

Penalty

FUNDAMENTALS

Example

Behavioral Juvenile Corrections **FEAR AND LOATHING IN THE SCHOOL SHOP¹**

“Mark, I’m gonna kick your rear end!” Herb said. Mark had bumped Herb’s elbow (maybe accidentally, maybe not). Herb was having enough trouble following the pattern using the jigsaw, without hassles from Mark.

Mark picked up his hammer. “No you ain’t. You try it, and I’ll kill ya!”

“Boys, that’s no way to talk,” Bruce Black, the fifth-grade shop teacher, said.

Herb looked at Mark. “Yeah, and I’m goin’ to smash your woodworking project too.”

“Boys, stop that kind of talk.”

“Mr. Black, I ain’t gonna stop it, and you can get outta my face, or I’ll smash you too.”

After several weeks of problems of this sort, Bruce went to see the principal. “Dr. Robinson, I don’t think it was a good idea to let those juvenile delinquents into our school. They’re completely out of control. I can see why the court sent them to that Achievement Place home. They steal, they fight, they disrupt—when they come to school at all. They’re the hardest 13-year-olds I’ve ever seen! They almost scare me.”

¹Based on Phillips, E. L. (1968). Achievement Place: Token reinforcement procedures in a home-style rehabilitation setting for “predelinquent” boys. *Journal of Applied Behavior Analysis*, 1, 213–223. The late Elery Phillips, Montrose Wolf, and their colleagues at the University of Kansas developed Achievement Place, a behavioral program for “predelinquent” children. Because of the research they did to develop an extremely high-quality program and because of their efforts at helping others start such programs, now Achievement Place style programs function all over the United States. And because of Mont’s crucial role in the development of the Achievement Place model, he received the 1998 Distinguished Service to Behavior Analysis award from SABA.

“What are they doing?” Mae Robinson asked.

“They have so much aggression inside them that they keep exploding.”

The toothpaste theory of abnormal behavior, Mae thought. She asked, “Can you tell me more specifically what they do?”

“Well, they’re very aggressive, with each other and even with me.”

It sure is hard to get people to talk about specific behaviors and not talk in the vague terms that prevent intervention, Mae thought. “Bruce, what specific things do they do that are aggressive? Do they hit each other?”

“Sometimes, but it’s not so much that; it’s more that they’re constantly threatening violence and destruction.”

“That’s our boys, all right. That repertoire of threats is a big part of what got them classified as predelinquents in the first place. I have an idea about what we should do that may help those kids.”

Mae explained to Bruce that the group home for juvenile offenders, where the boys lived, used the Achievement Place approach, an approach developed by Drs. Montrose Wolf and Elery Phillips and their team at the University of Kansas. In the group home, the boys earned points for good behavior and for productive behavior. They lost points for bad behavior. The points were reinforcers because the boys could use them like money at the group home. They could buy things with them, like permission to use the bikes, watch TV, eat a snack, go downtown, stay up past bedtime, and come home late after school.

Phillips had published his master’s thesis on the use of this point system. In one of his studies, he had used a penalty procedure involving the loss of points to get rid of the threats the boys were always making.

Bruce agreed to try Phillips’ procedure in his shop.

Back in the shop:

“This school stinks. I’m going to blow up the whole damned thing!” Mark said.

“Mark, that threat cost you 50 points,” Bruce Black said, in as calm a voice as he could manage with his heart pounding as fast as it was.

“Fifty what?”

“We’re working with your group home. They’ve given us permission to dock any of you boys 50 points whenever you threaten violence or destruction.” I hope it works, Bruce thought.

“Fifty points! I’m gonna blow up the home too!”

“That’s another 50 points.” Gosh, I hope it works.

It did work. Mark went from over eight threats an hour down to

none after Bruce Black used the penalty procedure for a few classes. The others improved much the same way. Within a few classes, the penalty procedure had completely gotten rid of the threats of violence and destruction that had filled the air.

And the boys were one small step closer to acting in a way that would keep them out of trouble with the world and give them a chance to lead a normal, decent life, not the sad life of the petty crook.

QUESTION

1. Describe the use of a penalty procedure to reduce inappropriate social interactions. Describe
 - the person whose behavior was modified
 - the undesirable behavior
 - the reinforcer used
 - the contingency
 - the results

Concept
PENALTY CONTINGENCY

*D*Concept
Penalty contingency

- the immediate, response-contingent
- removal** of a reinforcer
- resulting in a **decreased** frequency of that response.

In Chapter 4, we talked about decreasing behavior with punishment by the presentation of an aversive condition. Now we need to look at punishment by the loss of reinforcers—the **penalty contingency**.

C:\~1~1~1.0~1.0~1\POB.Chapter 5- Penalty

Behind the penalty contingency is the **penalty principle**: *A response becomes less frequent if loss of a reinforcer or a decrease in a reinforcer has immediately followed it in the past.* Note that this is a form of punishment—punishment by the loss of reinforcers. The other form is punishment by the presentation of an aversive condition.

The last game of the state finals. Third quarter. Your senior year. The high point of your life. You steal the ball from that obnoxious guard who has been bugging you since the start. You make a break for the other end of the court, dribbling with the speed that makes Forrest Gump look like a turtle. The crowd roars like a jet plane. The bass drummer pounds his drum so hard, he busts the drum head. And the referee’s whistle says you fouled that obnoxious guard. That’s your fifth foul. You’re out. And the obnoxious guard comes to give you a condescending, sportsmanlike handshake. The loss of a reinforcer—the opportunity to play in the state finals. Penalty? Let’s see how often you foul obnoxious guards once you start playing college ball.

What would sports be without penalties? You lose the ball, you lose the puck, you lose the yardage. This loss of reinforcers may penalize your sloppy playing enough that you become a halfway decent player.

Though the light’s yellow, you can make it. But the cop sees you, and you lose \$40. Pushing the yellow may become a less frequent response in your repertoire, suggesting punishment by the loss of a reinforcer.

We thought this was a good example of a penalty contingency, until a student pointed out that the loss of the \$40 is delayed by more than 60 seconds. So the delay is too great for it to penalize pushing the yellow. Instead we’ve got an analog to a penalty contingency, as we will see in a later chapter. This would work only for people who knew the rule describing the penalty.

This next one’s a little better: Though the light’s yellow, you can make . . . almost. The eager beaver in the crossroad smashes your car’s tail end, and you lose the beauty of your car. Punishment of pushing? Could be.

All this is bad news. But it would be worse if punishment by the loss of reinforcers didn’t occur. It would be worse if you kept making the same clumsy, dumb, costly mistakes all your life. It would be worse if the loss of reinforcers didn’t suppress carelessness.

Yes, boys and girls, let’s all thank our friend Mr. Punishment for making our lives livable. “Thank you, Mr. Punishment.”

By the way, the reinforcer lost in a penalty contingency can not be the one that’s maintaining the penalized response. Look at this pair of contingencies that are working concurrently (at the same time).

1. Look at the reinforcer maintaining Mark's threats. Is it the one that's removed in the penalty contingency?
 - a. yes.
 - b. no.

The penalty contingency involves a different reinforcer from the one maintaining the penalized behavior. (In the next chapter, we will introduce the extinction procedure; with that procedure, we simply withhold the reinforcer that previously maintained the response; but that's not the same as a penalty contingency.)

QUESTIONS

1. The principle of punishment by the loss of reinforcers—state it and give a couple of everyday examples.
2. Must the reinforcer removed by the penalty be the same

as the one maintaining the penalized behavior?

