Behavior and Its Causes: Reading # 1

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What is Behavior?

The word "behavior" is used in many different ways in the English language. We speak of "the behavior of ants", "the behavior of a patient's heart", "the behavior of atoms" and "the behavior of Hurricane Carla".   One dictionary definition of behavior is "the action or reaction of any material under certain circumstances". So behavior can mean the action or reaction of many different kinds of phenomena--from sub-atomic particles to weather systems.
This course is about the **actions and reactions of living creatures**, or the **behavior of organisms**. Important to note is that actions often mean more than the movements of various parts of living creatures. Actions include other parts of the world as well. The action (or behavior) of kicking a football involves certain movements of the kicker's body with respect to a leather object of specific size and shape, resulting in the movement of the ball in space. So the action involves the kicker's *movements* and *their effect* on the *ball*. Of course, the player may practice the kicking movement without the ball and that would still be behavior…but it's not the behavior of kicking the ball. As it turns out, most of the behavior that people are interested includes both movement and other parts of the world.

Even when we limit our topic to the actions of living creatures, behavior covers a lot of territory, particularly when it's human behavior. Human behavior is everything that people do, say, think, and feel. Behavior includes actions typical of almost all creatures, like eating after going awhile without food, scratching an itch, and sleeping. And it also includes such specialized human activities as painting a mural, kicking a football 60 yards between goalposts, and conducting a scientific experiment.

Humans also talk and write about the past and the future, about their joys and sorrows, about world politics, about their religious beliefs, and (at least for the past few hundred years) about scientific principles. People fantasize too -- sometimes about what they fear, or about winning the lottery or about the man or woman they love. All of these actions are behavior. They differ in many ways – in the parts of the body that are active when they occur, in how easily they can be observed by an onlooker, in how difficult they are to learn, and in how valued they are in various human cultures. As much as these behaviors differ in the body parts involved and in how we categorize them for everyday purposes, there is reason to believe that the same scientific principles account for their origin and continuation during the lifetime of individual people. This course is about some of those basic principles of behavior.

Behavior is the (1) _____ and (2) _____ of (3) _____.

Almost all living creatures are alike in that they (write/type the letter for all those that apply): (4) _____
      a. Eat
      b. Read
      c. Sleep
      d. Sing

Some humans do things that no other animal does (write/type the letter for all those that apply): (5) _____
      a. Conduct orchestra
      b. Write novels
      c. Escape painful stimulation
      d. Build a home

The Importance of Learned Behavior

Behavior exists in the world of nature because it aids in the survival of organisms. Behavior links organisms to other parts of the world. By finding and eating food, organisms obtain the energy they need to survive. By avoiding or escaping predators, organisms live long enough to mate and produce a new generation. For most of Earth's history, most behaviors of most organisms were built in as part of the equipment the organisms were born with. Some time during Earth's history, though, some of the built-in behavior of some organisms began to be open to change during the lifetime of individual organisms. Across many, many generations individuals became increasingly better equipped to adapt to the particulars of the world in which they found themselves. This openness to change in behavior was itself a biological characteristic of some organisms…and our ancestors were among them.

Organisms open to behavioral change have some advantages in the survival game. This is especially true if their lifespan is measured in years and decades (rather than in minutes and days). Longer life spans mean more time to learn. It is also especially true if the events that affect an organism's ability to survive change from generation to generation and even year to year and week to week. In such rapidly changing environments, the ability to learn new ways to behave greatly enhances survival.

Humans are the most adaptable of all organisms and most of the particulars of human behavior must be learned during each human lifetime. Although it is

possible that some individuals are biologically prepared to learn some things faster than they can learn other things, or faster than some other individuals, what each human learns depends on the experiences of that individual during his or her lifetime.

Openness to change in behavior is a (6) _____ characteristic of some organisms.

Of all living creatures, (7) _____ are the most open to behavior change during the lifetime of each individual.

What any human (8) _____ depends on the experiences of that human during his or her lifetime.

Organisms and Behavior

The skin of an organism marks a boundary that roughly defines where an organism ends and other parts of the world begin. In everyday talk, the rest of the world is often called "the environment", to distinguish it from the organism itself. But the organism is part of the world and the skin is not a sharp boundary. Parts of the environment (like food and air) are taken in and literally become part of an organism. In a reverse process, when an organism dies everything from the skin inward stops working and the organism becomes part of the larger world. So organisms are as much a part of the world of nature as is the world outside them, and the line between "organism" and "not organism" is both fuzzy and temporary.

When it comes to behavior, the line between "organism" and "not organism" is even fuzzier. **Behavior**—the actions of living creatures—**is made up of movements of an organism and also parts of the world outside that organism**.   In the case of behavior, the environment does not become part of the organism like food that is eaten and air that is breathed. Events and objects that are outside the skin stay outside the skin. Instead, the movements and the other elements of the behavior become integrated into an action like "turning on the faucet", or "making a bed". The behavioral event includes both the movement of various parts of the organism and certain other parts of the world.

So, kicking a soccer ball is a different action than kicking the door open. Although they do have some movements in common (kicking movements) the other parts of the action (the ball and the door) differ. The movements of an organism become an *action* when movement becomes integrated with other parts of the world. Turning the thermostat down requires certain movements

and a thermostat. Opening the refrigerator requires certain movements and a refrigerator. Even the kind of action we call speech involves movements of lips, tongue, and diaphragm as well as air that can be pushed across the vocal chords. Most (but probably not all) everyday actions can be viewed as events that physically integrate movements of an organism with parts of the world outside those movements. Most actions of humans are learned during the lifetime of each individual human.

Many people try to look inside (or guess what is inside) organisms to understand behavior. For them, behavior is like a shadow and they take brains or minds of organisms as their subject matter. Behavior analysts don't object to other scientists looking inside organisms to learn what is going on there – although most behavior analysts doubt that guessing about a person's mind will be helpful in explaining behavior. Instead of seeing behavior as a shadow that tells us something about an organism's brain or mind, behavior analysts view behavior itself as the phenomenon of interest.   So, the *actions* of organisms – not organisms – have center stage in behavior analysis.

> Behavior is made up of the (9) _____ of an organism and also part of the world (10) _____ the organism.

> Ringing a dinner bell and ringing a doorbell are (the same/different) (11) _____ actions.

> Most actions of humans are (12) _____ during their lifetime.

> Behavior analysts (13) _____ (do/do not) look inside organisms to understand behavior.

> Behavior analysts view (14) _____ itself as the object of interest .

Overt and Covert Behavior

Most of the behavior we will study in this course is behavior that is transdermal – it is behavior that includes parts of the world *outside the skin* of the behaving person. An easier (but less precise) name for transdermal behavior is *overt* behavior. All the behaviors mentioned so far have been examples of overt behavior. Onlookers can observe overt behavior easily because it usually does include parts of the world outside the skin as well as movements that are easily seen or heard by the onlooker. Overt behavior is what in everyday conversation we call "doing" or "saying."

Some behavior can't be publicly observed because an onlooker can observe neither the movements nor the other parts of the world. Examples of this kind of behavior are feeling your swollen gum with your tongue or imagining playing the piano. Although you can observe yourself touching your tongue to your gum, and can observe your imagining of playing piano, other people can't observe those behaviors. They can't see or hear what you are doing even though you are doing something. This kind of private behavior is called *covert* behavior. In everyday conversation we tend to say we are "thinking" or we are "feeling" when we are behaving covertly. Of course, when we describe aloud what we have been thinking or feeling, our talking is overt behavior.

Important to remember is that overt and covert behavior belong to the same world – the world of atoms and their activities as well as of organisms and their activities. In other words, the distinction between overt and covert behavior is *not* a distinction between "physical" and "mental". What goes on inside the skin is just as physical as what goes on outside. Feeling your swollen gum with your tongue and imagining playing a piano are part of the same world as kicking a football and playing a piano. The difference has to do with ease of observation by outside observers, not the stuff of which those actions are made.

In this course, we will concentrate mostly on actions that can be observed by onlookers. So we will focus on overt behavior. We have two reasons for doing this. The first reason is that overt behavior is what makes a difference to the society we live in and ultimately to us ourselves. Doing and saying can have very powerful effects on other people and on the world we share with other people. Asking for a drink of water can result in water, lighting a match near gasoline can result in injury, reciting a poem can move a listener to tears, and planting seeds can result in food to eat at a later time. On the other hand, thinking and feeling ultimately make a difference only if they are followed by overt behavior. Daydreaming about getting a degree or about playing the piano may make the dreamer happy and may even make it more likely that he will study or practice the piano. But unless he does study or play the piano, there will be no degrees, no music and no prizes (and the dreamer's happiness is short lived).   Given this reality, it is likely that thinking and feeling arose during human history because of their usefulness in supporting doing and saying--actions that have power to change the world outside a person. Therefore, doing and saying are important both to the behaving individual and to members of his or her social group. So the first reason for focusing mostly on doing and saying is that overt behavior produces changes in the world outside the behaving person and is therefore important to society as well as to our own survival and happiness.

The second reason for focusing our attention mainly on overt behavior has to do with the importance of science as a way of knowing. Science begins with

observation, so scientists can best learn about how and why behavior changes when they can repeatedly observe their subject matter. In addition to being what is most important to society, overt behavior provides maximum opportunity for reliable observation.   Behavior analysis is especially fortunate in that the phenomena of greatest theoretical and practical importance are also the phenomena most accessible to observation.

Behavior analysts have learned much about how actions are learned and why they continue to occur or stop occurring and why they occur just when they do and not at other times. They have used that information to help people learn more effective overt behavior. They have also used that information to help people think and feel differently when that will help a person. Because we can change what we think and feel in the same way we change what we do and say, it makes sense to consider doing, saying, thinking, and feeling as nothing more and nothing less than – behavior.

In this course we will focus on (15) _____ behavior, which includes what people (16) _____ and (17) _____ .

(18) _____ behavior, such as *thinking* and *feeling*, (19) _____ (does/does not) belong to the same physical world as is overt behavior.

A person's (20) _____ behavior is more important to an individual's society than is that person's (21) _____ behavior.

The distinction between "*covert"* and "*overt"* (22) _____ (is/is not) essentially the same as the distinction between "mental" and "physical".

Scientists can best learn how behavior works by studying (23) _____ behavior because it can be reliably (24) _____ .

Behavior and Its Causes: Reading #2

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What Is Behavior Analysis?

The modifiability of human behavior is the reason humans have come to dominate (for better or for worse) the animal world. It is also the reason that human behavior is "connected" to other parts of the world in such a variety of complex ways. In everyday terms, behavior analysis is about how behavior is acquired during the lifetime of individuals and how it changes as a result of changes in an organism's world. In more precise terms, behavior analysis is (1) the scientific study of behavior as it relates to environmental events and (2) the technologies of behavior change derived from that study.

The scientific study of behavior has resulted in human understanding, for the first time in history, of how behavior is acquired and maintained during a lifetime and why it occurs at only some times and places once it is acquired. In seeking to understand how individuals come to behave as they do, behavior analysts look to events in the physical world that affect the actions of organisms. These events are categorized as "the environment". The environment that behavior analysts are interested in is not defined in terms of its geographical relation to the organism (outside) but in terms of its *functional* relation to the organism's *actions.* Behavior analysts focus on those parts of the physical world that can be shown to *affect behavior* in some way.

> Behavior analysis is the scientific study of (1) _____ as it relates to (2) _____ events.
>
> Behavior analysis also includes technologies of behavior (3) _____ that are based on the scientific findings of the field.

