elbow on the desk, and began chewing her right thumb nail. "Besides it can't be that good for your eye. Your eyelid even looks red from all the rubbing."

"Come on, Dawn, that's from lack of sleep."

"Just your left eyelid?"

"Can't I rub my eye in the privacy of my study?"

"No. And you can't rub your eye when you lecture to your classes; they think it's a joke. And last year when you presented your paper at the Association for Behavior Analysis, you stood there rubbing your eye the whole time. It was embarrassing."

"I'll stop rubbing my eye when you stop biting your nails."

Now it was Dawn's turn to jump. She jerked her hand from her mouth and sat on it. Then she grinned, gave her head a nod that set her long, blond hair billowing, and rolled her eyes to the heavens in a show of innocence. This had been an effective escape response, always getting her off the hook with her father, but it was less effective with her husband.

Comment: (See Fig. 4-4.)

"You're a PhD, not a 5-year-old girl, and I'm not going to let you cutesy your way out of it this time. You're right, I don't want to rub my eye. But you don't want to bite your nails either. So here's what I'll do."

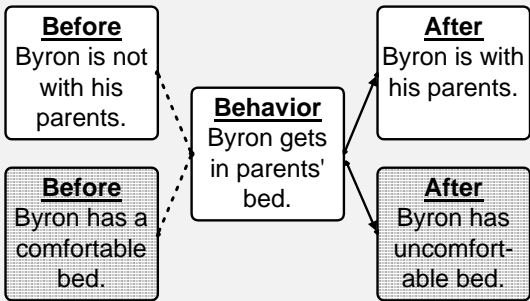
Dawn stopped grinning.

"You come up with a behavioral intervention to help you grow those long, sensuous, elegant, sophisticated nails you want. And if you can apply that same intervention to my minor eye rubbing, I'll let you, 'cause I'll admit I don't want to be the weirdo of the Psych Department."

The next evening at dinner, Dawn said, "I spent the afternoon in the library, and I found an article by Miltenberger and Fuqua. It

¹⁰Based on Miltenberger, R. G., & Fuqua, R. W. (1985). A comparison of contingent vs. non-contingent competing response practice in the treatment of nervous habits. *Journal of Behavior Therapy and Experimental Psychiatry*, 16, 195–200.

Inappropriate Natural Reinforcement Contingency



Performance-Management Punishment Contingency

And it worked. After just 1 week of this mild punishment contingency, Byron's nighttime visits dropped from 13 per week to 0 per week. Now all three sleep more comfortably.

Question: How many professional behavior analysts does it take to outfox a professional 5-year-old boy?

Answer: Three.

Question: How many traditional psychotherapists does it take to outfox a nontraditional 5-year-old boy?

Answer: More than two because two tried and failed.

And, of course, the combined efforts of Byron's two college-educated parents had been no match for him.

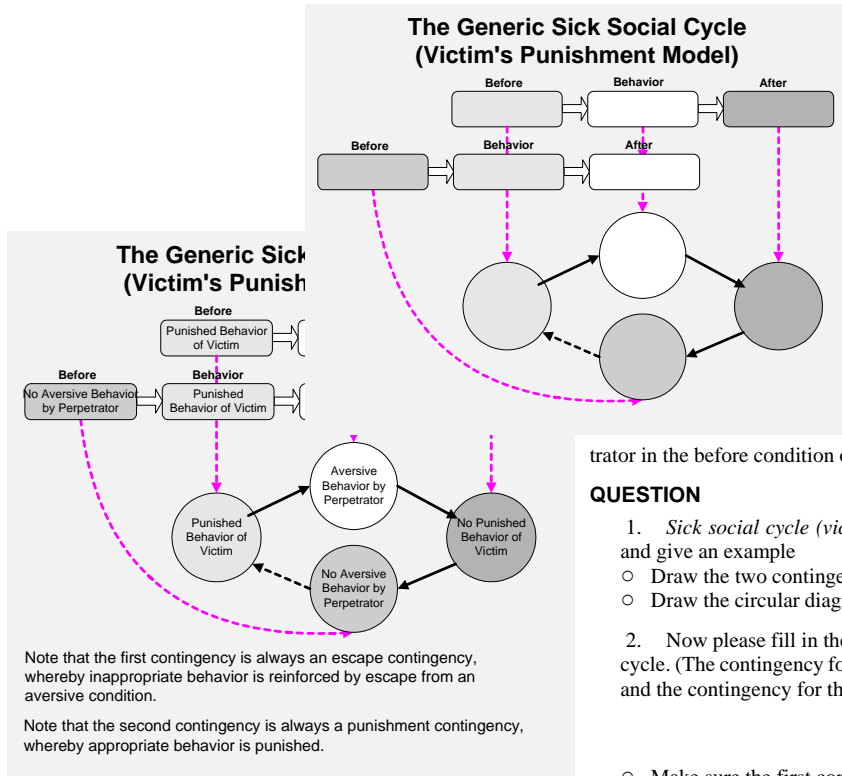
QUESTION

1. Diagram the punishment contingency used by Ayllon, Garber & Allison for getting rid of a child's inappropriate nighttime visits.

We should not read more into Jimmy's violent disruptions than is there. He is simply making a response that has been reinforced in the past. We should not say that he is trying to escape, or trying to control Sue, or trying to communicate his needs, or on a power trip. He is not necessarily even aware of what he's doing and most likely not aware of the contingencies controlling what he's doing. And the same might be said of Sue; she might not have realized that she was letting Jimmy off the hook when he disrupted, let alone that her failure to hang in was reinforcing his disruptions.

havior. The following is a generic diagram of this sort of social interaction.