Example *Developmental Disabilities* **USING PENALTY** **TO DECREASE SELF-INJURING²**

Jim was in trouble from the beginning of his life. His parents put

him in a hospital shortly after his birth. During the next 4 years, he got individual and group psychotherapy and dozens of drug treatments to reduce his hyperactivity, screaming, and self-injuring. Nothing worked.

His self-injuring started at age 4. By the time he was 9, he was a real threat. Besides slapping his face, he often banged his head against the floors and walls, punched his face and head with his fist, hit his shoulder with his chin, and kicked himself. Also, his self-injury had partially detached the retinas of both of his eyes.

Jim was all but blind when he was transferred to the Murdock Center in North Carolina where Dr. Tate and Dr. Baroff worked with him. Jim was 9 then; and aside from the scars on his face, he was a good-looking boy. He didn't speak, though he often uttered a few words—high-pitched, whining words, mostly gibberish.

But Jim did respond to people. He would always try to touch those who approached him, wrapping his arms about them, climbing into their laps, or clinging to them. Then he would be more tranquil. But when he was alone and free, he would cry, scream, hit

himself, and bang his head. There seemed no choice but to keep him tied in bed for the rest of his life. When they untied Jim, he hit himself several times per minute. He would destroy himself, if he were alone with his arms and legs untied.

Typically, Jim would lie, tied to his bed, except for his morning baths and daily walks. During these walks, two assistants walked beside him, each holding one of his hands. But even with this physical contact, Jim continued hitting his chin on his shoulder. During five daily 20-minute baseline sessions, when the assistants did not intervene, Jim banged his chin on his shoulder at the rate of 396 times per hour! After they had measured the size of the problem, the behavior analysts decided it was time to intervene. But how?

Remember that Jim quickly grabbed on to any nearby human being. This suggests that such contact was a strong reinforcer for Jim. Why? Perhaps because Jim was almost blind, and other people had to serve as his eyes. Also, contact with people looking out for his welfare produced food, candy, comforting words, and warmth.

Tate and Baroff reasoned that the contingent loss of this potential reinforcer might punish Jim's self-abuse. So during the daily walks, whenever Jim banged his chin on his shoulder, the two assistants immediately let go of his hands until he'd stopped banging for 3 seconds—a loss of the reinforcer of human contact.

The results? By the second walk, Jim's self-injury had dropped from a rate of 396 to 6 per hour—a fast and effective intervention! Jim still had many problems (which Tate and Baroff worked on with other techniques), but at least he could now go for walks with a minimum of self-injury. A major achievement in his barren life.

Comment: (See Fig. 5-3.)

By the way, during baseline, Jim whined, cried, walked hesitantly, and ignored his environment. But as soon as he stopped banging his chin, he also stopped whining and crying and started walking without hesitation, attending to his environment, and even smiling.

QUESTION

1. Describe the use of a penalty contingency to reduce self-injury. Include
 - the person whose behavior was modified
 - the undesirable behavior
 - the reinforcer used
 - the contingency
 - the results

Example *Behavioral Juvenile Corrections* **IT AIN'T GOOD TO SAY "AIN'T"³**

³Phillips, E. L. (1968). Achievement Place: Token reinforcement procedures in a home-style rehabilitation setting for "pre-delinquent" boys. *Journal of Applied Behavior Analysis, 1*, 213–223.

²Based on Tate, B. G., & Baroff, G. S. (1966). Aversive control of self-injurious behavior. *Behavior Research and Therapy, 4*, 281–287.

Bruce Black was back in Mae Robinson's office. "Dr. Robinson, remember the intervention we did to get rid of the verbal threats those two boys were always making in my shop?" Mae nodded. "We used a penalty procedure, and it worked real well," Bruce continued, "so I wonder if we couldn't use the same procedure to deal with another problem."

"What's the problem?" Mae asked.

"One of those boys, Mark, doesn't talk well," Bruce answered.

"Can you be more specific?"

"Well, his grammar's terrible."

"Can you be even more specific? Can you give me an example?"

"Well, he says *ain't* all the time," Bruce said. "Now I know a person's grammar isn't as important as what the person says. And

*D*Concept
Response-cost contingency

- the immediate,
- response-contingent
- removal of
- a **tangible** reinforcer
- resulting in a decreased frequency of that response.

I know this may just be my middle-class prejudice. It may be more my problem than his. But it bugs me."

"It may be your prejudice, but it's also the prejudice of many other people, especially people who are likely to be employers or who can otherwise help Mark. It's OK to use street talk on the street; but if he ever wants to escape from street life to get a job, for instance, it will be much easier if he can speak standard English," Mae said.

Bruce said he'd tried correcting Mark every time he said *ain't*—a reasonable intervention to try.

Traditional Intervention

Unfortunately, this was worse than doing nothing. Mark's frequency of saying *ain't* rose from 55 per day, when Bruce had ignored it (baseline), to 74 per day with the correction procedure.

This suggests that the corrections were actually reinforcing Mark's saying *ain't*.

Mae explained to Bruce that Elerly Phillips also had used the response-cost penalty contingency to reduce poor grammar at Achievement Place. So they decided to try to replicate Elerly's intervention.

Behavioral Intervention

C:\~1~1~1.0~1.0~1\POB.Chapter 5- Penalty

After 15 days, during which Bruce fined Mark 20 points each time he said *ain't*, the boy had completely stopped saying the word.

The Achievement Place house parents used the same penalty procedure and got Mark's rate of saying "ain't" down from 37 to 0 per day. A month after they had stopped the intervention, Mark was still free of the taint of "ain't."

QUESTION

1. Describe the use of a penalty contingency to reduce poor English. Include
 - the person whose behavior was modified
 - the undesirable behavior
 - the reinforcer used
 - the contingency
 - the results

Concept RESPONSE COST

Response cost is the name for the particular penalty procedure Mae and Bruce used when they reduced the verbal threats and "ain't." It's the price you must pay for bad behavior; but, it's like fly now and pay later: You pay the price after the bad behavior rather than before.

By tangible reinforcers we mean food, money, points, tokens, and the like.

Question:

To get praise from the coach, the athletes must do 100 push-ups. Is the requirement of 100 push-ups an example of *response cost*?

Our answer:

No, that's a *response requirement*, not *response cost*. That's effort of the response class, not removal of reinforcers. Doing 100 push-ups may be aversive, but it's not a penalty procedure like response cost. Effort isn't response cost, as behavior analysts use the concept.

Question:

The coach hears one of the players using foul language in the middle of the game and immediately sends her to the showers. She never swears again, at least not within earshot of the coach. Is that *response cost*?

Our answer:

No. The coach removed an **activity** reinforcer (playing the game), not a **tangible** reinforcer such as money. The swearing did become much less frequent, so it was a penalty procedure. But not the kind called *response cost*; we'll see shortly that it's called *time-out*.

We will look at another example of response cost in the next section.

QUESTION

1. *Response cost contingency*—define it and show how the intervention to reduce threats meets the three criteria needed for that procedure to be response cost. Also, diagram the contingency for that example.

Example **Behavioral Child and Family Counseling** **THE JOYS OF MOTHERHOOD⁴**

“Dr. Baker, I try to love Sam, like every mother should. I try, but I can’t. I hate my son. He makes our lives miserable. How can a 4-year-old boy destroy a family?”