Some Meanings of Environment

The usefulness of behavior to any organism depends on how that behavior helps the organism get along in the world. The world that an organism has to deal with is often called "the environment."

"Environment", like "behavior", is a word that is used in many ways. For most people, "the environment" means simply the physical world in which organisms reside. Everything outside the skin is the environment. Scientists, however, often use the word "environment" in more specific ways and in ways that differ from one another, depending on the subject matter of the science. For

example, in evolutionary biology "the selective environment" includes only those features of the world that affect the likelihood that an organism's genes will be passed on to the next generation.

Behavior analysts mean different things at different times when they speak of the environment. First, the environment sometimes means approximately what it means in everyday talk – the physical world, usually the world outside the organism. But, "environment" also has its own unique meaning in the technical vocabulary of behavior analysts. When describing procedures of behavior change, "environment" refers to those parts of the physical world that behavior analysts (or anybody else) manipulate experimentally (or educationally or therapeutically) to bring about a change in behavior.

Sometimes objects or events manipulated experimentally or educationally have an effect on behavior and sometimes they don't. Most of the events in the world that affect behavior directly can be classified as *stimuli*. For an event to be called a *stimulus*, it must affect a sensory receptor of an organism. For dogs, a dog whistle is a stimulus. But a dog whistle is not a stimulus for humans because its sound cannot be detected by auditory receptors of humans. The technical term **stimulus** is reserved for events that stimulate an organism's receptor. This means that physical events in the world may be a stimulus for one organism but not for another. Any event that affects a receptor can come to have some effect on behavior. But affecting a receptor doesn't mean an event will automatically have some effect on action. Think about an infant whose visual receptors are stimulated by the presence of the family dog. At first that stimulation has no effect on the infant's behavior: she doesn't reach for the dog, pet the dog, talk to the dog, or respond to the dog in any way. After a few months, the infant acquires all these actions and more. What has happened during those months is that the dog has acquired a number of *functions* with respect to the infant's actions.

Behavioral Environments

In this section we distinguish **behavioral** <u>environment</u> from the broader term <u>environment</u>. *Behavioral environments* are those objects or events, or their physical properties, or the relations among them, that are observed to *have some effect* on the behavior of a particular human (or other organism.) They are events that have behavioral *function*. For example, if people's saying "hi" to you typically results in your greeting them, then people's "hi" is part of your behavioral environment. As another example, a person looking through a microscope for the first time might not see differences in the tiny organisms that an experienced observer can see. The microscopic differences are part of the latter's behavioral environment but they are not yet part of the novice's behavioral environment. They may become part of her behavioral environment if the experienced observer teaches her to see them.

The behavioral environment of any particular person includes everything in the physical universe that affects that person's actions. Behavioral environments of different people may differ greatly even when the people live in the same city, have the same parents, go to the same school, etc. Consider Tasha and Tammy, who are twins in Ms. Carter's first grade class. Tasha sits next to Monty, the class clown, and he looks to her for approval of his jokes. Ms. Carter has often scolded Tasha for giggling in class. Sometimes Tasha can ignore Monty, but sometimes she finds she can't keep from giggling. So whenever she feels a
tickle in her throat and her stomach, she looks for a chance to leave the classroom before the giggles begin. As a result, Tasha is sometimes absent when learning opportunities are available. Tasha's sister Tammy sits next to the class "brain", Rocky, who helps Tammy find the place in the book so Tammy doesn't miss the first part of any lesson. Tammy is always in the classroom when new topics are introduced. These small differences in the behavioral environments of the twins can result in very large differences in the repertoires of Tammy and Tasha.   By the time they go to second grade, Tammy may be able to do many things Tasha can't do or doesn't do as well. This difference can make it easier for their behavioral environments to diverge further, which in turn is likely to result in further differences in the behavior of Tammy and Tasha as time passes.

So the environments that behavior analysts are mainly interested in are a subset of the universe of events that most people think about when they hear the word "environment". A behavioral environment consists only of those events in the world that relate to the behavior of a particular person.   Another way to say this is that the behavioral environment is constituted of those parts of the world that have some *function* with respect to the actions of a particular organism.   So two people living in the same general environment may have very different behavioral, or functional, environments.

In everyday talk the word (4) _____ means the world outside organisms.

Behavioral environments are (5) _____ (the same/ different) for different people.

For an event to be called a stimulus, it is not necessary that it affect that person's senses. (6) _____ (true/false)

If Stephen is color blind and can't see the difference between red and green, then those colors cannot be part of Stephen's (7) _____ (Hint: 2 words).

Behavioral environments can include objects, events, physical properties of object and events, and relations between objects and events. (8) _____ (true/false)

Learning to "See" Behavior

In order to understand behavior or to change it, we must be able to observe it – to see or hear or detect its occurrence in some way. Most of us have not learned to see behavior very well because we tend to focus on the organism who is behaving rather than on the behavior itself.   An observer must watch very closely to observe any given instance of behavior. And the instances of behavior keep changing from one moment to the next. We are going to call this constant ebb and flow of actions of a single individual a **behavior stream**. A behavior stream is ***"the actions of a particular organism as they follow one another in time"***. In order to begin to understand behavior, we must observe the ***behavior stream*** of one organism at a time. If we write down everything we observe as we watch a behavior stream flow, we might write something like the following:

> AJ picked up a pen and wrote about a half page of prose in two minutes. Then he put down his pen, got up from his chair, and walked to the kitchen. There he removed a cup from the kitchen cabinet and poured a cup of coffee.

Notice that we have described *actions*, not *movements*. Our descriptions include names for certain parts of the environment that are integrated with movements to form actions ("…picked up a pen…"). If we had tried to focus more on the physical dimensions of the movements and of the environment, our record may have looked something like this:

> AJ moved his hand to a 5" cylinder, closed his fingers around it, and pressed the pointed end against a paper, making small, circular and up and down motions. His hand moved from left to right across the page and each time it reached the right side, it moved down a fraction of an inch and continued the motions. After about 2 minutes, he put down the cylinder, stood, and walked about 20 feet north. He pulled toward him a flat, vertical surface and grasped the curved appendage of a small container. Placing the container on the surface, he then picked up a larger container and tipped it over the opening of the smaller container.

Most of us would consider the first record more useful than the second as a description of AJ's behavior stream because the first record described actions and not just movements. We also learned from the first record what AJ's actions produced. The action of writing produced prose and the action of pouring produced a cup of coffee.

Neither record tells us anything about *why* AJ is writing prose (perhaps he had an assignment due for his course) or *why* he poured coffee (perhaps he was helping his mother who has arthritis and finds it difficult to pour it for herself). Nor do we know why AJ wrote the words he did, wrote now instead of later, or got up just when he did. We also don't know how AJ learned to do these things in the first place. In short, we don't know anything about the causes of any of the behavior in AJ's behavior stream. A record of actions occurring in a behavior stream does not tell us why those actions occurred. Each action may have occurred for a different reason. In order to explain why AJ behaves as he does, we must first identify the actions we wish to explain.

When applied behavior analysts are asked to help someone behave differently (e.g. to say math facts fluently or to arrive at school on time) they must specify the behavior of interest before they can begin to help. So their first task is to observe the behavior stream of the person who wants to behave differently and to identify the particular action that is in need of assistance. The "problem" may be that the action is missing altogether, or occurring too seldom or too often, or too slowly or too fast; or it may occur at the wrong time or place or fail to occur at the right time and place.

Once the behavior of interest is identified, we can continue to observe the behavior stream in order to develop a **behavioral definition** of that action. ***The behavioral definition specifies exactly what any observer will see or hear when the behavior occurs in a behavior stream***. For example, if we are interested in a child's being able to say her math facts correctly, we might find the following definition useful: "*saying aloud the answers to 1-column math problems in all combinations of numbers from 1 through 9*" Notice that we are now taking the important step of identifying only certain actions of all the many actions occurring in a particular behavior stream. We are starting the process of *analysis* when we do this.

When the behavior of interest is completely absent from a person's behavior stream, we can observe the behavior stream of a person who performs the action well in order to develop a behavioral definition. By observing carefully, we can learn a lot about the important characteristics of the action to be produced in the behavior stream of the person seeking help.

A behavior stream is the flow of actions of (9) _____ organism(s).

      a.   one
      b.   two
      c.   any number of
      d.   none of the above

The first thing to do in order to understand or change behavior is to (10) _____ the behavior stream where the problem is occurring so we can identify the problem behavior.

Once we have identified the behavior of interest, we need to develop a behavioral (11) _____ that tells any observers what they will see or hear when the behavior of interest occurs.

The very best record of the events in a behavior stream (12) _____ (does/does not) tell us why the behavior occurred.

Behavior and Its Causes: Reading #3

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Scientific Explanation: Process and Content

The main business of science is to identify and describe the *processes* that explain the specific *content* of the universe. The content of the universe is all the objects, parts of objects, events and parts of events that exist or have existed in time and space. Because the universe is so complex, scientists generally focus only on some part of it. Astronomers limit their scientific attention mainly to bodies in space as they relate to the earth and to each other. Neuroscientists focus their attention on the activities of cells in the central nervous system of animals. The part of the universe that behavior analysts focus on is *behavior* as it occurs in the lifetime of individual organisms.

Basic researchers in behavior analysis generally aren't trying to learn something about any particular behavior…such as working math problems, or pressing levers, or flying planes. In other words, they aren't interested in any particular behavioral *content*. Their goal is to identify the *processes* by which behavior changes (or remains constant). Once scientists identify basic processes, they can state some general principles about how behavior change comes about during an individual lifetime.

In order to identify the processes that bring about changes in behavior, researchers must learn how to classify behavior and environment so that cause-effect relations can be identified. This has been called "finding the natural lines of fracture" between behavior and environment. Doing that involves two related tasks. The first task is to identify the range of phenomena that work the same way in nature. When we say they "work the same way", we mean they result from the same processes. The second task is to describe just how the processes work. This amounts to identifying the ways in which some kinds of events bring about changes in other kinds of events. These two tasks usually have to be carried out concurrently because accomplishing each of them depends on accomplishing the other.

Learning about basic processes in any domain is hard. the world of nature is a world of infinite variety. As you probably have heard, no two snowflakes are exactly alike. Nor are any two brains exactly alike. In fact, any *one* brain is not exactly like it was a moment or two ago. No two actions are exactly alike either, whether they appear in the same behavior stream or in different behavior streams. Only recently have humans learned how to classify behavior and environment in useful ways.

Acts of classifying are themselves behavior. Our very survival depends on classifying everyday events. For example, most humans are very good at eating only those parts of the world that are edible for humans. Eating food and not eating non-food is a way of dividing the world into two classes of objects: edible and inedible.   We classify further when we behave one way with respect to some edible items (calling them "fruit") and another way with respect to others edible items (calling them "grain").

Our everyday classifications are useful for everyday purposes, but most of them aren't adequate for understanding the processes going on in the natural world. That is so because everyday classifications are usually based on the ways phenomena appear to be alike to the humans who observe them – which is why they are useful for everyday life. If we were bats or ants or whales, classifications based on our everyday observation would be very different (and appropriate for our lives as bats, ants, or whales.) To make progress in understanding nature's processes, we must learn to see past our everyday classifications.