Remember that the dead-man test does **NOT** apply to the before and after conditions of a contingency diagram. So it's OK that the victim is not behaving in the after condition of the first condition, because that's really a stimulus condition for the perpetrator. And similarly, it's OK, if there's no aversive behavior by the perpe-



trator in the before condition of the second contingency diagram.

QUESTION

1. Sick social cycle (victim's punishment model)—define it and give an example
 - Draw the two contingency diagrams for your example.
 - Draw the circular diagram of the sick social cycle.
2. Now please fill in the diagram for your whole sick social cycle. (The contingency for the perpetrator goes in the top row; and the contingency for the victim goes in the second row.)
 - Make sure the first contingency is an escape contingency, where the inappropriate behavior of the perpetrator is reinforced by escape from an aversive condition.
 - Make sure the second contingency is a punishment contingency where the appropriate behavior of the victim is punished.

Such lack of awareness is almost certainly the case for many classroom teachers, even special ed teachers.

In Chapter 3, we saw an example of the sick social cycle based on an escape contingency for the victim; Dawn's inappropriately timed behavior was reinforced by escape from Rod's crying. In the case of Jimmy and Sue, we have a different type of sick social cycle, one based on punishment of the victim's appropriate be-

DGeneral Rule
The sick social cycle (victim's punishment model)

- The perpetrator's aversive behavior punishes the victim's appropriate behavior.
- And the victim's stopping the appropriate behavior unintentionally reinforces that aversive behavior.

BASIC ENRICHMENT

*In the Skinner Box
Experimental Analysis*
PUNISHMENT OF THE LEVER PRESS

jerks slightly; the water dipper raises, and the rat's on that dipper in a flash, licking it clean. Then, slowly, the rat approaches the lever again, as leery as before.

What's going on here? Of course, you only have to look at the title of this chapter to tell. The presentation of an aversive condition (a brief and mild electric shock) punishes the lever-press response. The rat is in a bind—the same bind you and I are often in: The same response produces both a reward (the drop of water) and an aversive stimulus (the shock). Just like the spoonful of hot soup can produce a good taste *and* a burned mouth. And just like the rat approaches the lever, we approach the hot soup, ever so leery.

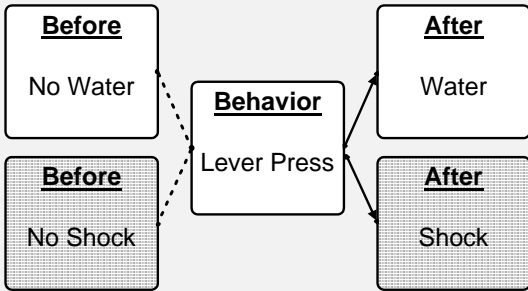
Once again, how does this punishment contingency compare with the escape contingency?

For escape, the **removal** of the shock reinforces the lever press.

For punishment, the **presentation** of the shock punishes the lever press.

But wherever you see a punishment procedure suppressing a response, you know it must be working against a reinforcement procedure maintaining that response. Either a reinforcement contingency must be operating at the same time as the punishment history, or, at least, the reinforcement contingency must have been operating prior to the punishment contingency. If there is no reinforcement contingency and never has been one, then there would be no response for the punishment contingency to punish. Here, the presentation of the water reinforces the lever press while at the same time the presentation of the shock suppresses the lever press.

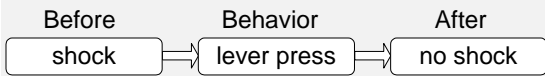
Reinforcement Contingency



Punishment Contingency

This time, when you peep through the window of the Skinner box, you see the water dipper is there again, but the notorious metal rods that make up the floor are still there, too. And of course it wouldn't be a Skinner box without a device with which the animal can respond. For the rat, it's usually the lever, as it is again this

Escape Contingency



QUESTION

- Using the Skinner box, compare and contrast punishment and escape.

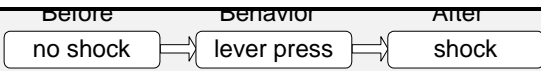
FOR EVERY PUNISHMENT CONTINGENCY, THERE'S A REINFORCEMENT CONTINGENCY IN THE BACKGROUND

Here's an important point:

Why is that true? Suppose you wanted to demonstrate punishment of the lever press in the Skinner box. You'd need the rat to press the lever before you could punish that response. But how would you get the leverpress response? You'd have to reinforce it—for example, with water.

In other words, for punishment to occur, you need behavior; and for behavior to occur reliably, it must be reinforced. Now it's easy to miss this important point if you just look at the case studies we presented in the Fundamentals section. In most of those cases, we

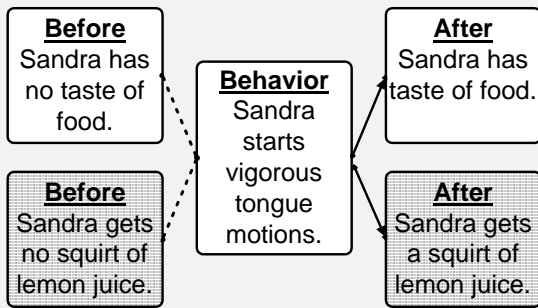
Whenever you have a punishment contingency, you must also have a reinforcement contingency.



time.