Even if she didn’t have a PhD with a specialty in behavior analysis, Dawn Baker would have had no trouble answering Mrs. Spade. In

the first 15 minutes of their interview, Sam had answered the question himself. Not only was he making his parents’ lives miserable and destroying their family, he was also making this interview miserable and destroying Dawn’s newly decorated office. Though Sam’s mother often told him to quit his destructive disruptions, Sam had managed to smash one flowerpot, knock over a chair, rip the cover off the latest issue of the *Journal of Applied Behavior Analysis*, lick the window, spit at his mother, scream, and conspicuously wet his pants.

“Mrs. Spade, why don’t we all go into the play-therapy room, next door,” Dawn said. She locked the door of the childproof playroom as soon as the three of them entered. Dawn and Mrs. Spade sat at the plain table, doing their best to continue their interview, while Sam did his best to destroy the indestructible toys he quickly scattered about the floor.

“Mrs. Spade, I think we should try a time-out procedure with Sam. If it’s OK with you, I’d like to start it now.”

“Would you please!”

Dawn stood up, took a child’s chair and placed it in the corner, facing the wall. At that moment, Sam was standing in the middle of the room, screaming and stamping his foot on the floor. Dawn calmly said, “No, Sam. Go to the time-out chair.” Then she took the child by the hand and led him to the chair. She moved all the toys away and stood directly behind him. Every time he turned his head or started to get up, she guided him back onto the chair and turned his head back to the wall. After 2 minutes had elapsed, she said, “OK, Sam, you can go play quietly now.”

Sam played quietly for 15 seconds before he started bouncing a child’s basketball off his mother’s head. So he and Dawn recycled through the time-out again. And they went on in this way for the rest of the interview. Dawn explained to Mrs. Spade the time-out procedure for Sam’s disruptions, and she showed the use of time-out every time Sam disrupted.

In nontechnical terms, Dawn explained that *time-out* is a procedure for getting rid of bad behavior—a punishment procedure based on the loss of reinforcers. So *time-out* means time out from the reinforcers that are normally available, like the toys in the playroom.

The results: As soon as Sam had started tearing the heck out of Dawn’s office, she automatically started recording baseline. So she had something with which to compare her intervention. During the first 15-minute intervention session in Dawn’s playroom, time-out produced an amazing drop in disruption. With time-out contingent on disruption, Sam immediately went from disrupting 60% of the time to disrupting only 3% of the time!

Comment: (See Fig. 5-4.)

And he maintained that low level of disruption during the remaining sessions of Dawn’s intervention. Mrs. Spade was ready to nominate Dawn for president of the United States.

QUESTION

1. Describe the use of time-out to reduce disruptive and destructive behavior. Include
 - the person whose behavior was modified
 - the undesirable behavior
 - the reinforcer used
 - the contingency
 - the results

Concept **TIME-OUT**

Both at home and at school, many behavior analysts find time-out to be an excellent procedure for getting rid of bad behavior in young children. Generally, they combine time-out contingent on bad behavior with reinforcement contingent on good behavior. For example, Dr. Lynn Clark recommends time-out to get rid of biting, screaming, swearing, back talk, fighting for control over the TV, refusal to eat, hurting pets, playing in the street, throwing food, name-calling, and persistent pestering.⁵

Lynn suggests that time-out is effective, fast, easy to use properly, helps parents and teachers get rid of bad behavior without themselves becoming too angry and upset, improves the relations between the child and the adults, and clears the air for the child to acquire good behavior. He advocates it as a fast, clean way of

⁴Based on Mace, F. C., Page, T. J., Ivancic, M. T., & O’Brien, S. (1986). Effectiveness of brief time-out with and without contingent delay: A comparative analysis. *Journal of Applied Behavior Analysis, 19*, 79–86.

⁵Clark, L. (1985). *SOS! Help for parents*. Bowling Green, KY: Parents Press (P.O. Box 2180). This is an excellent book for parents and teachers, full of many useful suggestions and guidelines, especially on the effective and humane use of time-out.

getting rid of problems without many hassles between the child and the adult. Everyone feels better than in the more traditional nagging and bickering ways in which so many parents and chil-

*D*Concept**Time-out contingency**

- the immediate
- response-contingent
- removal of
- **access to a reinforcer**
- resulting in a decreased frequency of that response.

dren interact.⁶

Of course something like **time-out** is nothing new. For years, a variation on this theme has been used in sports. The best example is hockey: Violate a rule and it's time out of the match and into the penalty box. Without straining too much we can see other examples: Three strikes and you're out at bat. Five fouls and you're out of the basketball game. One swear word at the referee and you're out of any game.

But don't confuse the behavioral use of time-out with solitary confinement in prison or the usual penalties in sports. In behavior management, we don't put the kid in time-out and throw away the key. We don't even kick the kid out of the game. **Usually, a brief time-out of just a couple of minutes or so will do the trick;** as soon as we can, we let the kid get back into the normal, richer environment where he or she can have a chance to acquire a good, healthy repertoire.

Is this *time-out*? "Johnny, you're making too much noise here in the classroom. Go out to the playground, and stay there until I tell you to come back in." Time-out? Maybe not. It might be reinforcement. There's a good chance Johnny will find more reinforcing activities on the playground than in the classroom. So the

⁶How long should time-out be? It is often recommended that the length of the time-out should be determined by the child's age—optimally, 1 minute per year of age; but that doesn't impress me. When working with a 4-year-old autistic child, 15 seconds will often do the trick; and 4 minutes would unnecessarily take too much time away from the valuable discrete-trial training. And my guess is, a 15 second time nonexclusionary time-out would work pretty well with me too, if you pinched the straw on my fruit smoothie for 15 seconds, every time I made a rude slurping noise, for example.

Here's a reply from the experienced and wise Bobby Newman: I don't use any kind of formula for figuring out how long time-out should be. I generally use 30 seconds, two minutes, or five minutes, usually depending on how "out of control" the person is when they're coming to time out, and also how reinforcing the activity they left is. More important to me is the termination of time-out. If they don't "have it together" when the timer rings, I say "I'm sorry, you need to get it together. I'll set it for one more minute and then we'll see." I rarely have to reset more than once.

C:\~1~1~1.0~1.0~1\POB.Chapter 5- Penalty

teacher may be reinforcing disruptive behavior by making access to a more reinforcing environment contingent on that behavior. It may be naive and even egotistical for the teacher to assume the playground is less reinforcing than his or her classroom. Often a danger when you try time-out.

That teacher should never have forgotten Br'er Rabbit and the briar patch. As you may recall, Br'er Fox caught his mortal enemy, Br'er Rabbit. So Br'er Rabbit pleaded with Br'er Fox, "Do anything with me you like, but please don't throw me into the briar patch." Of course, Br'er Fox did; and, of course, Br'er Rabbit liked it. Moral: Be careful not to use the briar patch for time-out with Br'er Rabbit.

Here's a formal definition of time-out:

Behavior analysts sometimes distinguish between two types of time-out: *exclusionary* time-out and *nonexclusionary* time-out. *Exclusionary time-out* means the person is excluded from the immediate setting—for example, by having to go to a separate room for a couple of minutes. *Nonexclusionary time-out* means the person remains in the immediate setting during time-out, for example, by sitting in a chair away from the regular activities. Sam's case involved nonexclusionary time-out.

QUESTIONS

1. *Time-out contingency*—define it and diagram a couple of examples where parents might want to use it.
2. Show how the previously described intervention to reduce Sam's disruptive behavior meets the three criteria in our definition of time-out.
3. How does time-out differ from solitary confinement and penalties in sports?
4. Describe the Br'er Rabbit problem in trying to use time-out.
5. Compare and contrast exclusionary and nonexclusionary time-out.