An example of the difference between everyday classification and scientific classification can be seen in the history of chemistry.   About 2,500 years ago, some people interested in knowing the basic elements of matter suggested that they were air, earth, fire and water. That classification system was not very useful in explaining anything. Then people tried classifying in terms of some of the various properties of objects they observed: color, weight, etc. They were getting closer to a useful classification system (but still not there). Eventually, people learned to classify the basic elements of the physical world in terms of the kind of atom of which they were made of. Anything made up of only one kind of atom was a chemical element. This way of classifying worked wonderfully in generating all sorts of questions and answers about the workings of nature.

Seeing past our everyday classifications of *behavior* has been a real challenge for scientists. But behavior analysts have made some progress in identifying processes that account for the content of learned human actions – that content being what people do, say, think and feel. They have done this by classifying the events in behavioral environments into a few general categories in accordance with the ways the environmental events cause behavior to change. In this course, you will learn names for several classes of environmental events that cause behavior change.

> Observed behavioral content can be explained by describing the behavioral (1) _____ that operate in nature and account for that content.

The first task in understanding basic processes is to figure out the range of phenomena that work the same way in (2) _____.

The second task is to describe just how the processes work in nature. This is done by identifying the ways in which some kinds of events cause (3) _____ in other kinds of events.

Behavior analysts identify behavior processes by classifying relations between (4) _____ events and behavior.

Scientific classification usually is (5) _____ (similar to/ different from) from everyday classifications.

Behavioral Relations and Behavioral Principles

We are going to call the relations that are observed to exist between behavior and environmental events in the repertoire of a particular organism *behavioral relations*. The content of the behavioral relations in a given organism's repertoire is unique to that organism. No two repertoires are exactly the same. Whatever the content of those relations, however, they conform to a pattern of cause/effect relations seen in the repertoires of the organisms of many different species. Because the pattern is the same, whatever the content of the specific behavioral relations, the pattern can be described without mention of any particular content. Patterns of cause/effect behavioral relations are called *functional relations* because actions (whatever their content) are a *function of* environmental events (whatever their content).

The word "function" is sometimes used in another way in behavior analysis. That is because any given behavior may *have* a function. For example, we might say "the function of flipping the light switch is obtaining light". This way of speaking makes the action the cause and the environmental change the effect. When we use the word "function" in this way, we are usually speaking of the behavioral relations in a particular organism's repertoire.

Because behavior analysts use the word *function* in these two different ways, the word tends to be confusing to beginning students – and even to experienced professionals. It would be convenient if we could avoid using the word and find substitutes for each way it is currently used, but the term *functional relations* is so much a part of behavior analysis that we cannot avoid using it. To make things as easy as possible, we will use "behavioral relations" to describe relations in a particular organism's repertoire and "functional relations" when we are discussing the generic ways that the environment functions with respect to behavior.

When certain classes of events in behavioral environments consistently cause certain kinds of behavior change, the functional relations can be stated in the form of a *behavioral principle*. Behavioral principles are general statements about the effects of behavioral environments on learned actions.   They are not about any particular behavior, such as pressing levers or saying the alphabet, or head banging. They are about any and all behaviors, including pressing levers, saying the alphabet, and head banging, if those behaviors are affected in similar ways by their behavioral environments. The behavioral relations of any particular organism's repertoire can be understood in terms of the functional relations described in behavioral principles.

People have gotten along adequately for tens of thousands of years without knowing any of the behavioral principles that can be used to explain and help us change behavior.   People also got along for most of human history without knowing about chemical elements or antibiotics or energy transfer. But people can be more effective when they know how nature works and knowledge about behavioral principles can help us in many practical ways. First of all, such knowledge will help us understand others and ourselves. Second, it will help us arrange the world so that our behavior benefits us as well as other people. Third, it will help us arrange the world so that other people treat us in ways that benefit us as well as them. Fourth, we will be in a better position to teach the skills and knowledge needed by new members of our society if they are to live productive and happy lives.

Although behavioral principles aren't particularly easy to understand, once someone understands them, she can apply them to any particular situation that involves learned behavior. That is so because principles that explain learned actions are the same for all people (and other organisms as well), whatever the particular content that is the behavior of interest. The scientists who devised the classification system that describes functional relations between behavior and environment were looking for commonalities in the *ways* the environment functioned with respect to behavior and behavior change. They were not looking for commonalities in the *content* of behavior or the particulars of behavioral environments. For example, in developing behavioral principles, scientists weren't looking for the particular events (like a dark room) that resulted in a particular action (like turning on a light). Rather, they were looking for ways in which behavioral environments in general affected actions in general. So the principles can be applied to a vast range of behavioral content.

Because this is a course in *applied* behavior analysis, we will be using examples of *particular* actions and *particular* behavioral environments that are likely to be meaningful to students. We will be looking at the content of behavior and the content of the behavioral environment in many examples of behavioral principles in action.   Behavioral principles will be applied to

everyday situations so that you can begin to see how actions are acquired during an individual lifetime and why they change over time.

The relations between behavior and events that affect the behavior of a particular organism are called (6) _____ relations.

Behavioral (7) _____ (check your spelling) are general statements about the ways that the environment functions with respect to behavior.

A behavioral principle describes the (8) _____ relations between behavioral environments and the behavior changes they cause.

Knowledge about behavioral principles can help us in these ways: (write/type the letter of all answers that apply): (9) _____

a. Assists us in knowing how to arrange things so we behave in ways that benefit ourselves and others.
b. Helps us understand ourselves
c. Helps us get the kind of treatment from others that is good for us and for them.
d. Enables us to help younger members of our society learn to behave in ways that make them productive and happy.

Learned Behavioral Relations and Unique Behavioral Environments

Learning is not terribly important in the lives of some organisms. Many organisms do not have to depend greatly on learning to be successful in the game of life. For those organisms, most of their actions are as much a part of their basic equipment as are their legs or their antennae. When, during the history of life on Earth, the behavior of the organisms of some species became open to changing during a lifetime, the processes we call "learning" became more important. Humans are the organisms for whom learning is most important.

In the previous section, we mentioned how *basic researchers* have classified behavioral events and environmental events in ways that help us understand how behavior works. *Applied* behavior analysts use their understanding of behavioral processes to bring about targeted changes in the behavioral content observed in particular behavior streams. Sometimes they do this in order to find out more about how behavior works under specific conditions, in which case they are behaving as applied scientists. The main goal of other applied

behavior analysts is simply to make the world work better for people they serve, in which case they are behaving as science-based practitioners, or engineers.   What makes them all members of the same discipline is that they work with the same subject matter: relations between behavior and environment.

Behavior analysts take a very down-to-earth approach to learning. They view learning as the acquisition of new actions, changes in previously learned actions, and changes in the functions of behavioral environments. In acquisition, movements become more and more integrated with parts of the environment to form actions. Think about a baby learning to stack blocks. The baby's movements become increasingly coordinated with the blocks. At first he can't get one stacked on top of another, but gradually his movements become better coordinated with the location, height, and balancing of the blocks. So one kind of change in behavior that we call "learning" is that new actions come to exist and remain in a behavior stream.

Another kind of change that we call "learning" is that new and old actions become related in very precise ways to other events in the physical world. These are changes in behavioral relations. For example, of all the sounds the baby makes in his early months, saying "da-da" is high on the list of sounds that the baby's parents are likely to encourage.   So "da-da" becomes relatively prominent in the baby's behavior stream. But the learning doesn't stop there because the baby then learns to say "da-da" when he sees his father but not when he sees other men. The baby's father and other men come to have different functions with respect to the action of saying "da-da". The relation between the child's father and the action "da-da" is a particularized behavioral relation. It is an example of a type of functional relation that is called "stimulus control".

During a human lifetime a stupendous number of particularized behavioral relations come to exist. In most human adults, many different actions each relate to a vast array of other events in many different combinations. For example, the simple action of opening the front door might relate to the bell's ringing, to the sight of the postal worker, to the time at which the newspaper is usually delivered, or to an odor in the house. In behavior analysis, these aren't relations between organisms and environment; rather they are relations between *actions* and *behavioral environments.*

What makes behavior so important to humans is that it relates to other parts of the world in so many different ways. Consider Matt, who is kicking for the extra point after a touchdown. The kick is aimed with respect to the goal posts, which requires coordination between what is seen and what is done. Furthermore, the haste with which the kick is executed depends on how close the defenders are to the kicker. Also, a strong wind may result in a kick aimed

in a somewhat different direction than otherwise might occur. (The extra point that could result would appear to be relevant but it cannot affect the kick because it has not yet occurred. The future cannot affect the present.)

So behavior, especially human behavior, may relate to many different parts of the world at any particular time. Matt's action of kicking the ball was related to the goalposts, the direction and strength of the wind, and the position and motion of the defenders as well as of his teammates.   This particular action was part of complex network of relations on this particular occasion. You already know that the other events in the network are parts of Matt's behavioral environment. So in this case, the goalposts, the wind, the position and motion of the defenders and teammates are all part of Matt's behavioral environment. Those events relate in very precise ways to Matt's action of kicking the ball.

Now consider Matt's teammate, Joe. If the wind's direction has no effect on Joe's kicking action, the wind is not part of Joe's behavioral environment when he kicks for the extra point today. That's because the wind has no function with respect to today's kick. If the wind never affects Joe's action of kicking, this consistent difference in the two players' behavioral environments may make a difference in their success as place kickers. This is an example of how behavioral environments differ for different individuals. One reason it is difficult to understand the actions of people we know is that we wrongly assume any event that is part of our behavioral environment is also part of the behavioral environment of everybody else.

Humans (10) _____ most of the behavioral content observed in their behavior streams.

Write/Type ONE letter to indicate which of the following is NOT included in the changes observed when humans learn: (11) _____
      a.   changes in previously learned action
      b. changes in mental capacity
      c. changes in the functions of behavioral environment
      d. changes in behavioral relations

Everyone has the same behavioral environment. (12) _____ (True/False)

Behavioral Repertoires

A behavioral repertoire is everything that a particular person can do, say, think, or feel at some particular time in her life and all the parts of the environment that enter into behavioral relations with those actions. At this time in your life,

your behavioral repertoire includes many behavioral relations and it includes many many different actions that are organized with respect to your behavioral environment. For example, there are probably many behavioral relations that involve text materials and we lump them together under the category of "reading". Other related sets of behavioral relations are called "playing tennis". Still others can be grouped under the heading "housecleaning". All the things you could do now if the right behavioral environment were present constitute your behavioral repertoire.

At this moment, you are not doing most of the things that you could do. If you are reading this, the behavioral relations that are appearing in your behavior stream are those relations that involve printed words and verbal responses (probably covert responses). There are many other actions you *could be* performing but the actions you *are* performing are grouped under the term "reading". (If you are doing more than merely reading, for example making notes, thinking about what you have just read, etc., we would say you are "studying"). All the actions in your behavioral repertoire that are not appearing now in your behavior stream are available to make an appearance. They *do* appear if and when the behavioral environment to which they are related becomes available.

One fact of life about behavioral repertoires is this: the more behavioral relations that exist in a person's repertoire, the more variations can occur in novel situations; and the more variations that occur, the more opportunities there are for acquiring new behavior. This is the reason that people rich in behavioral relations usually get richer (both behaviorally and in other ways). Nothing a person learns is irrelevant to that person's future. That is the reason people now realize learning is a lifelong pursuit, not just something they do while in school. Some people think a college degree is the most important thing to be gained by going to college. But what is *learned* in college is even more important than the degree itself. Obtaining a degree is highly desirable but a degree will not do much for a graduate unless that graduate also has a large behavioral repertoire--can do many things, talk of many things, and bring about useful changes in the world.   The reason degrees are valued by employers is that they are generally held by people who have many skills and quite a bit of knowledge. A student who somehow "makes it through" with the minimal repertoire required to graduate may get a raise or a new job; but she is not likely to go very far in a career compared to a student who has taken every opportunity to acquire a very large behavioral repertoire with respect to both the school environment and the rest of her behavioral environment.   A graduate with a large behavioral repertoire is behaviorally rich so that graduate has a great deal to offer employers and family members. As a result, she is likely to have many opportunities and she will be behaviorally prepared to take advantage of those opportunities.