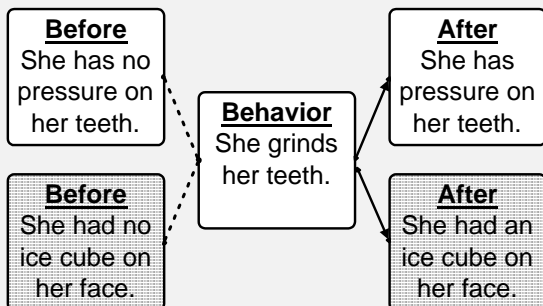
On this occasion, the rat acts weird. It keeps approaching the lever and then backing away. It raises its paws above the lever and then pulls quickly away. It touches the lever, ever so leery, and then jerks away. Finally, the rat presses the lever all the way down and

Inappropriate Natural Reinforcement Contingency



Performance-Management Punishment Contingency

Inappropriate Natural Reinforcement Contingency



Performance-Management Punishment Contingency

what the relevant reinforcement contingencies were that maintained the undesirable behaviors. But here are a couple wild guesses, just to show you what the contingency diagrams look like:

As you will see in Chapter 10, under some conditions pressure on the teeth seems to be a reinforcer. We call this reinforcement contingency *inappropriate* only because it is exerting more control over the behavior of the two women than it should.

Sandra's vigorous tongue motions caused her to throw up her food, which in turn produced the taste of the food. And, strange as it seems, research suggests that the taste of regurgitated food may sometimes be a reinforcer.

In any case, whenever you use a punishment contingency, you should keep your eye on the reinforcement contingency as well. One of the values of the Skinner box is that it highlights the need for a reinforcement contingency. And concern for the reinforcement contingency's maintaining the undesirable behavior is even more important now that the use of punishment has decreased considerably in popularity. In many instances, we are almost forced to do a functional analysis in order to find the undesirable reinforcement contingency. Then we can counteract that undesirable contingency in one way or another—for example, by extinction of inappropriate behavior combined with differential reinforcement of alternative behavior.

In The Skinner Box *From the Experimental Analysis of Behavior* **BASIC RESEARCH¹⁶**

With Jack's self-mutilation, we saw how the process of reinforcement and punishment may work in opposite directions. We guessed that Jack's head banging occurred because attention reinforced it. We also guessed that the severe physical stress from his head banging wasn't very aversive for Jack. Perhaps his head banging had gradually increased in intensity, causing it to lose its aversiveness.

This may seem like wild speculation, so we need to test the notion with an experiment in the lab. The first question is: Are there circumstances under which a small reinforcer will maintain a response, in spite of an intense physical stressor contingent on each response? If yes, then the second question is, why? What are those circumstances? Research lab-based answers to these two questions will help us understand Jack's case.

Dr. Nathan Azrin used pigeons rather than human beings in a relevant study at Anna State Hospital. Past experiments have shown that most results of this sort of animal research are as true of human beings as they are of other animals.

¹⁶Based on Azrin, N. H. (1959). Punishment and recovery during fixed-ratio performance. *Journal of the Experimental Analysis of Behavior*, 2, 301—305.

knew the strange behaviors occurred at high rates. We didn't ask why they occurred. But if they occurred, you can be sure they were producing reinforcers. In these cases we don't know what the reinforcers were. But we assume there must have been reinforcers.

What do you think reinforced Velma's and Gerri's grinding their teeth, Sandra's regurgitating, Jack's banging his head, the grade-school kids' disrupting, Ange's sneezing, David's self-stimulating, Sid's rubbing his eye, Dawn's biting her nails, Peter's aggressing, and Ann's trashing the ward? Whew, what a list! Now, most of these studies were done before the common use of functional analysis—an analysis of the contingencies responsible for behavioral problems (nowadays, functional analyses would normally have been done before intervention, to see if it would be possible to decrease the behavior without using a punishment procedure). But in these examples, we don't really know

If we had walked into Nate Azrin's lab then, we might have seen a pigeon inside a Skinner box pecking a small disk that served as a response key (instead of a rat pressing a lever).

Immediately after each key peck, the pigeon flutters its wings, lurches violently, and almost falls down. Looking closer, we notice a pair of wires connected to the pigeon. Through these wires the bird receives a brief but intense shock each time it pecks the key. The shock is so powerful it almost knocks down the pigeon. Yet the bird keeps pecking the key and getting shocks. Why? Jack kept banging his head, in spite of the physical stress. In the same way, the bird keeps pecking the key, in spite of the electric shock.

In fact, why does the pigeon peck the key in the first place? As we keep looking at this peculiarly persistent pigeon, we notice that some key pecks cause a feeder full of grain to come up to a trough in the wall of the Skinner box. Of course, the bird is quick to start eating the food for the few seconds the feeder remains in the trough. Put another way, reinforcement by the presentation of a food reinforcer maintains the key-peck response. Just as Jack's head banging produced the potential reinforcer of attention, the pigeon's key pecking produces the occasional reinforcer of grain.

So the answer to our first experimental question is this: Yes, sometimes an animal, and we assume a human being, will tolerate much physical stress contingent on each response, though that response produces only a small reinforcer, even when that small reinforcer occurs only occasionally.

Then what about our second question: Why? What are the circumstances? The answer: We will tolerate much physical stress when the intensity of the physical stress increases gradually.

As we *imagined*, day by day, Jack gradually increased the intensity of his head banging; we *know*, day by day, Nate gradually increased the intensity of the electric shock.

Other work had shown that if Nate had started out with a high-intensity shock, the bird would have greatly decreased its rate of pecking and might have stopped altogether. So Nate Azrin's careful laboratory work supports our speculations about the processes underlying this bizarre behavior from the everyday world.