Example from
Behavioral Special Education
THE TIME-OUT RIBBON⁷

Mike was 8 years old and he had an IQ of 27; he lived in a state institution structured around cottage living. He and four other low-functioning boys attended a special ed. classroom in a room of their cottage. They met an hour and a half each day—an hour and a half of bedlam. Mike was so hyperactive (i.e., overly active) he was completely off the wall, running around the classroom yelling and throwing everything he could grab. For the 7 months of the class, the teacher, with all her reprimands, could do nothing.

⁷Based on Foxx, R. M., & Shapiro, S. T. (1978). The time-out ribbon: A nonexclusionary time-out procedure. *Journal of Applied Behavior Analysis, 11*, 125—136.

Foxx and Shapiro, who were at the University of Maryland, Baltimore County, during this time, came to the teacher's aid. Punishment seemed a reasonable intervention, but neither shock nor traditional time-out was too popular in the institution. Traditional time-out, also called *seclusionary* or *exclusionary* time-out, involves putting someone in an isolated room. Many people, including some behavior analysts, find shock too aversive even to think about, let alone to use. And, for some people, isolating a helpless client in a time-out room hints of medieval brutality and neglect, though behavior analysts use time-out rooms in a careful

way, keeping the duration of the time-out as short as possible (and, for safety reasons, keeping the door to the room unlocked). What Foxx and Shapiro needed was a punishment procedure that didn't turn people off. Maybe *nonexclusionary time-out* (time-out without being excluded) would be more socially acceptable.⁸ In nonexclusionary time-out, the student is no longer able to participate in the activity and is removed to a location where he or she can still see and hear the activity.

So they collected baseline data for 7 days. Then they started a reinforcement phase for 10 days. During this phase they asked the teacher to give each child a smile, praise, a touch, or a small snack about every 2 1/2 minutes. They were going to use time-out in the next phase, so they had to make sure they had a reinforcing environment to time the boys out of. The frequency of reinforcement had to be high enough so that it was aversive not to be allowed to participate in it. The reinforcement-plus-time-out phase lasted 12 days.

During both reinforcement phases, each boy, including Mike, wore a colored ribbon around his neck, in the style of a bolo tie. But when a boy started acting up, the teacher would take the ribbon

away from that boy for 3 minutes. During that time, the boy got no reinforcers.

This was nonexclusionary time-out because the boy stayed in the classroom; he wasn't excluded from it. If, instead, the teacher had put the boy in the hallway for 3 minutes, that would have been exclusionary.

⁸Incidentally, some people call nonexclusionary time-out *contingent observation*. We prefer *nonexclusionary time-out* because *contingent observation* implies that the procedure is contingently adding something rather than contingently removing. In other words it implies that the opportunity to observe the activity is contingent on misbehaving. This is not true because the student could also observe the activity he was participating in, before his inappropriate behavior.

But terminology anarchy doesn't end there. Some use *seclusionary time-out* rather than our *exclusionary time-out* and, even more confusing, *exclusionary time-out* for our *nonexclusionary time out*! I guess the bottom line is, that you will need to be careful to make sure you and who ever you're talking to or reading understand each other.

How'd it work? Like a charm. The boys were noisy and unruly when they first entered the classroom each day. They quieted down as soon as they put on their ribbon ties. A behavioral charm. (Incidentally, you should probably not take seriously the slight increase from the baseline to the reinforcement condition, because that increase is probably just random fluctuation in the data and not a reliable, significant change in frequency.)

Keep in mind that for any time-out procedure to be effective, the activity or environment the student is removed from must be reinforcing.

QUESTION

1. Describe a behavioral intervention using nonexclusionary time-out to reduce hyperactivity. Specify
 - the response classes
 - the punishment contingency
 - the presumed reinforcers
 - the contingency diagram
 - the results
 - any other interesting features of the intervention

**Compare and Contrast
PENALTY VS.
THE THREE OTHER
BASIC BEHAVIORAL CONTINGENCIES**

This contingency table summarizes the relations among the four basic contingencies. For example, select "remove" from the white row, "reinforcer" from the white column, and "penalty (frequency decreases)" from the corresponding cell in the gray area. This means: *The contingent removal of a reinforcer is a penalty contingency and it causes a frequency decrease.*

Contingency Table (final)		
Stimulus, Event, or Condition	Present	Remove
Reinforcer	Reinforcement ↑	Penalty ↓
Aversive Condition	Punishment ↓	Escape ↑

What do ↑ and ↓ mean?

Here's the other form of essentially this same table. If you remove 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 penalty contingency (corresponding inside gray cell), which you can call *punishment by stimulus* subtraction or, more commonly, negative punishment (S^P).

Contingency Table (final)	
Present - Stimulus; Event or Condition	Remove - Stimulus; Event or Condition

Comment: (See Fig. 5-5.)

Response Frequency Increases ↑	Reinforcement contingency Reinforcement by stimulus addition Positive reinforcement (S ^{+R})	Escape contingency Reinforcement by stimulus subtraction Negative reinforcement (S ^{-R})
Response Frequency Decreases ↓	Punishment contingency Punishment by stimulus addition Punishment (S ^{+P})	Penalty contingency Punishment by stimulus subtraction Punishment (S ^{-P})

We have two punishment contingencies: One, involving the presentation of an aversive condition, we call *punishment*; the other, involving the removal or loss of a reinforcer, we call a *penalty contingency* (we do this to reduce confusion, though we also can call the penalty contingency *punishment*). We can decrease behavior either by presenting aversive conditions or by removing reinforcers contingent on that behavior.⁹

We also have two reinforcement contingencies: One, involving the presentation of a reinforcer, we call *reinforcement*; the other, involving the removal of an aversive condition, we call an *escape contingency* (we also can call the escape contingency *reinforcement*.) We can increase behavior either by presenting a reinforcer or removing an aversive condition contingent on that behavior.

So we can use a reinforcer either to increase or decrease behavior, depending on whether we present or remove the reinforcer. And we can use an aversive condition either to increase or decrease behavior, depending on whether we remove or present the aversive condition.

We also have two contingencies involving the removal of something: One, involving the removal of an aversive condition, we call *escape*; the other, involving the removal of a reinforcer, we still call a *penalty contingency*. (No big surprise here.) We can use removal contingencies either to increase or decrease behavior, depending on whether we remove an aversive condition or a reinforcer.

Tree Diagram of the Four Basic Behavioral Contingencies

⁹Although suggesting a different solution, Stephen Ledoux concurs with our analysis of the confusion traditional terminology causes: "In everyday usage *positive* connotes good or pleasant while *negative* connotes bad or unpleasant. As a result people have some difficulty with the concept of a *negative* reinforcer strengthening behavior. They have even greater difficulty with the concept of *positive* punishment; they have trouble imagining much that is positive about punishment." From S. F. Ledoux (in press). Increasing tact control and student comprehension through such new postcedent terms as added and subtracted selectors and consequences. *The International Behaviorologist*.

QUESTIONS

1. Draw or fill in the complete contingency table of the four basic contingencies, all properly labeled. You must understand it; memorizing won't get it.
2. Compare and contrast the penalty contingency with the other three.
3. In the same way, compare and contrast the punishment contingency with the two reinforcement contingencies.
4. Be able to draw, fill in, and explain the tree diagram of the four basic behavioral contingencies.