A behavioral repertoire is (13) _____ a person can do, say, think, or feel at some particular time segment of their life.

Actions in your behavioral repertoire will occur when the appropriate (14) _____ (Hint: 2 words - check spelling) becomes available.

A repertoire that is rich in (15) _____ [2 words] is a ticket to success in the world of everyday action.

Primordial Behavior

A sight that many humans find intensely interesting is a nursery of newborn babies. Although the infants don't do much that appears to relate very well to the world around them, the newborns already differ from one another behaviorally.   Some of them sleep a lot and others are very wakeful. Some thrash about while others move languidly. Some cry frequently and loudly, some are more likely to fuss and whimper, and still others rarely cry at all. Some appear to watch nearby movements and others orient toward human voices or startle more readily at sudden noises. How important these differences are or what, if anything, they predict about the future behavioral repertoires of the infants is not well understood. Nor do we know whether such differences in newborns are due to genetic differences, or due to differences in prenatal environments, or to something else.

Whatever the origin of those differences, the newborns are not doing much of anything that could be viewed as organized behavior. That is, most of the newborn's activities are "uncommitted" to particular parts of the world they live in. The movements aren't integrated very well with other events or objects. Although the infant's arms move about, she doesn't reach out for objects. If an object is laid in her palm, she may grasp it (an unlearned behavior), but she won't look at it or manipulate it, as she will soon learn to do.   And although her vocal apparatus is intact, she doesn't say anything about her world or herself -- content we will later see if she is healthy and her behavioral environment develops appropriately.

Because behavior analysts seek to understand *learned* relations between behavior and other parts of the world, the rather unorganized movements of newborn humans is "primordial". That means that the more or less random movements of newborns are the raw material out of which complex behavioral relations are built. To say that the behavior of newborns is primordial is to suggest that it is the starting point for the behavioral content – the particular actions and behavioral relations – that comes to exist during the lifetime of a human. Behavior analysts leave it to other scientists to figure out where the

primordial behavior comes from. The work of behavior analysts begins at the point where primordial behavior starts to become organized and integrated with environmental events as a result of behavioral processes.

(16) _____ behavior (for example, the unorganized, random behavior of a newborn) is behavior uncommitted to any particular behavioral environments.

Primordial behavior becomes integrated with environmental events as a result of (17) _____   _____ (2 words).

Operant Behavior and the Behavioral Environment

Operant behavior is, roughly speaking, learned actions that operate on their environment, usually changing it in some way. Some examples of operant behavior are braking a car, flipping a light switch, and making a cake. All of these actions must be learned and they will only be learned if an appropriate environment is provided. Each of them also changes the world in some way. Pressing the brake slows the cars speed, flipping a light switches produces light, and making a cake results in something to eat.

Operant behavior is one kind of behavior that behavior analysts study and the kind of behavior that most of this course is about. Other examples of operant behavior are playing a tune on a piano (the action of pressing the keys produces sound), blocking a soccer ball from entering the net (the activity of positioning the body with respect to the net prevents the ball from entering the net), and writing this sentence (the action of pressing keys on a keyboard results in words appearing on the screen). The actions you have been reading about in this text are all examples of operant behavior.

The defining feature of operant behavior is that it itself changes over time as a result of its relation to events in its environment. The causes of changes in operant behavior are codified in the principles of behavior. Recall that behavioral principles are statements that describe the functional relations between behavior and its environmental causes.

Specific actions are acquired during an organism's lifetime when movements of that organism and the world outside those movements become integrated as a result of behavioral processes called *operant processes*. Operant processes account, directly or indirectly, for most of the particular behavioral relations that come to exist between actions and behavioral environments in human repertoires. The particular actions that come to exist in any human repertoire are the result of operant processes in action.

As humans go through life, their operant repertoires typically continue to expand--at least well into adulthood and often until the end of life. By saying that a human repertoire expands, we mean that the human learns new actions, and that more and more of the world becomes part of their behavioral environment, and that the relations between their actions and the world become increasingly varied and complex.

Here is an example. When Marvin learns to drive at age 16, he learns many new actions – like braking and accelerating, shifting gears and using the turn signal. Brake lights of cars in front of Marvin become part of his behavioral environment as he learns to brake when they appear; the gas gauge becomes part of his behavioral environment when he learns to stop for gas as the needle approaches "empty". Parts of the world that previously had no effect on Marvin's behavior now acquire a function, thereby becoming part of Marvin's behavioral environment. These relations between Marvin's actions and the behavioral environment become even more complex when Marvin reliably moves his foot to the brake only when the brake lights in front are fairly close or when traffic is moving very quickly. Any time the car in front is further away and traffic is moving slowly, Marvin delays braking and often doesn't brake at all when brake lights flash on the car in front of him. Operant processes bring all of these changes in Marvin's behavioral repertoire about.

Marvin, like everybody else, began life with almost no organized actions in his behavioral repertoire. Recall the newborn babies in the hospital nursery. They don't do much that we would recognize as useful action. Left alone they would quickly die because they can't cover themselves to escape cold, or feed themselves (even if food is available), or do anything else that would keep them alive. They don't even reach for food if it's in front of them (although they'll "root" at objects pressed against their face). During the first several months, an infant's behavior will become increasingly integrated with various parts of its world. The baby learns how to get his thumb into his mouth, to reach for objects and to hold and release them, to coo when a parent enters the room, to point to objects, to stack blocks, to take the lid off toy pots, to spoon food into his mouth, to move away from things that have hurt him in the past, etc.

Although the *particular events* that lead to changes in one child's repertoire may differ from the events leading to changes in the repertoire of another child, the *processes* that account for these changes in the infant's repertoire are the same for all people as well as for other animals. The same kinds of functional relations exist between behavior and environment. The main behavioral difference between humans and other animals is the breadth and depth of the behavioral environments of humans-- especially that part of their

behavioral environments composed of the actions (including speech) of other people.

(18) _____ behavior is behavior that operates on the environment.

This course is mostly about principles that explain (19) _____ behavior as it occurs in the behavior streams of people.

Operant processes are (20) _____ processes that explain how operant behavior works.

The particular operant behavior seen in any particular behavior stream is the result of (21) _____ processes.

Operant processes account for most of the particular behavioral relations that are established between actions and behavioral (22) _____ in human repertoires.

Behavior and Its Causes: Reading #4

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Operant Events and Operant Units

In the previous reading, we defined operant behavior as actions that operate on the environment, changing the environment in some way. One way of explaining a phenomenon is to demonstrate that you can produce it reliably. So if you can arrange things so that a baby says "da-da" when his father comes into the room (and/or when he enters the room where father is present), you can explain the baby's behavior by describing the arrangements that produced that behavioral relation.   Of course, if the baby one time says "da-da" when his father comes in the room, that could simply be a coincidence.   The relation between the father's appearance and the baby's saying da-da must occur *reliably* for us to say that there a behavioral relation exists between presence of father and baby's saying "da-da".   In other words, the same action must occur repeatedly under the same conditions if we are to be confident that we have identified a behavioral relation that exists in the child's repertoire.

One of the major problems faced by anybody interested in understanding the behavior of any particular person is when to consider actions of that individual person as being "the same action" and when to consider actions that may be alike in some way as "different actions". Consider the act of digging a hole in your yard. If, over a period of 2 years, you dig 21 holes in your yard, should we count these as "the same behavior" or as "different behaviors"?   In other words, did you do the same thing 21 times, or did you do 21 different things? Or did you do two or more different things, each some number of times?

All 21 acts of shoveling dirt out of a circumscribed area of your yard may be considered "the same behavior" on the basis of the act's form or topography. All instances of shoveling look very similar in their form, so we could consider all the instances as "doing the same thing." If we did this, we would be using a *topographical definition* of the behavior. Both in everyday life and in the science of behavior analysis, topographical definitions are sometimes useful.

But sometimes people in everyday life distinguish behaviors as "different" when they are topographically the same. For example, if 19 of your hole-digging acts were followed by planting seedlings and 2 of them were followed by burying a deceased pet, then most people would consider the 19 diggings that resulted in planted seedlings as "doing the same thing" and the two diggings that resulted in "buried pet" as "different" from those 19. The everyday distinction is based on something more than the features of the act

itself. The distinction is based on what follows the digging (planted seedlings or buried pets) and also on what precedes the digging (a potted seedling or a dead pet).

This everyday distinction is consistent with the approach behavior analysts usually take in deciding whether actions appearing at different times in a behavior stream are repetitions of "the same act" or are "different" acts. But behavior analysts look much more closely and systematically at the behavior and at the environment. And what they look for is guided by behavioral principles. In the final analysis, what counts as "the same act" is all those instances of behavior that occur under the same conditions as a result of the same history of relations between the acts and their consequences. This kind of definition is a *functional definition* of behavior.

This brings us to a distinction between *operant events* (or occurrences or instances) and a more inclusive *operant unit* that is made up of recurring instances. The *operant unit* (sometimes just called "an operant") is made up of many instances of behavior that are distributed across time in the behavior stream. Any two instances may be separated by minutes, days, weeks or even years. For example, the operant events -- individual occurrences of acts -- that make up your "planting operant", may occur over several weeks or years. Although some of your planting acts may be months apart, the different operant events we label as your "planting" can belong to the same operant unit. What makes them part of the same unit is their systematic relations, over time, to repetitions of environmental events. The behavioral events, or instances, that make up an operant unit have an internal organization that has been studied extensively. In a later module you will learn about various ways that the instances of an operant unit become distributed in time as a result of the particular ways the behavioral environment relates to those instances.

> Operant (1) _____ are also called *occurrences* or *instances.*
>
> The occurrences of an act that belong to one operant unit are often distributed across (2) _____.
>
> If repeated occurrences of an act relate to the behavioral environment in the same way, the occurrences of the act (or operant events) are part of the same operant (3) _____.

Behavioral Contingencies

The kinds of historical relations that are important to understanding the causes of behavior are called "behavioral contingencies", or "contingencies" for short. The term "contingencies" in behavior analysis refers to ways in which

particular actions and events in behavioral environments relate causally to one another. (*Causal* relations means the same thing as "cause-effect relations".) Three broad classes, or categories, of events are the main components of behavioral contingencies. Events classified as "actions" constitute one category of events that make up behavioral contingencies. The other two categories of events in behavioral contingencies are events classified as "antecedents" and events classified as "consequences".   The terms "antecedent" and "consequence" are based on the temporal relations of environmental events to the actions in the contingencies. (To say events are *temporally related* means they are related in *time*.)

An event is classified as an "antecedent" on the basis of its temporal relation to some act. An "antecedent" in behavior analysis is an event that comes *before*, or precedes, an act. Similarly, a "consequence" is an event that follows, or comes *after*, an act. And "consequence" usually also means that what follows the act depends on the act's occurring. Antecedents and consequences are categories of events that relate in time to occurrences of a particular act. So behavioral contingencies are relations among 1) antecedent environmental events, 2) actions, and 3) consequent environmental events. If events occurring in this temporal order can be shown to be causally related, the events are said to constitute a *3-term contingency*.