QUESTION

1. Compare and contrast Jack's case with Azrin's Skinner box experiment.

Ethics

SHOULD YOU USE ELECTRIC SHOCK IN A PUNISHMENT CONTINGENCY?¹⁷

¹⁷Based on: Goldiamond, I. (1984). Training parent trainers and ethicists in nonlinear analysis of behavior. In R. Dangel & R. Polster (Eds.), *Parent training foundations of research and practice* (pp. 504-546). New York: Guilford Press; Griffith, R. G. (1983). The administrative issues: An ethical and legal perspective. In S. Axelrod & J. Apshe (Eds.), *The effects of punishment on human behavior* (pp. 317-338). New York: Academic Press;

SID'S SEMINAR

Tom: I hate this punishment contingency, especially with electric shock. Shock is awful just to read about, let alone to experience. There's no way I'd ever use electric shock in a punishment procedure.

Sue: I feel the same way, especially with children who have it forced on them. But then I ask myself if their lives were better after the punishment procedure. And in the cases we read about, I have to answer yes.

Tom: Were they enough better to justify the electric shock?

Sid: Good question. We must always ask whether the benefit was worth the cost.

Sue: Let's look at the cases: For Jack the cost was perhaps a couple of dozen brief, mild shocks. The benefits were that he stopped injuring his head and he no longer had to be tied or imprisoned in a crib. That also meant he might have a better chance of acquiring some normal behavior. As for Ange, the cost was 3 minutes of mild shocks. And the benefits were relief from a life of constant sneezes. Also, she no longer had to suffer difficult medical treatments.

Joe: In both cases, the physical stress of the punishment procedures seems a lot less than the physical stress of the horrible conditions the children suffered. I think the benefits much more than justify the costs.

Eve: In spite of Mr. Field's point contingencies, I haven't talked much in this seminar. But I've got to say something now. The lives of those children seemed almost inhuman, in both of those cases, and especially in the cases of Jack and Ange, I can't even imagine it. I sure wouldn't volunteer to give those electric shocks. I don't even like to watch a physician stick a needle in someone. But I'd force myself to overcome my

Iwata, B. A. (1988). The development and adoption of controversial default technologies. *The Behavior Analyst, 11*, 149-157;

McGee, J. J. (1987). Ethical issues of aversive techniques: A response to Thompson, Gardner, & Baumeister. In J. A. Stark, F. J. Menolascino, M. H. Albarelli, & V. C. Gray (Eds.), *Mental retardation and mental health: Classification, diagnosis, treatment, services* (pp. 218-228). New York: Springer-Verlag;

Martin, G., & Pear, J. (1988). *Behavior modification: What it is and how to do it* (pp. 195-197). Englewood Cliffs, NJ: Prentice Hall;

Thompson, T., Gardner, W. I., & Baumeister, A. A. (1987). Ethical issues in interventions for persons with retardation, autism and related developmental disorders. In J. A. Stark, F. J. Menolascino, M. H. Albarelli, & V. C. Gray (Eds.), *Mental retardation and mental health: Classification, diagnosis, treatment, services* (pp. 213-217). New York: Springer-Verlag;

Van Houten, R., Axelrod, S., Bailey, J. S., Favell, J. E., Foxx, R. M., Iwata, B. A., & Lovaas, O. I. (1988). The right to effective behavioral treatment. *The Behavior Analyst, 11*, 111-114;

We've cited many references here because this is an important and controversial issue. In addition, some references present views that directly oppose ours, but they are views with which the serious behavior analyst should be familiar.

squeamishness to help those poor kids live a slightly more human life.

Tom: Maybe so, but is that what it takes? Aren't there other ways of helping those kids?

Sid: That's a good point, too. We should always make sure we're using the least aversive and the least drastic, the least restrictive, and the least intrusive intervention.

Sue: Yes, in my work with Jimmy, an autistic child, we decided our attention was reinforcing some of his disruptive behavior. So we used contingent attention to reinforce a more acceptable alternative response. That helped us get rid of part of his disruptions. Maybe in Jack's case, they could have used attention to reinforce an alternative to head banging.

Sid: An excellent idea.

Joe: Maybe. But maybe not. Suppose they had wasted several weeks messing around with differential reinforcement of alternative behavior and perhaps some other less drastic procedures. And suppose you finally found one that worked. If I were Jack's father, I'd say this to the professionals: "Why in the heck did you subject my kid to several extra, needless weeks of head banging, while you wasted time searching for some wimp procedure? Why didn't you use a few brief, mild shocks right away, so he could stop destroying himself? My kid has a right to the most effective and prompt intervention you've got."

Sid: You're saying not only should we (1) weigh the costs of the punishment procedure and the benefits of getting rid of the inappropriate behavior, but we also should (2) weigh the costs of searching for a less drastic procedure. We should consider both factors when doing a cost-benefit analysis of punishment.

Joe: Yes, and I'll say this too: I think the physical stress these punishment interventions cause is much less than the physical stress physicians often cause with their treatments involving drugs, injections, and surgery. Yet most people don't get bent out of shape about that.

Max: I read an article by Dr. Brian Iwata where he describes recent work similar to that done with Jack. He writes about the development of a device that automatically shocks self-injurious behavior. They call it *SIBIS*, the *Self-Injurious Behavior Inhibiting System*. Here's what he has to say about the need for punishment contingencies: "Our treatment program on self-injury had an overall staff-to-client ratio of about 5:1 (five staff for each client), with BAs, MAs, and PhDs outnumbering clients by better than 2:1. Despite all this expertise, our reinforcement-based approaches to treatment were not always successful. We clearly needed to have available a treatment option based on aversive stimulation." He then adds that his reading of the literature suggests that electric stimulation is often the best way to go, for the client's sake.