Example of Time-out Behavioral Medicine HELPING A BABY WITH COLICKY BEHAVIOR¹⁰

Jenny: Since she was 2 weeks old, April's been crying day and night. Her constant crying, her piercing shrieks, are driving me crazy. I get so angry, I want to beat her. I feel like abusing her.

Dawn: I know how you feel. Constant crying often causes child abuse.

Jenny: My husband, Jim, and I haven't been able to get any sleep. Jim goes to work so sleepy he almost fell off the scaffolding at his construction site. And now he's started sleeping over at his mother's so he can get a decent night's rest. And I'm about ready to divorce him. When he comes for supper all we do is listen to April cry and fight with each other. He says April's crying is my fault—I'm too nervous and uptight.

Dawn: Well, that's one popular theory—it's Mom's fault. But the scientific research doesn't support that theory.

Jenny: I don't know. I feel so guilty, like a bad mother. I told my pediatrician she had to give April something or give me something. So we tried all sorts of drugs with April, like Mylanta, belladonna, and paregoric. Nothing helped, at least not much. Now April's 5 weeks old and she just keeps shrieking. It's horrible. It breaks my heart.

Dawn: Yes, I know, you're all having a rough time. That's not an easy thing, what you're going through. This may be the hardest time in your life.

¹⁰Based on Larson, K., & Ayllon, T. (1990). The effects of contingent music and differential reinforcement on infantile colic. *Behavior Research and Therapy*, 28, 119-125.

¹ The graphed data are from Ayllon, T. & Freed, M. (1989) *Stopping Baby's Colic*. New York: Perigee. This outstanding book is a must for all parents whose babies have crying, eating, or sleeping problems.

Jenny: I don't know what to do; my pediatrician says no medical condition is involved, no severe constipation, no gastroesophageal reflux, no intussusception, I think she called it—nothing to cause April to scrunch up and act like she's got severe abdominal pain. My pediatrician says it's colic. Do you think my baby has colic, Dr. Baker?

Dawn: Well, as the pediatrician Dr. William Sears put it, *Colic is something a baby does, not something it has*. He's got a point. We should talk about the colicky behavior, not the colicky baby. It's a behavior problem; not a medical problem. A baby who is said to *have colic* is just one who cries and is irritable much of the time.

Jenny: I guess that's why my pediatrician referred me to you. She said you were a behavior analyst.

Dawn: There is no known physiological, anatomical, or medical cause of colicky crying. In fact it seems so unlikely that one will be found that medical researchers have pretty much stopped looking.

Jenny: Everyone's told me it's because poor little April has too much gas in her stomach, and that was hurting her and making her cry. I will say Jim did his best too. He put warm towels on her stomach, held her under warm showers, even took her for midnight car rides. Nothing helped much. I did things like put her on top of a running clothes dryer, swing with her, and just hold her and try to love her with all my heart. Still nothing helped.

Dawn: An English researcher, Dr. Ilingsworth, has shown that babies who act colicky have no more gas than those who don't. Again, it looks like colic is neither a disease nor an illness. It's just a way of behaving; it's just excessive crying.

Jenny: Doctor, we'll do anything you say. Just help us, please.

Dawn: Well, here's what I'd like you to try:

- Get a cassette tape player and a tape of your favorite singer. Then, keep the music on as long as April is awake and quiet for at least 30 seconds. You should also interact with her at those times—look at her, talk softly to her, rock her, play with her, be loving and affectionate.
- But as soon as she starts to cry, turn off the tape player and take care of any needs she might have, like feeding her or changing her diaper.
- If she keeps crying, put her in your portable infant carrier. She should stay there for 3 to 5 minutes—longer if she keeps crying. We call this *time-out*. Withdraw both music

and attention during time-out.

And it worked the very first day Jenny began the time-out procedure (sometimes it takes a few days, but rarely as long as a week).

C:\~1~1~1.0~1.0~1\POB.Chapter 5- Penalty

Even 2 months later, when Dawn did a follow-up to evaluate the maintenance of the behavior change, April was fine, crying no more than is typical for a baby her age.

Jenny: I sure do thank you, Dr. Baker. Now, April, Jim and I are happy being together. Now I love my baby and feel like a normal mother. I feel as if we have a normal family again.

Here's an interesting point: **No one in the history of medicine or in the history of psychology had been able to solve the problem of colic—not until Larson and Ayllon applied behavior analysis to its solution.** Imagine that. Impressive. Just a simple, little time-out intervention—though a very creative time-out intervention. Most of us may not be as clever and creative as Larson and Ayllon, but looking at the world from a behavior-analysis perspective can help us understand and solve many problems that traditional approaches have failed to solve.

QUESTIONS

1. Be able to diagram the contingency Dawn used to help April stop her crying (Larson and Ayllon).
2. What kind of contingency is it?
 - a. reinforcement
 - a. escape
 - b. punishment
 - a. penalty
 (Yes, you're on your own in terms of answering this one. We've taken off the training wheels. No hints.)

Example of Time-out Behavioral Medicine

HELPING A FAILURE-TO-THRIVE BABY¹¹

About one out of seven failure-to-thrive infants die. This is serious business. They don't eat properly; and as a result, they lose weight, they don't grow, they become dehydrated, their electrolytes become imbalanced, and they die. For one third of the fail-

ure-to-thrive infants, there is no known physiological, anatomical, or medical cause. These cases are called *nonorganic*. And **behavior analysis seems to hold the only solution for nonorganic failure-to-thrive babies**; nothing else works.

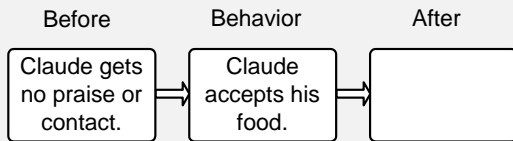
Consider Claude's case: He was 21 months old "with nephrogenic diabetes insipidus, a congenital hereditary disorder in which the kidneys do not respond" properly.

Claude was in the hospital for the fourth time because of his failure to thrive. He wouldn't eat much, and he would vomit or spit out most solid food he did eat. For the last 16 months he had been put

on nasogastric (nose to stomach) tube feeding, to keep him alive. In the hospital, they tube fed him 15 hours a day and kept him on four different drugs. In spite of Claude's kidney problem, his failure to thrive seemed to be nonorganic. He needed to eat normally, in order to gain the weight he had to have to survive the

surgery for his kidney problem.

1. Suppose you are now a professional behavior analyst and you're called in to help Claude. First, you would ask if Claude



needs to increase appropriate behavior, or decrease inappropriate behavior. Claude needs to do both. He needs to increase his acceptance and eating of food that is given to him. So please fill in the following reinforcement diagram.

Reinforcement Contingency for Eating

¹¹This case is based on Larson, L. L., Ayllon, T. & Barrett, D. H. (1987). A behavioral feeding program for failure-to-thrive infants. *Behavior Research and Therapy*, 25, 39-47. This article was part of Karen Larson's MA thesis; now that's one heck of an MA thesis!

C:\~1~1~1.0~1.0~1\POB.Chapter 5- Penalty

Every time Claude accepted and ate a bite of food, his mother would praise him and run her fingers up and down his arm, tickle his stomach, or rub his knees. Of course, he would get none of that if he didn't accept his food.

2. But you might also use a time-out contingency to decrease Claude's refusal of his food. You might dig out your old copy of *PB (Principles of Behavior)* and review the contingency Dawn used with April; so diagram the following performance-management contingency, using exactly the same contingency as April's (except make allowance for Claude's mother's preference for Elvis Presley).