Consider the following scenario. At 5:00 pm at the grocery store checkout counter, a child asks his dad for candy. Dad says "no" and then the child screams loudly. There are several actions mentioned in the scenario. In order to sort out what is happening, we first must pick one action mentioned in the scenario as the "behavior of interest" (BOI). In this scenario, the BOI could be Dad's saying "no" or it could be the child's asking for candy, or it could be the child's screaming. Since all of those are behaviors, it is up to us which one we are interested in analyzing. Let's say we are interested in Dad's saying "no". Once the BOI is identified, we can start looking at antecedents and consequences. We need to look at the events that come before the BOI and events that come after the BOI. Let's look at the elements that play the role of antecedents, action, and consequences in this scenario.

Behavior (act) of interest: (Dad) saying "no"

Before the act occurs: Checkout counter of grocery at 5:00 pm
                                                    Child asks for some candy

After the act occurs: Child screams loudly

We have identified an act and some of its antecedents and consequences. Can we say that we have identified a 3-term behavioral contingency? Not yet. We

need some more information to be able to say that with confidence. First, we must have some evidence that Dad's saying "no" was the result of one or more of the antecedent events we have identified (and not the result of some concurrent event like the clerk asking if Dad had any coupons). And we must also have some evidence that the child's screaming was the result of Dad's saying "no" (and not the result of something else that happened concurrently...such as his finger being pinched by the grocery cart).

To find out these things, we must observe the behavior of interest many times. If we find that Dad is highly likely to say "no" only when one or a combination of these antecedents is present, and we also find it highly likely that the child screams loudly only when Dad says "no", then we have good evidence that a 3-term contingency is in effect.

As you can see, a 3-term behavioral contingency requires more than a one-time series of events. A single occurrence of Dad saying "no" in a particular situation does not provide enough information for us to identify a behavioral contingency. We might be able to identify the antecedents and consequences of that single act but we can't know yet if the antecedents and consequences are causally related to the act. To say they are causally related, we need evidence that the occurrence of the action is systematically preceded and followed by the same antecedent and consequent events.

> The three broad classes, or categories, of events that are the main constituents of behavioral contingencies are (4) _____, acts, and (5) _____. (use plural words)
>
> (6) _____ are events that follow an act.
>
> (7) _____ are events that precede an act.
>
> Contingencies involve repeated relations between (8) _____ and environmental events that precede and follow them.

Contingencies as Causes of Behavior Change

As it turns out, the causal relations embedded in behavioral contingencies supply the mechanisms for behavior change. The relations embedded in behavioral contingencies result in the origin of new acts in a repertoire. Those relations also result in new relations being built up between action and an expanding behavioral environment.   Here is an example of how behavioral contingencies build actions.

Juni is a very young infant whose dad plays teaching games with her every evening. He moves a little clown doll near Juni's face and when she turns her head and looks at it, dad squeezes the clown so that it squeaks. As a result of the relation between turning her head toward a moving object and a consequent squeak, Juni learns over the next few days to turn and look at the clown when it approaches her face. One day Juni's hand moves in the direction of the clown and dad quickly presses the little clown against Juni's palm and it makes it squeak. Over the next few days, Juni becomes better and better at reaching for the clown because Dad only squeezes the clown against her hand when her reaches are improving in their direction and timing. One day Juni reaches right out and grabs the clown and it squeaks. Dad lets it go and Juni moves the clown to her mouth. Soon Juni is grabbing the clown right away when Dad holds it up. This is an example of how a contingency between a particular antecedent, certain movements, and consequences works to bring an organized act into existence.

Juni has acquired the action of reaching out and taking a nearby object. Note that Juni didn't just one day do that, out of the blue. That action was gradually built up by a series of changing relations between her movements and their antecedents and consequences. The first relation was between her turning toward an object and the squeak. Then came the relation between Juni's movements toward the object and Dad's placing of the object against her palm with a squeak.   Dad helped Juni become better at reaching by waiting for a hand movement that came closer to the clown than the previous movement before delivering the consequence. When Juni's reaching was really good, Dad released the object, which went to Juni's mouth. A new consequence for reaching nearby objects has become part of Juni's behavioral environment. We can tell that the consequence of object-in-mouth is one that is very powerful because soon Juni is reaching for all kinds of objects and mouthing them. Once the behavioral contingencies arranged by Juni's dad resulted in the formation of an organized action in her repertoire, the action was maintained as part of other contingencies. Often an action, once formed, becomes part of many different behavioral contingencies.

It is important to note that not all behavioral contingencies have the effect of generating and maintaining actions and behavioral relations in human repertoires. It just so happened that the contingencies in the above example had that effect. Some contingencies have other effects. The principles that describe the results of behavioral contingencies are what much of this course is about.

> The relations embedded in behavioral contingencies cause (9) _____ in behavior and also result in the origin of new (10) _____ in a repertoire and also result in new relations between action and the behavioral (11) _____.

Juni acquired the act of reaching for the clown because her dad arranged behavioral (12) _____.

Was Juni's learned act also maintained by contingencies different than those that caused the act to be learned? (13) _____ (Yes, no)

Behavior and Its Causes: Reading #5

Operant Reinforcement

Operant reinforcement is a *process* that goes on in nature. The reinforcement process is the name for an *increase in frequency* of a behavior that has reliably produced a particular consequence. The response-consequence contingency is the cause of the change that we call reinforcement.

We cannot choose whether a response-consequence contingency will result in the reinforcement process. Nor are we aware of many of the response-consequence contingencies accounting for our own behavior.   We did not plan to learn much of what we have learned. Nor did anyone plan to teach us some things we have learned. In fact, humans often learn what others would rather them *not* learn. Parents would prefer their children not learn to smoke or locate a drug dealer. Children would prefer their siblings not learn to extort promises about keeping silent. The learning occurred because certain antecedents, behaviors, and consequences happened to occur in a certain order-- even though no one planned that. Parents and siblings often play a role in the learning of unwanted behavior, but they usually are not aware of the role they play. And their own behavior in playing a role in producing and maintaining the unwanted behavior of their offspring and siblings is itself evidence of the reinforcement process in action.

Even though the reinforcement process goes on continuously, and independently of our wishes, humans can learn to arrange three-term contingencies so that the process results in an increase in frequency of behaviors that benefit the behaving individual as well as the larger society. When humans make particular consequences contingent on particular behavior and the result is an increase in the frequency of that behavior, then this is called a reinforcement procedure, or operation.

The distinction between a reinforcement **procedure** and the reinforcement **process** is a distinction between an operation (implementing a contingency) that produces an effect and the effect (increased frequency) produced by the operation. The operation is the procedure and the resulting change is the process.

> In other words:
>
> Person arranges reinforcement contingency to make reinforcement happen = reinforcement **procedure**.
>
> Behavior increases in frequency after a reinforcement procedure is implemented = reinforcement **process**.

In the last reading, we discussed behavioral contingencies -- temporal arrangements (planned or unplanned) of antecedents, actions, and consequences. We described how behavioral contingencies resulted in a new action coming into existence in Juni's behavioral repertoire. The action was then repeated over and over by Juni. Dad's delivery of consequences contingent on Juni's actions was a reinforcement procedure that brought about the change in Juni's behavior. The increase in frequency of Juni's reaching/grasping the clown doll exemplified the reinforcement process.

Reinforcement is the first behavioral procedure (and process) that you have learned about in this course.   It is probably the most important because of its role in producing new operant units, and also in increasing the frequency of instances of a previously acquired operant. The power of reinforcement procedures to bring about desired behavior change is often underestimated—partly

because people don't understand how the reinforcement process works or how to implement effective reinforcement procedures. But there are other reasons why reinforcement is often overlooked.   When a person implements a response-consequence contingency, the change in the learner's behavior often occurs over several days' or weeks' time. People usually want behavior change to occur immediately, so they fail to continue the reinforcement procedure long enough to get the desired result.   This is unfortunate because lasting behavior change almost always takes time. Patience and consistency are the keys to success in implementing any behavior change procedure, especially a reinforcement procedure.

Operant reinforcement is a process that goes on in (1) _____.

When humans arrange response-consequence (2) _____ that result in increased frequency of behavior, those arrangements are called (3) _____ procedures.

The change in behavior that exemplifies the operant reinforcement process is a(n) (4) _____ in the frequency of behavior that results from a response-consequence contingency.

Lasting behavior change almost always takes (5) _____, so patience and (6) _____ are important when using reinforcment procedures.

From Primordial to Operant Behavior

Although human infants are born with a small repertoire of organized actions, such as sucking, the behavioral repertoire of human infants at birth is made up mostly of primordial behavior. Recall that primordial behavior is movement that is not organized and has no function—it doesn't relate to anything else in particular. Compared to the many actions that most humans can perform even two years later, the human repertoire at birth is seriously deficient in terms of its survival potential. Human infants depend entirely on other humans for their survival.

The value to organisms of the behavioral process of operant reinforcement is that it adapts the infant's movements over time to fit the particular environmental events present in that infant's world. This is accomplished when the infant's movements occur close in time to other events in the infant's world. In other words, contingent relations between antecedents, movements, and consequences result in the movements becoming integrated with the world to form actions. Gradually over time, the unsystematic movements of primordial activity become organized into specific actions that relate to the world in specific ways, as when Juni's reach and squeeze movements came into being. When such actions come to exist and occur repeatedly in a behavior stream, relating to their environment in systematic ways, we can say that the *infant has acquired an operant*.

The earliest operants in human repertoires are made up of actions that are fairly simply—actions like Juni's reaching and squeezing the toy. In our example, Juni's dad arranged contingencies so that Juni could learn the action of reach/grasp very quickly. Humans are often quite effective in aiding and abetting the learning of their young. However, the reinforcement process resulting from Dad's intervention is the same process that results in Juni's learning to bat the geometric forms hanging from the mobile over her bed, where no human intervention takes place. Whether the contingencies are arranged by someone or occur naturally as a result of the way the physical world is constructed, the process of operant reinforcement is the same.

At birth, a human repertoire is composed mostly of (7) _____ behavior.

Primordial behavior becomes organized into specific actions as a result of the behavioral process of (8) _____.

Whether they are constructed by humans or occur without human intervention, operant processes work the (9) _____ way.

Operant Reinforcement and Behavioral Complexity

Once Juni, or any other human infant, acquires some simple actions, those learned acts provide a new level of behavioral organization, which can then become organized by operant reinforcement into yet more complex actions. That is, Juni's reach and grasp operant may later become part of an operant unit composed of acts that are each more complex – for example, an operant unit we might call "washing her face". Once the reach and grasp operant is available to enter into other contingencies, it can become part of Juni's "washing her face" operant. In completing the act of washing her face, Juni reaches and grasps several objects: faucet, soap, towel, etc.

Each level of organized complexity that emerges in a person's repertoire gives the behavioral process of operant reinforcement more to work with. Furthermore, the more actions a person can perform, the more ways there are for that person's actions to become systematically related to environmental events. The reach and grasp operant was one that had to be in Juni's repertoire before the more complex operant of washing her face could be built by operant reinforcement. Thus, as a behavioral repertoire becomes richer, its behavioral environment can become richer. And as a behavioral environment becomes richer, a behavioral repertoire can become richer. Step by step, the growth of one gives opportunity for the growth of the other.