Sid: Regarding that, let me read a message from Dr. Peter Holmes that I downloaded last night from the Behavioral Bulletin

Board: "A court case in Flint, MI, may have broad implications for the 'use-of-aversives' controversy. Yesterday it was reported that a U.S. district court awarded a grandmother \$42,500 in damages because a school system had refused to permit her granddaughter to wear a SIBIS device in her special ed. classroom. (The granddaughter has blinded herself from self-hitting.)

Eve: That poor child. That's so sad.

Joe: It sure is sad, but I'm happy to hear that the courts are beginning to rule that people have a right to effective behavioral interventions, even if they go against a simplistic set of values of some school policy makers.

Tom: Maybe, but one problem with punishment is that the punishers may end up being role models. And the clients themselves may imitate that use of punishment. And another problem is that caretakers can easily abuse the use of punishment.

Sid: Yes. Children, clients in centers for the mentally handicapped, and clients in psychiatric hospitals are easy to abuse because they often don't have much power to defend themselves.

Max: That's why at least half the states now have laws designed to protect the rights of defenseless clients in the use of punishment. And most institutions have guidelines for punishment, for example:

- The person's behavior must be dangerous to himself or herself or to others.
- The person probably will benefit from the intervention.
- Solid data suggest that less drastic or less intrusive interventions will not work.
- Generally, use reinforcement to establish appropriate behavior, with any uses of punishment to get rid of inappropriate behavior.
- A well-trained, professional behavior analyst must design and supervise the procedure.
- A client's rights committee must approve the procedure.

Sid: So we use punishment as a last resort and with guidelines to protect the client.

Max: Let me just add that in future chapters the authors describe procedures that may sometimes be good alternatives to punishment.

QUESTIONS

1. What are two factors you should consider in doing a cost-benefit analysis of using punishment?
2. What are six considerations you should include in guidelines for punishment?

CONFUSION BETWEEN PUNISHMENT AND AGGRESSION

In our view, we should not be allowed to use punishment as a performance management or training technique without considerable supervision and accountability for our actions. Here's the problem: Suppose, for example, our child or an autistic child or a mentally handicapped adult acts inappropriately. Suppose they spit at us. That will be aversive for us. So what do we do? We "implement a punishment contingency." We slap the offender. Why? Because that was a well-thought out behavioral intervention? No, because when we're aversively stimulated (like when we're spit at), it's reinforcing to strike back, to aggress. And whether we're a parent, a teacher, or a direct-care staff member in a training center for the mentally handicapped, we will tend to hit first and ask questions later. We will tend to go for the aggression reinforcer of striking our tormentor and *then* try to justify our actions in terms of a punishment procedure designed for the best

interests of the person whom we're supposed to be helping, the child or client. So it's good that we're restrained in our use of punishment; it's good that we have to have special training and special approval before we even squirt a kid with a little mist in the face. (Some students have misread this to mean that punishment doesn't work, but the point of this whole chapter is that carefully used punishment works very well. The following summarizes the point of this paragraph.)

Don't use punishment in wrath.

Don't confuse the behavioral use of punishment with divine retribution.

Forget the eye-for-an-eye notion. Divine retribution is God's job; your job is to make that punishment as short as possible; all you want to do is modify behavior, not make people atone for their sins.

INTERMEDIATE ENRICHMENT

Research Methods DEPENDENT VARIABLE AND INDEPENDENT VARIABLE

The concepts of *cause* and *effect* are complex, and not all philosophers of science consider them of value. But at least they're a place to start. You turn on your kitchen stove, and the water starts to boil. Roughly speaking, the heat from the stove caused the water to boil. The heat was the cause. The boiling was the effect.

Each time the rat presses the lever, you give it a drop of water—you reinforce the lever presses. In the future, the rat presses the lever more frequently. Your reinforcement caused the rat's increased frequency of lever pressing. Past reinforcement is the cause; the increased frequency of pressing is the effect. Cause and effect.

DConcepts

Dependent variable

- A measure of the subject's behavior.

Independent variable

- The variable the experimenter systematically ma-

And that's what scientists study—cause and effect. The scientist asks, Why does something happen? What causes it? I wonder what would be the effect of doing this or that. Cause and effect.

But scientists don't often use the words *cause* and *effect*. Instead, they use the expressions *independent variable* and *dependent variable*. *Independent variable* means "cause" and *dependent variable* means "effect," more or less. You might say a particular value of the independent variable causes a particular value of the dependent variable.

You might say a particular temperature of the water causes it to boil at a particular rate. The temperature is the independent variable and the boiling is the dependent variable. And you might say a particular amount of reinforcement causes the rat to press the lever at a particular frequency. The amount of reinforcement is the independent variable and the frequency of pressing is the dependent variable.

So two basic concepts of science are dependent and independent variables. In behavior analysis, the *dependent variable* is a measure of the client's or subject's behavior. The *independent variable* is the variable the behavior analyst or experimenter systematically manipulates to influence the dependent variable. In the case of Sandra's regurgitation, the behavior analysts selected as the *independent variable* a small amount of unsweetened lemon juice squirted into Sandra's mouth contingent on her throwing up; and they observed its effects on the *dependent variable*, her frequency of regurgitation. Sandra eventually stopped throwing up her milk.

The frequency of future regurgitation was *dependent* on the punishment contingency of the sour lemon juice in her mouth whenever she had regurgitated in the past. But the experimenters could implement the contingency or not, whenever they wished. So the implementation of that contingency was independent; it was the *independent variable*. Another way to put it is the *independent variable* is the *intervention* and the *dependent variable* is the *target behavior*.

QUESTIONS

1. Define each of the following concepts:
 - (1) dependent variable
 - (2) independent variable
2. Describe an experiment that illustrates these two concepts.