Time-Out Contingency for Refusing to Eat

Not only did Claude's mother turn off the music immediately, she also said "No" firmly, removed Claude from his chair, put him in his crib, turned her chair away, and refused to look at him. After 3 minutes without crying, she would put him back in his chair and continue with his meal.

3. And she used the same contingency every time Claude vomited. Please diagram it:

Time-Out Contingency for Vomiting

How long do you think it took for these three simple contingencies to get Claude eating more or less normally? About 3 days for him to accept 89% of the bites his mother offered him. Ten days out of the hospital and Claude was eating everything he got.

And what about Claude's vomiting? Another success story; within 4 days he'd decreased from a baseline of six vomits a day to less than one a day.

During baseline (the traditional intervention), Claude "emitted deep, loud, coughing and gagging noises, and demonstrated repeated voluntary contractions of his stomach muscles that would induce vomiting. However, after 5 behavioral feeding sessions, he no longer emitted vomit-inducing behavior. Additionally, he appeared happier and more pleasant at mealtime and no longer kicked and screamed during feeding sessions. . . . Thirteen months after Claude's hospitalization, he had shown significant and constant improvement and had undergone a successful kidney transplant."

Imagine how powerful a little reinforcement contingency and a couple of time-out contingencies can be. They can solve a problem that has baffled the medical profession from the beginning.

How would you feel if you were able to make such a significant positive impact on the life of another human being and his family, perhaps even saving that life? Well, here's the deal: The world is full of little Claudes and darn few behavior analysts. What are your plans for the next few years?

QUESTIONS/OBJECTIVES

1. Be able to diagram the three contingencies Larson, Aylon, and Barrett used to help Claude become a thriving baby.
2. Be able to label each contingency.

Principle
THE LAW OF EFFECT

Edward Thorndike (1874-1949) did the classic experiment that involved his puzzle boxes. A puzzle box is a cage containing dangling ropes, levers, and latches that a cat (or other organism) can manipulate. If the cat makes the proper responses with those manipulanda, the cage door could unlock and the cat could exit. Thorndike locked the cat in the puzzle box and placed food outside the box, just out of the cat's reach. At first, the cat would spend a lot of time approaching the food but, of course, could not get it. However, soon the cat would happen to bump into the lever that unlocked the door; then the cat would get the food. After about three minutes of trials, it would quickly press the lever, exit the cage, and get the food reinforcer. So the cat decreased its unreinforced behavior and increased its speed of pressing the lever, exiting the cage, and getting the food reinforcer. Thorndike called this *trial-and-error behavior*. He concluded that cats do not learn by developing insight into a problem, instead they learn through trial and error. In contemporary terms, if they happen to make a response that happens to produce a reinforcer, they will make that response more quickly the next time. He also believed this is how human beings learn.

Thorndike's *law of effect* simply states that *responses made just prior to "pleasant" events are more likely to be repeated, while responses made just prior to "unpleasant" events are more likely to diminish*. He called these "pleasant" events *satisfiers* and the "unpleasant" events *annoyers*.

We think the law of effect is the most important law in psychology. And, in our view, the law of effect forms the basis of behavior analysis, and behavior analysis forms the basis of most worthwhile psychology. The law of effect is the most powerful tool available for understanding human behavior. However, psychologists criticized the original law of effect for being either circular or involving subjective terms (*pleasant* and *unpleasant*). So here's a modern version that eliminates both circularity and subjectivity:

Here *effect* means *results* or *outcomes*. So we could say *the law of results says the results of our actions determine whether we will repeat them*. (For a discussion of the circularity of the law of effect, see <http://unic.cc.wmich.edu/~malott/EPB.html>.)

It's so simple! Right? It's just a summary of our four basic contingencies of reinforcement and punishment. If our actions produce reinforcers or reduce aversive conditions, we tend to repeat those actions. And if our actions produce aversive conditions or remove reinforcers, we tend to stop repeating those actions. So simple—and yet so powerful. It summarizes everything you've read so far, and everything you will read in the rest of this book. It summarizes life! That means that if you understand how the law of effect works, you understand the prime mover of our lives. And you'll have a fighting chance to do something about it.

Question:

DPrinciple
The law of effect

- The effects of our actions
- determine whether we will repeat them.

She winks at him as he enters the classroom. He smiles. The next time he enters the classroom, he smiles, before she has a chance to wink. Is this an example of the *law of effect*?

Our Answer:

The action we're analyzing is his smiling. The effect or result of his action is not her wink, because the wink occurs before the smile. So even if he does repeat the smile, it's not because of the effect of that action. The example says nothing about its effect or results, so the law of effect doesn't apply.

Question:

He normally ignores her, but this time she winks at him as he enters the classroom. He sits down next to her and begins to chat. Now she will more frequently wink at him when he enters, and he usually sits next to her on those occasions. *Law of effect*?

Our Answer:

Without a doubt. The effect, or result, of her wink was the reinforcer of attention. So her winking eye is becoming muscle-bound because of its frequent use.

QUESTION

1. State the *law of effect* and comment on its value.

Sid's Seminar

ROLLING OVER THE DEADMAN

Sid: Who's got a good example of reinforcement in everyday life?

Tom: My girlfriend kisses me as long as I'm not chewing tobacco.

Sid: What behavior are you analyzing?

Tom: My not chewing tobacco.

Joe: No, that fails the Deadman Test; dead men don't chew tobacco either. And if a deadman can do it, it ain't behavior.

Tom: So, how do I fix it?

Sid: You roll over the deadman. First, you roll over the behavior. You make the behavior the opposite of what you have. What's the opposite of not chewing tobacco?

Tom: Chewing tobacco. But that doesn't work: I chew tobacco and my girlfriend kisses me?

Sid: Right, you've got behavior because deadmen don't chew tobacco. And you're right, that contingency's not what you want. So now you roll over the contingency; what's the opposite of "my girlfriend kisses me"?

Eve: My girlfriend stops kissing me.

Sid: Right, and that's what goes in the after condition. Of course the opposite goes in the before condition—my girlfriend is kissing me. So let's diagram the whole contingency.

Joe: So when we roll over the deadman, we find he's lying on a penalty contingency—punishment by the loss of kisses.

Tom: Women are so unreasonable.

Sid: We roll over the deadman by first rolling over the nonbehavior (making it the opposite of what we thought we had and, thus, making it real behavior). And then we roll over the after condition (making it the opposite of what we thought we had). And we find that our correct contingency is also the opposite of what we thought we had; for example, the opposite of reinforcement is penalty. Let's try one more.

Tom: OK, how about this one: After I eat dinner at my girlfriend's, I'm lying on the couch, and I don't move; so she doesn't ask me to do the dishes. That's like, ahh, avoiding doing the dishes.

Sid: What's the behavior you're analyzing?

Tom: Not moving; it allows me to avoid the aversiveness of doing the dishes.

Joe: That one fails the deadman test too; deadmen are experts at not moving, at least not without a little help from their friends.

Tom: So, how do I fix this one?

Max: Let me say it, this time: You roll over the deadman. And you roll over the deadman by first rolling over the nonbehavior (making it the opposite of what you thought you had, thus, making it real behavior). Then you roll over the after condition (making it the opposite of what you thought you had).

Sid: Our readers have been sitting there patiently; why don't we give them a turn?

1. Dear reader, would you mind filling in this diagram for the pseudo sleeping beauty?

2. And we find that our correct contingency is also the opposite of what we thought we had; for example, the opposite of escape by the removal of an aversive condition is

- a. reinforcement by the presentation of a reinforcer
- b. punishment by the presentation of an aversive condition
- c. penalization by the removal of a reinforcer

Sid: **And what do we do when we find the deadman, boys and girls?**

Boys and Girls: **We roll him over,** Mr. Fields.