Naturally, there are limits to what operant reinforcement can produce. Human anatomy and physiology allow a great deal of flexibility, but the reinforcement process cannot result in a human flying to Mars…or even from tree to tree in the park. Humans don't have the biological equipment to fly. So operant reinforcement is limited by the physical characteristics of a behaving organism. Limitations also come from the environment side of the behavioral equation. If the speech of other people doesn't get related to a child's acts (vocal or nonvocal) in behavioral contingencies, then the speech of others cannot become part of the child's behavioral environment. It will remain noise.

Behavioral complexity is built up gradually as the behavioral environment gets (10) _____ as a result of operant (11) _____.

What operant reinforcement can do is limited by the (12) _____ characteristics of an organism and also by the range of events that get related to a child's acts in behavioral contingencies.

Reinforcement and Operant Frequency

So far, we have focused mostly on the role of operant reinforcement in producing new operants (acts that change the environment) in the repertoires of humans. In addition to its ability to produce these new operants, operant reinforcement also accounts for other features of operant behavior. Among the most important things that operant reinforcement does is account for the frequency with which an operant occurs in a behavior stream.

Just because a particular operant is in a person's repertoire does not mean that it appears very often in that person's behavior stream. For example, Marianna may have the act of smiling (or saying "thank you" or entering a draft in her checkbook) in her repertoire but that behavior may appear in her behavior stream at a very low frequency. If it does occur at a low frequency, the frequency of its

occurrence can be increased by operant reinforcement.

For an act to increase in frequency, behavioral contingencies must change. The contingencies currently in effect are not adequate to maintain the act's occurring at a higher frequency. There are many different ways for reinforcement contingencies to change. One way is a change in the events that occur as consequences of the acts that make up the operant. If Marianna doesn't smile very often when the consequences for her smiling are returned smiles, Marianna might smile more often if the consequences of her smiling are vocal greetings. If adding vocal greetings to the consequences of Marianna's smiling increases the frequency of her smiling, then operant reinforcement has occurred.

Another way that reinforcement contingencies can change is that current consequences may increase in frequency. For example, Marianna's smiling may now result in a return smile from 1 of every 10 people she smiles at. If the frequency of returned smiles increased to 1 of every 2 of Marianna's smiles and, as a result, Marianna's smiles increased in frequency, then operant reinforcement has occurred.

In addition to accounting for the particular forms of behavior that emerge in human repertoires, operant reinforcement also can (13) _____ the frequency of operant.

One way that reinforcement contingencies change is that the events that occur as (14) _____ of the act change.

Another way for reinforcement contingencies to change is that there can be a change in the (16) _____ with which some consequence follows behavior.

Conclusion

Operant reinforcement is a powerful behavioral process. It is the main engine behind the acquisition and maintenance of behaviors in human repertoires. We owe most of the particulars of our behavioral repertoires to the behavioral process of operant reinforcement. This is not to say that nothing else is relevant to the fact that we can and do behave as we do. There are many other things that are necessary to our learning those behaviors that we learn during our lifetime. But without the process of operant reinforcement, we would learn little and be very unlikely to survive (unless fed and kept safe by others for whom operant reinforcement was occurring).

Behavior and Its Causes: Reading #6

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Operant Extinction

As discussed previously, primordial movements are fashioned into organized acts when particular behavioral contingencies result in the process of reinforcement. (Recall the discussion of behavioral contingencies in Reading #4.) The organized action of reaching and grasping the clown was fashioned by repeated and precise arrangements in time (and space) between Juni's movements with respect to the clown (reaching and grasping) and the consequences of those movements (touch and squeak).

If an act that has been maintained by a particular reinforcement contingency continues to occur but the consequences no longer follow, then the contingency is no longer in effect. We might predict that the act would decrease in frequency, and eventually stop occurring, once the contingencies were no longer in effect. And that is exactly what happens. Operant extinction is the name of this behavioral process. The process can be described like this: Extinction is a decrease in the frequency of an act due to the discontinuation of the reinforcement contingency that has maintained its frequency.

As in the case of the reinforcement process, the extinction process is simply the way the world works. It does not have to be planned or carried out by another human. However, if other humans are supplying the consequences in the reinforcement contingencies that are maintaining an act, then they will have to stop supplying those consequences if nature's extinction process is going to take place.

> The extinction process is a(n) (1) _____ in frequency of an act caused by discontinuation of a reinforcement contingency.

> The extinction process (2) _____ (is/is not) something that happens in nature regardless of human wishes or plans.

Extinction Procedure

The discontinuation of reinforcement contingencies is called an *extinction procedure*. Recall the behavioral contingency that resulted in Juni's learning the reach and grasp action.   Now imagine that after a day or two of very effective reaching for the clown, Dad and Mom take a short trip and leave Juni with Aunt Mina and Uncle Ted. Before leaving, Dad shows Aunt Mina how

good Juni is at reaching for the clown. So after Juni is fed and diapered, Aunt Mina holds the clown up for Juni. Uncle Ted says "Better not let her have that, because she'll probably put it in her mouth and it may have germs on it." So when Juni reaches for the clown, Aunt Mina pulls it back and Juni's hand fails to make contact with the clown. Sometimes Aunt Mina makes the clown squeak when she holds it up for Juni to look at, but she never makes it squeak when Juni reaches toward it. So the squeak still occurs but it is no longer a consequence of reaching. The squeak must come *after* the reaching in order to function as a behavioral consequence. After a day or two, Juni no longer reaches for the clown when Aunt Mina holds it up. She may even cry when Aunt Mina holds the clown in front of her.

Aunt Mina has accidentally instigated an extinction **procedure**. She has rearranged the way Juni's behavioral environment relates to her reaching behavior. Aunt Mina wasn't planning to decrease the frequency of Juni's reaching but she did not continue the reinforcement procedure that was maintaining it. Her accidental discontinuation of that reinforcement procedure resulted in the disappearance of the reach/grasp act from Juni's behavior stream. The extinction **process** occurred even though Aunt Mina doesn't know how it works.

The distinction between an extinction procedure and the extinction process is a distinction between an operation (implementing a contingency) that produces an effect and the effect (decreased frequency) produced by the operation. The operation is the procedure and the resulting change is the process.

> In other words:
> Person arranges (either on purpose or accidentally) extinction contingency to make extinction happen = extinction procedure.
> Behavior decreases in frequency after an extinction procedure is implemented = extinction process.

Remember from Reading 5: The distinction between a reinforcement **procedure** and the reinforcement **process** is a distinction between an operation (implementing a contingency) that produces an effect and the effect (increased frequency) produced by the operation. The operation is the procedure and the resulting change is the process.

We can guess that when Dad returns, he will notice right away the change in Juni's repertoire. He might tell Juni's mom that Juni is tired of the clown game, or maybe he'll even say she dislikes the clown when she cries upon seeing it. Like most people, Dad doesn't spend much time trying to figure out why Junie is behaving differently. It doesn't occur to him that part of Juni's behavioral environment changed dramatically while he was away. He simply attributes the change in behavior to some unexplained change in Juni. In fact, any changes in Juni's behavior (and, therefore, in Juni herself) can be traced

to the ways in which Juni's behavioral environment has been relating to her actions.

> If a person arranges a reinforcement contingency to make it happen, we call this a reinforcement (3) _____ (process, procedure). The discontinuation of reinforcement contingencies is called a(n) (4) _____ (2 words).
> The decrease in frequency of Juni's reaching is called a(n) (5) _____ (2 words).

Neutral Contingencies

Just because there is a contingency between some act and some consequence does not mean that the reinforcement process will take place. You will learn later in this course about contingencies that *decrease* the frequency of an act.   For now, we want to make the point that it is possible for a behavior/consequence contingency to have no effect at all on the frequency of acts that participate in the contingency. Consider this example. First grader Ned completes only 1 or 2 of the 10 daily worksheets students are supposed to complete during each school day.   Ms. Zachary implements a procedure whereby she gives Ned a piece of candy each time he completes a work sheet; but after two weeks Ned is still completing only one or two worksheets a day.

Ms. Zachary planned a reinforcement procedure and she implemented a contingent relation between the act of completing a worksheet and the consequence of a piece of candy. Despite her good planning and good implementation of her plan, the reinforcement process did not happen. In fact, no change occurred in Ned's rate of completing worksheets. Since the reinforcement process did not occur, the contingency she implemented was not a reinforcement contingency. The contingency had no effect on Ned's completion of math problems. It was behaviorally neutral. The consequence did not function as a reinforcer.

If Ms. Zachary discontinued the contingency between completing worksheets and candy consequences, her discontinuation of that contingency would not likely result in a decrease in frequency of Ned's completing worksheets. If the contingency didn't result in reinforcement, then discontinuation of it will not result in extinction.   We would not expect the extinction process to occur when the contingency was discontinued because the contingency between completing worksheets and candy had no effect in the first place. That contingency was neutral, not a reinforcement contingency.

In the everyday world almost all acts have some kind of consequence, but the contingencies in which the acts and consequences come together don't always

have an effect on the act's frequency. Sometimes the contingencies are neutral.

An example of a contingency that may be neutral in the repertoire of many people is the short musical phrase that reliably follows turning on one's computer. The contingency between turning on the computer and the sound is very good because the sound is always produced by pressing the "on" button and never occurs unless the on button is pressed. However, if the contingency were discontinued, and the sound no longer followed pressing the "on" button, this might have no effect on the frequency of turning on the computer. If the discontinuation of the contingency has no effect, then the contingency is neutral. This is true even if the user says they 'like" or "enjoy" the sound. Liking an event does not necessarily mean that the event functions as a reinforcer.

Neutral contingencies can be ignored unless they were planned and implemented to alter the frequency of an act. If a contingency designed to increase frequency of an act does not increase the frequency, then the designer will have to change the consequence (or add another) in the contingency. If the designer employs an extinction procedure, the designer must ensure that the contingency maintaining the act is the contingency that is discontinued. Any neutral contingencies can remain in effect.

> It is possible for contingencies to have no effect on the frequency of acts that are part of the contingency. (6) _____ (true/false)
>
> An extinction procedure requires discontinuing a contingency that does have an effect on an act that is part of the contingency. (7) _____ (true/false)
>
> Discontinuing a neutral contingency will result in the extinction process. (8) _____ (true/false)

Issues to Consider When Implementing Extinction Procedures

An extinction procedure – discontinuation of a reinforcement procedure that has been maintaining an act's occurrences in a behavior stream – results in decreased frequency of that act. Extinction is a powerful procedure that can be very useful in decreasing rates of acts that are mildly harmful to the well-being of the behaver and/or other people or things. However, extinction procedures often have other effects that are just as important but less beneficial. Furthermore, extinction procedures are hard to implement effectively. We will discuss these matters briefly in this section.

One of the less beneficial effects of extinction procedures is called "extinction-produced aggression." When a previously reinforced act occurs repeatedly and

its reinforcing consequences repeatedly fail to follow, people (and other animals) often behave aggressively. They may strike out (verbally or nonverbally) at the person (or toy or machine) who used to provide the consequence but no longer does so. They may even strike out at an innocent bystander. Think about how drivers often behave if their car doesn't start when they turn the ignition key. As a driver repeatedly turns the key and the engine repeatedly fails to turn over, the driver becomes more and more likely to pound the steering wheel, swear, or shout at anyone who is present. The tendency for people to aggress when an act in their repertoire is undergoing extinction needs to be considered if an extinction procedure is planned.