Research Methods GRAPHS

When collecting data on the behavior of interest, you might find that the data don't make much sense at first glance; you need to organize and study them. Let's look at the case of Sandra's regurgitation. The behavior analysts organized the data as shown in the next figure.

This figure shows details of the results of the lemon-juice intervention. The vertical axis (*y-axis* or *ordinate*) represents percentage intervals of Sandra's regurgitation. The horizontal axis (*x-axis* or *abscissa*) represents the days when the data were collected. This axis is divided into four separate segments, the first 5 days of baseline, 4 days of the lemon contingency, 2 days of baseline again, and 27 more days of the lemon contingency. Usually we indicate the dependent variable on the vertical axis and the independent variable on the horizontal axis. But it's not simply days of the independent variable here; it's days of exposure to the intervention versus days of exposure to the baseline conditions.

The data points show that the values of the dependent variable (percentage of intervals of regurgitation) decreased when we presented the intervention value of the independent variable (the contingent sour lemon juice in Sandra's mouth).¹⁸

*D*Concept

Multiple-baseline design

- An experimental design
- in which the replications involve
- baselines of differing durations
- and interventions of differing starting times.

This more detailed look at the data shows that Sandra's regurgitation decreased as soon as the behavior analysts started using the lemon-juice contingency. So this suggests it was the lemon-juice contingency that controlled Sandra's regurgitation.

We use bar graphs in the main part of this book because they show the results in a quick and dramatic way; but behavior analysts usually make daily use of more detailed graphs that show the change in performance over time, that show trends in the data, like the preceding graph. This way, they can do more detailed analyses of the effects of the independent variable on the dependent variable. A bar graph of the data would look like the lemon-juice graph in the first part of this chapter. That bar graph is based on the mean percentage intervals of regurgitation by phase. The bar graph also shows the effect of the independent variable on the dependent variable. (The experimental design the behavior analysts used to study Sandra's regurgitation is called a **reversal design**—an experimental design in which we reverse between intervention and baseline conditions to assess the effects of the intervention. We will study the reversal design in Chapter 5.)

¹⁸Note that we might say there are two values of the independent variable in this study, 0% contingent sour lemon juice (baseline) and 100% contingent sour lemon juice (intervention).

QUESTIONS

1. What information can be obtained from a line or bar graph?
2. What information is represented in the x-axis, or abscissa?
3. What information is represented in the y-axis, or ordinate?

Research Methods

MULTIPLE-BASELINE DESIGNS

Earlier, we omitted this part of the discussion between Sid and Dawn:

Sid, the professional skeptic, said, "Before I agree to spend my time and energy on your intervention, I want to know more about Miltenberger and Fuqua's evidence that it works."

"First," Dawn said, "their clients recorded their undesirable habitual behavior, during at least 6 days of baseline before the intervention, just like we did. The undesirable habitual behavior occurred at a lower rate after the intervention."

"Coincidence?"

"The more times you repeat or replicate an intervention, and the more times you get the same results, the more confident you are those results came from your intervention and not just chance variation. So they replicated the experiment five times. They collected the baseline of five different clients and then intervened. They used a **multiple-baseline design**. More specifically, they used a **multiple-baseline-across-subjects design**. Five different clients each showed a decrease in the frequency of their undesirable habitual behavior from the baseline to the intervention." [The other types of baselines are multiple-baseline-across-behaviors and multiple-baseline-across-settings designs.]

"Yes, but maybe they were getting better anyway. Maybe if Miltenberger and Fuqua hadn't intervened at all, the frequency of undesirable habitual behaviors would still have decreased."

"Maybe, except when you look at the data for each day, there's no decreasing trend during baseline. In other words, the baseline shows no evidence that the undesirable habitual behaviors were becoming less frequent."

"But a week might not be enough time to see a slow decrease."

"Whether that's a problem depends on how abrupt the change is from baseline to the first days of the intervention. In all cases there was an abrupt and fairly large decrease from the baseline to the intervention—much larger than could result from a slow trend in the baseline," Dawn replied.

"OK, I'll go for it, but is their intervention self-punishment, as you interpret it, or is it just increased self-awareness?" Sid asked. "Maybe recording and clenching their fists just made them more aware that they were doing the undesirable habitual behaviors. And once they were aware of their behavior; they could control it; they could eliminate it."

THE IMPORTANCE OF GOOD RESEARCH DESIGNS

“I doubt if increased self-awareness caused the decreased frequency of undesirable habitual behaviors during the intervention, but it might have during baseline. During baseline, maybe their recording of their own behavior did increase their awareness of their undesirable habitual behaviors. So maybe that self-recording caused them to make the undesirable response less frequently during baseline than before they started recording. Still, the contingent fist clenching during the intervention decreased the frequency of the undesirable habitual behaviors, even below the baseline. So I guess the fist clenching must have been aversive and the contingent clenching must have been a punishment procedure.”

“Yes,” Joe said, “that’s a pretty good example of the value of a baseline. You can’t do the research without having the clients self-record. So if you include their self-recording during the baseline, then you can rule that out as the sole cause of the changed frequency during intervention.”

In experimental research, you should clearly show that changes in your independent variable caused changes in your dependent variable. For instance, look at the reduction of Sid’s eye rubbing and Dawn’s nail biting between baseline and the intervention. With that goal, let’s make explicit the four criteria of good research Dawn and Sid implied:

1. You must have something to compare. You must record the dependent variable under at least two different values of the independent variable. In behavior analysis, we often compare the intervention with a baseline condition (self-recording plus contingent fist clenching during the intervention versus self-recording only during the baseline).
2. You need to replicate the change in your independent variable enough times to rule out coincidence (for example, do the same intervention with five different people). You could replicate the experiment across subjects, settings, or behavior.
3. With a baseline comparison, you need to record data long enough to rule out the chance that your dependent variable would have changed even if you hadn’t changed the independent variable (for example, record for several days).
4. You need fewer days of baseline if the change in your independent variable will produce abrupt changes in your dependent variable.