Sid: And how do we roll him over?

Eve: We roll over the behavior, and we also roll over the before and after conditions by reversing them.

BASIC ENRICHMENT

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

Remember, we made a parallel point in the punishment chapter:

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

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 look at only the case studies we presented in the Fundamentals section. In most of those cases, we knew the strange behaviors occurred at high rates. We didn't ask why they occurred. But if they occurred, you can be fairly sure they were producing reinforcers. In these cases we don't know what the reinforcers were. But we assume there must have been reinforcers. Here is a guess at one, just to give you another example of what the contingency diagram looks like:

In any case, whenever you use a penalty contingency, you should keep your eye on the reinforcement contingency as well. Nowadays, behavior analysts often do a functional analysis to find the undesirable reinforcement contingency. Then they can counteract that undesirable reinforcement contingency one way or another; for example, they might terminate the reinforcement contingency and thus extinguish the inappropriate behavior; and at the same time, they might use differential reinforcement of alternative behavior.

Ethics

THE BENEFITS OF BASIC RESEARCH

Let's take a moment to discuss the concepts of *basic research* and *applied research*. Scientists do basic research when they want to find out how the world works. They do applied research when they want to find out how they can make the world work better. Practitioners are not necessarily doing research, but hopefully they are applying well-researched practices in their efforts to make the world work better.

Most scientists doing basic research like to see the results of their work used to **help humanity**; and such uses sure help scientists

justify their work to their friends and neighbors. But many scientists don't need these applications to justify their work to themselves. They consider basic research of value just because it **adds to human knowledge**, regardless of its use in human affairs.

For years, behavior analysts doing basic research insisted on working with rats and pigeons in the lab, with little concern for human applications. Before these basic researchers realized they could contribute to the immediate well-being of humanity, they spoke out on the virtues of pure science and sometimes scorned those concerned with the everyday world. Still, in spite of their lack of concern, their work laid the foundations for the development of a psychology of effective application to human affairs. You've seen that, in this book.

On the other hand, traditional psychologists who concerned themselves exclusively with the problems of humanity had little success. So the scientists who seemed to care the least about the welfare of humanity have contributed the most to it.

Now that experimental behavior analysts see they have something to contribute to the outside world, they are as eager to make such contributions as anyone else would be. At this point, our greatest danger may be that these basic researchers have trouble resisting the social reinforcement involved in applied behavior analysis. And if too many leave their "ivory towers," we may soon run out of new scientific developments to apply to human affairs.

Incidentally, if you ever have the chance to work on a basic research project, grab it! You'll soon see that these scientific problems are every bit as reinforcing to study and solve as are the problems outside the lab.

QUESTION

1. What are the two main values of basic scientific research?

INTERMEDIATE ENRICHMENT

Compare and Contrast

PENALTY, RESPONSE COST, AND TIME-OUT

We're using *penalty* as a briefer and slightly more informal way of saying the same thing as *punishment by the loss of reinforcers*. The *penalty* contingency is the general or generic term, and response cost and time-out are the two subcategories.

We've seen the two types of penalty contingencies—response cost and time-out. The difference in the definitions of *response cost* and *time-out* is darn slight—only two words. Let's look again at the general form of the two definitions.¹²

*D*Concept

- response-costing
- removal of
- _____ reinforcer
- resulting in a decreased frequency of that response.

If you fill the first blank with *response cost*, then you should leave the second blank empty or write in a *tangible*. This means response cost involves the removal of reinforcers. But if you fill the first blank with *time-out*, then you should fill the second blank with *access to*. This means that time-out involves the removal of **access** to reinforcers. Mark lost the points he already had every time he threatened someone, so that's *response cost*. Sam lost access to all the toys on the floor for 2 minutes every time he became a royal pain, so that's time-out. Of course Dawn also had to remove any toys Sam had in his hands at the time, so the distinction gets fuzzy around the edges.

Here's another way to put it: Time-out is usually the removal of the opportunity to make reinforced responses. When hockey players go to the penalty box, they lose the opportunity to make reinforced responses for a period of time; that's time-out. They don't lose points they've already earned; that would be response cost.

I visited a junior high school classroom for emotionally disturbed children where Dr. Robert Hawkins had set up a behavioral incentive system called a *token economy*. The students earned tokens

for constructive work and academic behavior. They lost points for inappropriate behavior. The teacher and one of the boys were playing chess. The boy made a dumb move and the teacher captured his pawn. The boy swore. The teacher held out her hand and said, "That'll be one token." The so-called emotionally disturbed boy pulled a token out of his pocket and handed it to the teacher, without saying a word and without taking his eyes off the chess board. That was a loss of a reinforcer; so it was a response-cost contingency. If she had said they would have to stop playing for 2 minutes because he'd sworn, it would have been a time-out contingency.

By the way, in the face of the loss of a token reinforcer, why was the so-called emotionally disturbed boy able to control himself with such cool maturity? Because if he'd argued, or thrown a tantrum, or sworn at the teacher, the behavior would not have been reinforced; it would have cost him even more tokens! Professionals pin the label of *emotionally disturbed* on these kids, but instead, maybe they should pin the label of *emotionally disturbing* on the environments that reinforce such behavior.

Sometimes there also may be another difference: With response cost, you normally lose the reinforcers forever. For example, when the boys in Achievement Place lost points, they could never get those **specific** points back, though they could earn future points. But in some time-out procedures, the loss of a reinforcer need not be permanent. Consider this example of time-out: The parents send their daughter away from the dinner table for a couple of minutes when she pesters her little brother. But after those couple of minutes, she can return to finish the meal with no permanent loss of reinforcers. Contrast that use of time-out with the following response-cost contingency: For the same offense, the parents might send the daughter to bed with no supper. She's lost it forever.

On the other hand, at least one of the two actual case studies we looked at involved permanent loss of reinforcers. Every 2 minutes of Sam's time-out from play represented an opportunity lost and gone forever, because Dawn had limited the length of each session to 15 minutes. So sometimes even time-out produces a permanent loss. But response cost is almost always a permanent loss. For example, when you get a traffic ticket and must pay a fine, the violations bureau doesn't just keep your \$50 for a few days and then return it to you. That response-cost-like procedure is a permanent loss of that \$50, even though you may earn other \$50 bills in the future.

Here's another cue: Response cost **often** involves **tangible** reinforcers, like tokens or money (we say *often*, because response cost might involve the loss of nontangible reinforcers such as approval or it might involve an increase in effort). Time-out **usually** in-

¹²Not only is the difference between the two concepts subtle in the structure of their definitions, it's also subtle in application. Many penalty contingencies fall in a gray area, where they may, more or less, be both response cost and time-out. Nonetheless, the two concepts are in common use by behavior analysts; so we should use them as consistently as we can.

volves activity reinforcers, like playing hockey. But, again, there are exceptions.

Response Cost vs. Time-out	
Response cost	Time-out
Removal of the reinforcers themselves	Removal of access to reinforcers
Loss of earned reinforcers	Loss of opportunity to earn reinforcer
Lost forever	Lost temporarily
Tangibles	Activities

Keep in mind that these criteria are just guidelines. Sometimes a penalty contingency will have some of the features of response cost combined with some of the features of time-out. That's life. That's the twilight zone; and when a contingency falls in the twilight zone, we don't waste too much time trying to decide if it's response cost or time-out; we just call it by its more generic and useful name—*penalty*.