There are ways of reducing the likelihood of extinction-produced aggression. One way is to be sure that a person has alternative ways to produce the consequence in the contingency that is discontinued. A person who has battery cables, knowledge of how to use them, and access to a live battery can begin engaging in alternative acts that result in cars starting. Those alternative acts are likely to produce the same consequence – engine running – as the act of turning the ignition switch. One rule for appropriate use of an extinction procedure is to be sure that the person's repertoire includes an alternative behavior that produces the consequence that has maintained the act in the past.

Of course, Aunt Mina didn't realize that she was implementing an extinction procedure when she held the clown up and but pulled it away when Juni reached toward it. That is one of the dangers of not knowing about behavioral principles. People often fail to understand how their own actions enter into the contingencies that cause changes in the behavior of others.

Another problem with extinction procedures is that a decrease in the frequency of an act is often preceded by a brief period during which there is an *increase* in the frequency of the act that is being extinguished. This brief increase is called an *extinction burst*. If the act undergoing extinction is seriously detrimental to the health or immediate well-being of someone (the behaver or someone else), then the temporary increase in rate has some potential for harm. For this reason, behavior analysts usually use an extinction procedure when the act to be extinguished is not dangerous or highly destructive. And they always make sure that the person has in his repertoire an alternative act that either produces the same consequence as the act undergoing extinction or produces an alternative consequence that is at least as valuable to the behaver as the consequence that is no longer contingent on the act undergoing extinction.

Another problem with extinction procedures is that the implementation must be almost perfect if the extinction process is to occur. That is, an extinction procedure cannot be effective unless the reinforcing consequence virtually

never follows the act. If the reinforcing consequence sometimes follows the act and sometimes doesn't, this is not an extinction procedure. The procedure in which reinforcing consequences sometimes occur and sometimes don't is a kind of reinforcement that makes behavior harder to extinguish. You will learn more about that kind of procedure later in this course.

Finally, it is important to note that an act cannot extinguish if it does not occur. In other words, it is the *contingency* that must fail to happen, not the act. If we arrange a behavioral environment so that some unwanted act does not occur, such an arrangement does not result in the extinction process. The act must *occur* and the consequence *not occur* for the behavioral process of extinction to happen. In short, the *contingency* between act and reinforcing consequence must be discontinued.

> When a reinforced contingency is discontinued (9) _____ is sometimes seen.

> An initial increase in frequency of an act that no longer produces a reinforcing consequence is called a(n) (10) _____.

> When using a(n) (11) _____ procedure, it is important to insure that the consequence in the discontinued reinforcement procedure is available to the learner contingent on alternative behavior.

> The extinction process can only occur if the act (12) _____ (does/does not) occur and the consequence in the former reinforcement contingency (13) _____ (does/does not) occur.

Conclusion

When a reinforcement contingency between occurrences of an operant and some particular consequence fails to occur over an extended period of time, the acts that are no longer followed by the reinforcing consequences gradually decrease in frequency, sometimes to zero. The procedure of discontinuing a reinforcement contingency is an extinction procedure. The reduction in frequency of an act that is caused by the extinction procedure is a behavioral process called *extinction*.   Extinction procedures can be an effective way to bring about behavior change but they are difficult to implement. Effective implementation requires concurrent reinforcement procedures.

> Extinction procedures are (14) _____ (easy/hard) to implement effectively.

Behavior and Its Causes: Reading # 7

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Differential Reinforcement

The procedure of differential reinforcement has the effect of increasing the frequency of one behavior while at the same time decreasing the frequency of another behavior. For example, if Mary saw that her 5-year old son Trey often ate with his hands rather than his fork, leaned his elbows on the table, or propped his head up with one hand while eating with the other, she might decide that it was time to teach him to eat with his fork while keeping his other on the napkin in his lap.   Mary could use the procedure of differential reinforcement to teach Trey good table manners during mealtimes. For example, Mary could praise Trey's eating with a fork while keeping his other hand in his lap, and ignore Trey's eating in other ways. Of course, Trey is still getting the food reinforcers, whichever way he eats. But eating in a mannerly way results in Mary's praise in addition to food. If her intervention is effective, Mary will see an increase in Trey's mannerly eating behavior and a decrease in Trey's unmannerly eating behavior.

In this example of differential reinforcement the behaviors that are treated differently are very similar to one another. They probably belong to the same operant unit at first because they are interchangeable with one another in terms of how they relate to their environment. They all occur in the same situation (mealtimes) and they all produce the same consequences (food). Differential reinforcement is a way to divide Trey's eating behavior into two operants whose frequencies change in different directions. In the past all the different ways of eating led to the same consequence: food. After Mary implements her differential reinforcement procedure, some ways of eating result in praise in addition to food; other ways of eating don't get the praise – only the food.

> Differential reinforcement is a procedure that (1) _____ the frequency of one behavior and (2) _____ the frequency of another.
>
> Differential reinforcement involves one (3) _____ (one, two) situation(s) and   (4) _____ (one, two) behavior(s)..
>
> In differential reinforcement, one behavior is (5) _____ and the other behavior is (6) _____ . (use technical terms)

Laying the Groundwork and Implementing the Procedure of Differential Reinforcement

Whether Mary's efforts result in the desired behavior change or not will probably depend on many things. One thing that might make a difference in this particular case is whether Mary lays the proper groundwork for the intervention. It might help if Mary explained the value of good manners during a conversation about some topic that interested him. She would need to listen to Trey and introduce her topic at an appropriate moment in the conversation, which might be about birthday parties or dinosaurs, or some other topic that interests Trey. During the course of the conversation, she might explain to Trey that she thought he was now old enough to learn how grown-ups eat with good manners. In another conversation, she might say at some point that he is very smart and will learn in no time to sit up straight, eat with one hand, and keep the other hand on his napkin in his lap. She needs to be prepared to answer questions Trey might ask as to why it is important to have good manners, who decided what counts as good manners, and so forth. Laying the groundwork might take several conversations to accomplish.

This kind of groundwork is not always necessary or even possible. It would not be useful if Trey didn't understand what she was saying. And if Mary dwells for too long on the topic in any one conversation, her praise for good manners may not function as a reinforcer. One reason why such groundwork may support the differential reinforcement procedure is that it may increase the value of praise for good manners. Recall that the food reinforcers will continue no matter which way Trey eats, so if the praise is going to increase the frequency of eating with good manners, it has to add to the value of the food reinforcers. If Mary can increase the value of praise for good manners by making good manners themselves a "good (grownup) thing", the differential reinforcement procedure may have a better chance of bringing about the desired behavior change.

In laying this groundwork, Mary is specifying the behavior that is desired by telling Trey what counts as good manners and giving him a reason why he might want to learn to eat with good manners. Important to note is that Trey is not learning to eat with good manners while she is talking. He may learn to *talk* about eating with good manners during this conversation; but he can only learn to *eat* with good manners when he is eating.

After Mary has laid the groundwork that she hopes will help Trey learn quickly to eat with good manners, she can begin using differential reinforcement to teach him to do so. She needs to be very alert for opportunities to reinforce mannerly eating because Trey has been eating in the old ways for a long time and may very seldom be sitting up straight with one hand in his lap. But if he

does, even for a moment, Mary needs to say, with a smile, something like "Hey, look at you…sitting up straight and eating with one hand!" or What nice manners you have"   Next time, she might say something like "Trey, I'm proud of how grown up your manners are". When Trey eats with good manners, Mary provides the consequence of an approving comment. If all goes well, this delivery of approving statements contingent on good manners and the failure of such statements to follow bad manners will result in splitting the eating behavior into two operants. The rate of eating with good manners will increase and the rate of eating with poor manners will decrease.

> In the example given of laying the groundwork for a differential reinforcement procedure, Mary initiated discussion of good manners during conversations in which she (7) _____ to what Trey had to say about something that interested him.

> Mary explained to Trey what counted as good manners and gave him a good (8) _____ (reason, model) for wanting to learn good manners.

> When Mary praised Trey's good manners at the dinner table, she praised in (9) _____ (the same/different) ways.

Pitfalls to Avoid in Implementing Differential Reinforcement

Finding opportunities to reinforce a behavior that is, at first, occurring very seldom is hard enough. But keeping her mouth shut when Trey is slouching over his food, or leaning with both elbows on the table, will be even harder for Mary. When he does any of those things she will be tempted to say "Don't forget your manners" or "Have you forgot how to eat properly?" or "You aren't learning very fast" or some other nagging or criticizing statement. You might ask "Wouldn't reminders help him learn faster?" The answer is that they might, but not if the reminders occur when he is performing the *unwanted behavior*. Remember, Mary is using differential reinforcement to *reinforce* the *wanted* behavior and *extinguish* the *unwanted* behavior. Extinguishing that behavior means ignoring it in this case.

There are a number of reasons why reminders contingent on the undesirable behavior could sabotage the procedure of differential reinforcement. First, the reminders could themselves function as reinforcing consequences, particularly if Mary is so focused on his manners that the only time she talks to him during dinner is to "work on his manners." After all, the *reminders* are a form of attention. If Trey gets more of Mary's attention while his manners are poor than while his manners are good, poor manners might be *more* likely to occur rather than *less* likely. And when he is first learning to eat with good manners,

he won't be doing it very often, so if Mary's attends to poor manners most of her attention will end up following poor manners, even if she praises good manners on the few occasions they occur.   She may accidentally be arranging for more attention to follow poor manners than good manners.

But things could be even worse. If Mary nags Trey about a lot of different things, then Mary's annoyance or displeasure could come to function as a reinforcer for any behavior that produced Mary's annoyance.   This tendency for annoyance to function as a reinforcer would be strongest in situations where a lot of nagging occurred. So, Mary's nagging or constant reminders about good manners during dinner could result in Trey's working hard to produce Mary's annoyance (by eating with poor manners). In that case, Mary's attempts to differentially reinforce good manners would be to no avail. Even if her praise was contingent on Trey's good manners, it would have little effect if the more powerful reinforcer of Mary's displeasure was contingent on Trey's poor manners.

The fact is that some very strange consequences come to function as reinforcers in the behavioral repertoires of many people. We probably all know some people who seem to go out of their way to hurt other people's feelings. Some people appear to go out of their way to hurt the feelings of just one or two particular people. Other people seem to do whatever possible to annoy or displease most people. People for whom annoyance of others functions as a reinforcer are at a serious disadvantage in life, because people will tend to avoid them, which in turn will result in their having fewer opportunities. So it does not seem likely that Mary or any other parent would knowingly provide behavioral environments that resulted in such repertoires. However, parents – and teachers and friends – do sometimes accidentally provide such behavioral environments.

> If Mary follows Trey's poor eating manners with criticism or correction, those consequences might possibly function as reinforcers because they are a form of (10) _____ (attention, reminder) and they are contingent on eating.
>
> If someone else's displeasure is a reinforcer, behavior that produces that displeasure will (11) _____ in frequency.
>
> In a situation where someone's displeasure is a reinforcer for undesirable behavior, praise for desirable behavior may not function as a (12) _____ .

Differential Reinforcement and Operants

The behaviors designated as "different" before differential reinforcement begins are sometimes different only in the eye of the beholder. The procedure of differential reinforcement makes them different in the repertoire of a learner. Before Mary used differential reinforcement, Trey occasionally ate in a way Mary labeled as "good manners" and often ate in many other ways Mary labeled as "poor manners". His various ways of eating were all reinforced with food so they were all pretty much the same to Trey, even though they were very different from Mary's perspective. Mary used differential reinforcement to change Trey's repertoire so that his operant of "eating" was split into two operants: eating with good manners and eating with poor manners (which we defined above). We can only know that this splitting has actually occurred if we see the frequency of mannerly eating increase and the frequency of unmannerly eating decrease.