QUESTIONS

1. *Multiple-baseline design*—describe it and give an example.
2. List three types of multiple-baseline designs.
3. Explain and illustrate four of the criteria for good research using a simple baseline design.

*Ethics and Research Methods*¹⁹

¹⁹Based on: Jordan, J., Singh, N. N., & Repp, A. C. (1989). An evaluation of gentle teaching and visual screening in the reduction of stereotypy. *Journal of Applied Behavior Analysis*, 22, 9–22. And based on McGee, J. J. (1987). Ethical issues of aversive techniques: A response to Thompson, Gardner, & Baumeister. In J. A. Stark, F. J. Menolascino, M. H. Albarelli, & V. C. Gray (Eds.), *Mental retardation and mental health: Classification, diagnosis, treatment, services* (pp. 218–228). New York: Springer-Verlag.

As you just saw, the use of aversive contingencies generates hot debate among students. But the debate gets even hotter among professionals: John McGee, the main advocate of gentle teaching, has little doubt about the immorality of using the punishment contingency to prevent inappropriate behavior. In spite of the sort of research we’ve presented in this chapter, he would say we have “two decades of failed punishment-based research.” He goes on to say:

I hold that the use of punishment is . . . the use of ill-conceived, poorly tested, and counterproductive methods. . . . Chains have been replaced by forced relaxation. Lobotomies are replaced by grotesque practices such as squirting noxious substances in people’s faces, eyes, and nostrils. Hydrotherapy is now water mist sprayed into the face. Punishment and neglect are now termed aversive therapy. . . .

At best, punishment results in submissive, obedient persons. More typically, after severe forms of punishment fail, the individuals are restrained or encased in helmets for the balance of their lives.

The fact of the matter is that in those places where punishment is used correctly and systematically, it is still repugnant and unnecessary.

McGee cites his work at the Nebraska Psychiatric Institute with 82 people classified as mentally handicapped or mentally ill. These 82 people all did severe self-injurious behaviors. He claims that for all 82 clients he and his colleagues prevented or reduced the self-injurious behavior to a manageable level. And they did it without the use of punishment.

If McGee is right in his critique of the use of the punishment contingency, and if he’s right about the effectiveness of gentle teaching, then behavior analysts face a serious moral problem. But, of course, most behavior analysts don’t accept his criticism. They would argue that he uses superficial, erroneous analogies in comparing the behavior analyst’s use of the punishment contingency with failed psychiatric techniques of the past, and that his assessment of the punishment research and its results is wide of the mark. They also might suggest that he selected the label *gentle teaching* as a misleading emotional appeal akin to the language manipulation of Madison Avenue. And they might suggest that a more descriptive, though perhaps less salable, label would be *behavioral training based on reinforcement and quiet teaching*.

In addition, they would question the data he has offered in support of gentle teaching, on two grounds: First, the data are not consistent with the published scientific data and their direct experience in working with self-injurious behavior. But such objections are open to many interpretations and can be challenged. More to the point,

Comment: (See Fig. 4-5, which is based on data from Miltenberger & Fuqua’s [1985] study.)

they question the validity of the data he offers because of their informal nature.

The history of the practice of science is the history of men and women seeking truth and instead discovering what supports their biases, their prejudices. And the history of scientific method is the history of the development of procedures to protect us scientists from our own biases. (We have placed these sections on scientific research methods throughout this book. In a sense, these sections are about that—methods scientists have developed to protect themselves from their biases.)

Scientists have learned to distrust informal evidence. It's too easy to fool ourselves (even though we are honorable people with noble intentions). To protect ourselves from our own biases we must follow the following scientific practices:

- We must use good experimental designs that provide for clear comparisons between various experimental conditions. And when one experiment leaves room for more than one interpretation of the results, then we must do another experiment, and another.
- We must describe our experimental procedures and measurements so completely and objectively that other scientists can repeat (replicate) our experiments to see if they get the same results.

*D*Concept
Informed consent

- Consent to intervene in a way
 - that is experimental or
 - risky.
 - The participant or guardian
 - is informed of the risks and benefits
 - and of the right to stop the intervention.
- We must take **reliability measurements** on both our in-

*D*Concept
Reliability measurement

- The comparison of measurements
- of dependent variables and
- independent variables
- obtained by independent observers.

dependent variables and our dependent variables. Put another way, we must have two or more different people—**independent observers**—measure our behavior as scientists to ensure that we and our staff do the procedures as we have described them. We must be sure we reliably intervened as we said we did. And we must be sure we are recording the behavior we say we're recording. To do this, independent observers must record the same dependent

variables and then compare their results. If they are not in high agreement about what the subject was doing, then the results are not reliable and we can't trust them.

Informal data provide a good place to start in our quest for knowledge. But eventually the advocates of gentle teaching must meet the strict requirements of scientific method in their use of research designs, description of procedures, and reliability measurements.

The ethical question is: Are the clients of behavior analysts being treated with inhumane callousness, as the gentle-teaching advocates seem to suggest? Or are the clients of the gentle teachers deprived of their rights to effective treatment, as the behavior analysts may suspect? This is not an empty debate. And the requirement that the answers must come from high-quality scientific research is no ivory-tower, intellectual requirement. Answers to these ethical questions must meet this requirement if those answers are to rise above the biases of the participating scientists.