Most of these distinctions are not hard and fast—and we don't mean to make a big deal of the overall distinction between response cost and time-out. **The big deal is that both response cost and time-out are types of penalty contingencies.**

So what is it?

- Time-out?
- Response cost?
- Neither—it falls in the twilight zone?

It meets all the criteria in the preceding table for response cost. So that's easy.

Now, remember this one?

- Time-out?
- Response cost?
- Neither—it falls in the twilight zone?

QUESTION

- Compare and contrast punishment by the loss of reinforcers, penalty, response cost, and time-out.
 - Construct a table comparing and contrasting time-out and response cost. Remember that it's hard to get a good grade on the quizzes if you don't understand the tables and can't reproduce them.
 - Recognize examples of each.

Research Methods

REVERSAL DESIGNS (EXAMPLE 1)

Comment: might insert graph of reversal design.

The scientist needs to know if the changes in the independent variable are responsible for the changes in the dependent variable. And the performance manager needs to know if the intervention is responsible for the changes in the client's behavior. But to know this, the scientist must look at the dependent variable when the independent variable hasn't been changed and when it has and then compare the two values of the dependent variable. And the performance manager must look at the client's behavior when the intervention is in effect and when it isn't and then compare the two performances.

That's why the baseline is so important. Remember the use of time-out from physical contact to reduce Jim's self-injury. We showed the data for the baseline followed by the intervention and compared the two. The data looked good; Jim's frequency of self-injury dropped, from the baseline days to the intervention days.

But maybe it was just a coincidence. Maybe something else important just happened in Jim's life at the same time. And maybe that something else was the real cause of the decrease in his self-injury. For instance, maybe the weather became more comfortable, and that caused him to decrease his self-injury. Or maybe his parents had visited him. Or maybe the dietitian had changed his diet. Or maybe any one of a thousand coincidences.

In their original research, Tate and Baroff were aware of those possible coincidences. So to rule them out, these behavior analysts used a **reversal design**. That is, they reversed their procedure: They withdrew their time-out contingency and returned to baseline conditions. Then they waited to see if Jim would start his self-injury again. He did. So now they were more confident that their time-out contingency was responsible for the decrease in his self-injury. But, of course, they didn't want to leave Jim in this unhealthy condition, so they intervened again with their time-out contingency. And again Jim's self-injury reduced to a low level. This second reversal had two benefits: It improved the quality of Jim's life, and it made Tate and Baroff even more confident that they were not dealing with a coincidence, that the time-out contingency was responsible for Jim's improvement.

How did the second reversal make them more confident? Maybe the changes in Jim's behavior resulted from two coincidences. For instance, maybe the original decrease in Jim's self-injury resulted from an improvement in the weather. And maybe the increase in his self-injury resulted from a worsening in the weather. And their first intervention and reversal just happened to occur at those times. It's possible. Not likely, but possible. So the second reversal, where they started the time-out contingency again, increased their confidence in the importance of the time-out. The odds of three coincidences in a row seemed too low to worry about.

Now Tate and Baroff could continue their use of time-out with confidence. They also could recommend that the staff at Murdock Center consider it for similar problems. And they could publish the results of their intervention with considerable confidence, so that

other behavior analysts also could consider using it to help other unfortunate people like Jim.

*D*Concept
Reversal design

- An experimental design
- in which we reverse
- between intervention and baseline conditions
- to assess the effects of those conditions.

By the way, *research design* means the way you arrange the various conditions of your experiment or intervention; and the *reversal design* is one type of research design. We sometimes call the *reversal design* an *ABA design*, where the first *A* refers to the first baseline condition, *B* to the experimental intervention, and the final *A* to the reversal back to the baseline condition. The *simple baseline design* with no reversals is another type of research design. Intervention, without measuring performance during baseline, might be an example of a *case study*—a weak research design.

Question:

I check my addition twice. First I add from the top of the column of numbers down to the bottom. Then I reverse the direction and add from the bottom up. I get the same results both times. So now I'm more confident of my answer. Is this a *reversal design*?

Our answer:

No way. A *reversal design* is an *experimental design* where you compare an experimental *intervention* with a *baseline*. Adding numbers has none of those features.

QUESTION

1. *Reversal design*—define it and show how Tate and Baroff's original research on the use of time-out to reduce self-injury meets the three components of the definition.

Research Methods
REVERSAL DESIGN

Here are more details on the actual experimental evaluation Larson and Ayllon used.

The experimental evaluation of the time-out intervention actually involved six different phases, with each phase usually lasting a few days.

1. For the moment, look at baseline 1, time-out 1, baseline 2, and time-out 2. Do those four phases represent a reversal design?
 - a. yes
 - b. no
2. Please explain your answer.
3. Does that reversal design you discovered in answering question 1 increase your confidence that the time-out intervention is what actually reduced the colicky crying?
 - a. yes

C:\~1~1~1.0~1.0~1\POB.Chapter 5- Penalty

b.no

4. Please explain your answer.

To make their experimental design even better, their second phase involved the noncontingent presentation of the music. The mother turned on the music sometimes, regardless of whether or not the baby was crying.

5. Does the noncontingent presentation of the music reduce the crying?
 - a. yes
 - b. no
6. Please explain your answer.
7. In the noncontingent music phase, they presented and removed the music independently of whether the child was crying. Does this phase increase your confidence that the time-out intervention reduced the colicky crying? In other words, what reduced the crying?
 - a. the soothing effects of the noncontingent music
 - b. the music actually being **contingent** on crying
8. Please explain your answer.
9. The last phase is the follow-up phase. It occurred 2 months later. Here, all they did was measure the amount of crying. Does the follow-up phase increase your confidence that the time-out intervention was worth doing?
 - a. yes
 - b. no
10. Please explain your answer.

QUESTION / OBJECTIVE

1. Be able to explain the function of each phase in the Larson and Ayllon experiment on the use of time-out to reduce colicky crying.

Research Methods
THE IMPORTANCE OF BASELINES

Let's imagine what might happen if you don't use a proper research design. Sometimes you need a good design, even when you're not doing research—when you're working as a practitioner. Consider the case of Frank, a young man who was referred to the Psychology Service. He spent so many hours slapping his face, the staff had to restrain him. Before we started a behavioral intervention, we collected baseline data on his unrestrained frequency of self-injurious slapping. It was a good thing we did.

During eleven 30-minute observation periods, his frequency of face slapping rapidly dropped from over 600 an hour to nearly 0. But we hadn't done anything! This was just baseline.

Imagine this hypothetical situation: Imagine we had used a pharmacological intervention in which Frank took a tranquilizer every day in the hopes that this would get rid of his face slapping. And suppose we had used the drug without getting baseline data first. It would have looked as if the drug had caused the decrease in slapping. Then Frank might have unnecessarily been on that drug the rest of his life!

5

1. Give an example of the importance of collecting baseline data and what might happen if you didn't.

Moral: We often need to collect baseline data to make sure our intervention, our independent variable, is causing any changes we see in the dependent variable. It's important to be sure of what's causing what, both for scientific and

practical reasons. So as scientific researchers we need to collect baselines, and even as practitioners, we sometimes need to collect baselines (for example, physicians often withhold the prescription of antibiotics for a few days to be sure the antibiotics are needed to cure your sore throat). Practitioners may need to collect baseline data when they're not sure whether an elaborate, expensive, or potentially hazardous intervention is needed.

QUESTION