Comment: do students know what ivory-tower depute means?

QUESTIONS

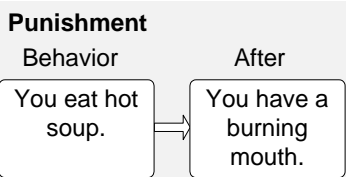
1. *Reliability measurement*—define it.
2. What scientific practices must we follow to protect ourselves from our biases?

Ethics and Research Methods
**INFORMED CONSENT
AND SOCIAL VALIDITY**

Before Stephen Luce and his colleagues began using contingent exercise to reduce Peter's aggression, they talked it over with Peter's parents. They described the aggression. Of course this wasn't news to Peter's parents, and they desperately wanted help to get rid of this aggression. The behavior analysts also described various possible interventions, with their risks and benefits. Then they explained that the parents could ask the behavior analysts to stop the intervention anytime they wished. Only after all these issues had been discussed, did the behavior analysts ask the parents for their **informed consent** to intervene. This informed consent process is ethically and legally crucial whenever we use an experimental intervention or aversive control, even one with an aversive outcome as mild as this set of exercises.

Even if an intervention works, the participants might not like it. For example, they might not think it was worth the effort; or they might think it had negative side effects. An intervention can be behaviorally valid (it works) but not **socially valid** (people don't like it). So the behavior analysts individually asked the participating teacher and teacher's aides about it. Each said it was effective, and some mentioned that such a procedure would generally not raise objections (a problem with using electric shock). Also, later, the teacher independently used contingent exercise as an effective punishment procedure in reducing other problem behaviors and in working with other children. All this suggests that the procedure is socially valid.

1. cont in-

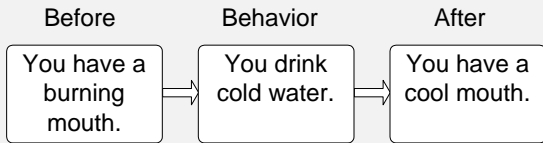


Increases re-sponse rate	Increases re-sponse rate	Decreases re-sponse rate
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Think you've got it? Let's see. Suppose you burn your mouth with a spoonful of hot soup. Then, with no hesitation, you gulp down a glass of cold water.

Let's analyze that one. You've got two responses here. First, let's look at the response of putting the spoonful of hot soup in your mouth. The outcome? The soup burns your mouth (probably an aversive condition). What's the contingency? *Negative reinforcement*? Not even close. Remember, just because it's bad doesn't mean it's *negative*, at least not as behavior analysts use the term. For behavior analysts, *negative* means *removal* and *positive* means *presentation*. So, instead, we've got *punishment*—punishment by the presentation of an aversive condition.

Negative Reinforcement (Escape)



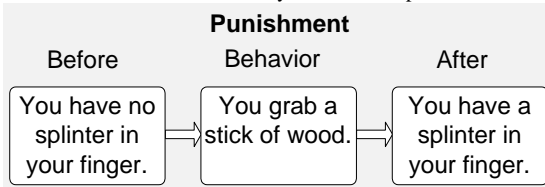
The second response is gulping down the water. But what's the negative reinforcer? The water? Sorry. The negative reinforcer is the burning mouth (the aversive condition)! And what kind of a reinforcer is it? A negative reinforcer. It's negative because it would reinforce by its removal. And the contingency? *Negative reinforcement*—reinforcement by the removal of an aversive condition.

QUESTIONS

1. *Informed consent*—define it and give an example.
2. *Social validity*—define it and give an example.

Compare and Contrast NEGATIVE REINFORCEMENT VS. PUNISHMENT

In Chapter 3, we warned you that the concept *negative reinforcer* confused most students. We said you could escape the confusion



Remember: Don't confuse *negative reinforcement* with *punishment*. In everyday English, negative and punishment mean something unpleasant. But negative reinforcement and punishment differ, though both involve aversive conditions. In the negative reinforcement contingency, the response removes or reduces the aversive condition; but in the punishment contingency, the aversive condition follows the response. Also, negative reinforcement increases the frequency of the response, but punishment decreases the frequency. Here is another example:

You get a splinter while grabbing a stick of wood. The pain in your finger (aversive condition) probably will decrease the frequency with which you repeat such a careless act in the future: Punishment by the presentation of an aversive condition.

You pull out the splinter. The reduction in pain (aversive condition) probably will increase the frequency that you pull out splinters in the future: negative reinforcement or reinforcement by the removal of an aversive condition.

We've tried to write this book so that you won't often have to grapple with the "positive" and "negative" terminology. But once you sail out of the safe haven of *Elementary Principles of Behavior*, you should be ready to deal with any confusion.

by substituting *aversive condition* for *negative reinforcer*, at least until the proper use of *negative reinforcer* becomes a strong part of your repertoire. We also said *negative reinforcement* means the same thing as *reinforcement by the removal of an aversive condition*.

Now for the big problem: discriminating between negative reinforcement and punishment. *Negative reinforcement* is the contingent *removal* of an aversive condition. It *increases* the rate of behavior. *Punishment* is the contingent *presentation* of an aversive condition. It *decreases* the rate of behavior.

Fighting the Confusion		
Positive Reinforcement	Negative Reinforcement	Punishment
Presentation of a reinforcer	Removal of an aversive condition	Presentation of an aversive condition

QUESTION

²⁰Based on: Bernstein, G. S. (1989). In response: Social validity and the report of the ABA task force on right to effective treatment. *The Behavior Analyst*, 12, 97.