Mary's classification of some activities as "good manners" and other activities as "bad manners" allowed her to develop behavioral definitions between what she would reinforce and what she would extinguish. Her classifying activity did not result in the splitting of Trey's eating behaviors into two operants. Her use of differential reinforcement procedures was what accomplished that splitting.

It is worth noting that Mary's classifications of mannerly and unmannerly eating were based on the conventions of her society. In another society, good and poor eating manners may be defined differently. As a transmitter of her particular society's eating conventions, Mary used differential reinforcement to split Trey's eating operant into two operants: one that society calls "mannerly" and one society calls "unmannerly".

Not all differential reinforcement works to bring people's behavior in line with their society's socially transmitted standards.   Sometimes it works in the opposite direction. This can happen when some members of society reinforce behavior that is deviant from the social norms and extinguish behavior consistent with social norms. A parent who acquiesces to a child's request when the request is loud and demanding but not when the request is quiet and polite is likely to hear fewer and fewer polite requests and more and more demanding requests. A child who relinquishes her candy when threatened by a sibling but never shares her candy when her sibling offers to trade one for one is inadvertently teaching her sibling to bully her. A spouse who complains when his wife throws clothes on the floor but ignores the wife's putting the clothes in the washer is differentially reinforcing slovenly clothes handling if the complaints function as reinforcers. And complaints are likely to have that function if he complains about many of her behaviors. She may not "like" the complaints but that doesn't mean they don't function as reinforcers for her slovenly behavior.

In each of these cases, a learner's repertoire is changed when behavior that occurs in a particular situation gets split into two different operants by the procedure of differential reinforcement. As a result of that procedure, one of the two differentiated operants goes on to live an active life in the learner's behavioral repertoire while the other undergoes extinction.

The same procedure can occur when automatic consequences (rather than socially contrived consequences) of behavior split an operant into two operants. For example, a novice skier at first engages in many different leg movements while standing at the top of small hill. Some of these movements result in the skier gliding down the hill and others don't. The movements that result in gliding increase in frequency and the other movements decrease in frequency. The differential reinforcement of some movements splits the movements occurring in this situation into two operants – one that increases in frequency and the other that decreases.

> The behaviors that are reinforced and extinguished in differential reinforcement may be split into different (13) _____ in the repertoire of a learner.
>
> The classification of some acts as "desirable" and other acts as "undesirable" may result in their being viewed by onlookers as two different (14) _____ even though the contingencies that maintain them may be the same.
>
> Differential reinforcement splits one operant into two operants, one of which (15) _____ in frequency and the other of which (16) _____ in frequency.

Conclusion

Socially arranged differential reinforcement is a way to ensure that just the "right" versions of an act continue at high frequency in a repertoire. Before the socially arranged differential reinforcement procedure was implemented, all of Trey's eating behaviors were reinforced in the same way: with food. So, all of his eating behaviors were "right" in the non-social behavioral environment. Of course, what is "right" in the world of nature is often "not right" according to human social conventions. Trey's table manners matter in the behavioral environment constructed by the society in which Trey lives. In that world, only some ways of eating are "right", so only those versions of eating earned Mary's praise; the others did not.   If praise is a reinforcer, then the differential reinforcement of proper eating behavior splits Trey's eating into two operants: mannerly eating and unmannerly eating. Henceforth, these two operants have diverging paths in Trey's behavioral repertoire.

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Behavior and Its Causes: Reading # 8

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What Counts as a Reinforcer?

Sometimes people ask questions like this: "Is candy a reinforcer?" Such a question is not answerable. The technical term "reinforcer" can be applied to some particular event only if other particulars are specified. First, instances of the event in question must be observed to occur reliably after some particular action in the behavior stream of a particular organism. So, to answer such a question we must see if candy reliably follows some particular action in the behavior stream of a particular person. If there is no such contingency, then there is no way to talk about whether candy is a reinforcer. Second, the reliable relation between the action and the consequence must increase and/or maintain the frequency of the action as time goes on. In other words, the contingency between that action and the candy must have a particular kind of effect on the action for us to say the candy functions as a reinforcer.

The kind of question that *can* be answered, at least in principle, is one like this: "Is candy functioning as a reinforcer in maintaining Little Bobby's temper tantrums at the grocery check out line?" This question asks the listener to look for a contingency between a specific action (tantrum) of a particular organism (Bobby) and a specific consequent event (candy). It also asks the listener to identify whether or not the contingency is what is causing the action to occur as often as it does. If the listener does observe a contingency between tantrums and candy and can say that that contingency is what accounts for Bobby's tantrums, then the answer to the second question is "yes, candy is a reinforcer for Bobby's tantrums at the grocery store." That "yes" answer does not, however, allow us to answer "yes" to the first question ("Is candy a reinforcer?"). We can only say that candy is a reinforcer *for Bobby's tantrums*. Candy may or may not function as a reinforcer for other actions in Bobby's repertoire. And it may not function as a reinforcer for *any* actions in the repertoires of some people.

The point is that the technical term "reinforcer" does not specify events that have any particular physical properties – although all reinforcers have physical properties. "Reinforcer" is a name given to any events that reliably follow repeated instances of any action and, as a result, increase or maintain the frequency of that action's occurrences. Words like "candy", "praise", "attention", or "lottery tickets" name events that are defined in terms of their physical characteristics (even though some of those characteristics are hard to specify precisely). What qualifies an event as a reinforcer is its temporal relation to particular actions (it must follow them) and its function in a

particular behavioral environment (it must increase the frequency of those actions). Once again, for any particular consequence to be called a "reinforcer", it must be an event (of any physical dimensions) that reliably follows occurrences of some action and it must increase or maintain the frequency of that action's occurrences in a behavior stream. *Reinforcers*, like all the technical terms in behavior analysis, are identified by their functions, not by their physical features.

When we describe relations between actions and events in behavioral environments, we have to first specify the physical events that enter into the relations (e.g., tantrums and candy). We also have to say how those events are related in time (the tantrum first, followed by the candy). Once the temporal order of events having particular physical characteristics is specified, we can ascertain whether the relation between those actions and those consequences has the effect of increasing or maintaining the frequency of those actions. If the relation has that effect, we can call the consequences "reinforcers".

> The term reinforcer is used to designate events that have certain (1) _____ (physical/functional) properties.
>
> To qualify as a reinforcer, a particular event must relate in time to a particular action. Specifically the event must reliably (2) _____ the action in time.
>
> To qualify as a reinforcer, an event that follows an action in time must increase or maintain the (3) _____ of the action it follows.
>
> Reinforcers (4) _____ (do/do not) always have physical properties.
>
> The physical properties of a reinforcer (5) _____ (are/are not) what allows us to classify it as a reinforcer.

The Sliding Scale of Reinforcer Effectiveness

Whether and how well an event functions as a reinforcer depends on many things. First there is the matter of how well correlated are the actions and their consequences. Also of importance is the size of the consequence relative to the effort or difficulty of the action it follows. Third, the time that intervenes between the action and the consequence makes a difference to how effective the consequence is in reinforcing the action.   Fourth, conditions that enhance or detract from the value of an environmental event affect how

that event will function when it is a consequence in a contingency.   Each of these will be discussed below.

How Good is the Contingency?

A *contingency* between an action and a consequence implies that occurrences of the action are linked to occurrences of the consequence more tightly than either the actions are linked to other consequences or the consequences are linked to other actions. Let's use Trey's mannerly eating as an example. When Trey was at the dining table, Mary praised Trey's actions of mannerly eating and ignored actions of unmannerly eating. If Mary also offered praise at many other times while they were dining, the contingency between mannerly eating and praise would be weak. Praise would be scattered all through the dining period, following this and that action (although never with actions of unmannerly eating, which Mary always ignored). The power of the praise as a reinforcer for mannerly eating would be weakened due to the weak contingency between mannerly eating and praise. When praise follows all kinds of Trey's actions at the dining table, then there is a weak contingency between mannerly eating and praise. The weakness of the contingency makes it likely that the praise will not be very effective in increasing the frequency of Trey's mannerly eating.

When it is important to increase the frequency of an action's occurrences in some situation, it is important that, in that situation, the consequences of that action be reserved for that action and that action alone until the frequency of that action in the situation has increased. Once Trey's mannerly eating is occurring at a high frequency, the contingency can be relaxed. Mary will be able to praise other laudable actions at the dining table as well as tossing in a little praise now and then for continued mannerly eating. But Trey will learn mannerly eating behavior faster if praise at the dining table is reserved for mannerly eating.

> A contingency is a relation between a(n) (6) _____and a(n) (7) _____.
>
> To the extent that a particular consequence follows only one particular action and no other action, the (8) _____ is strong.
>
> By scattering praise throughout the meal and not reserving it for mannerly eating, Mary was weakening the (9) _____ between mannerly eating and praise.

Does the Size of a Consequence Match the Effort of the Action?

In order for a consequence to function as a reinforcer, the amount of the consequence must be sufficient to make the action worth the time and effort that it takes to perform it. This is especially true when alternative actions that are easier to perform can produce the same consequence.   Receiving $1 for mowing the lawn is not likely to maintain lawn mowing. The amount of work involved is mismatched with the $1 consequence. Only if you had no other way in the world to get money would lawn mowing likely be maintained by the $1. Of course, you may mow the lawn for other reasons but then the $1 would not be the reinforcer maintaining the lawn mowing. The contingency between lawn mowing and $1 would be neutral.

Matching the size of a behavioral consequence to the action required to obtain the consequence is not always easy. In fact, many things need to be considered when deciding what the amount of a behavioral consequence is going to be. First, there is the age of the behaver and his experience with the event that is going to be the consequence. An ice cream cone after a trip to the orthodontist might be sufficient to maintain a young child's bravely making a monthly trip. An ice cream cone might not suffice to maintain an older child's going each month. Perhaps a ticket to a newly released adventure films would suffice to keep him on schedule.

Second, there is the issue of how important it is for members of a complex society to learn to work diligently. If a person's actions frequently produce consequences that are very large in proportion to the amount of effort involved in the action, it will be hard for that person to learn to work hard. Basically, the world has taught him that relatively easy actions produce relatively large consequences. A person with such a history of reinforcement may become inclined to produce consequences the easiest way possible – and the easiest ways are usually not socially desirable. They include stealing, begging, and bullying. So, from the standpoint of social responsibility, the consequences of an action should be fair in terms of the effort required, but not overly generous if the learner is going to become and remain a contributing member of society.

> The amount of a consequence should (10) _____ the amount of behavior required to obtain the consequence.

> A socially responsible approach to designing contingencies is that the amount of consequences should be (11) _____ in terms of the effort required but not so generous that they teach a person to put out minimal effort.

Do the Consequences Follow the Action Immediately?

The consequences with the most reinforcing power are those that follow an action immediately. "Immediately" means, in the ideal case, within seconds. Sometimes a single occurrence of an immediate consequence can produce an increase in the frequency of an action. More often, an action-consequence relation must occur many times before the action's frequency reaches its maximum. But if the contingency is very tight and the consequence is always immediate, even a very small reinforcer can have a profound effect on the frequency of an action.

Sometimes an action results in consequences that are widely separated in time from the action, but the consequences seem to have a reinforcing function. For example, the flowers that are the consequences of annual planting of a garden do not appear for many days or weeks after the planting actions. Yet we might guess that the blooms reinforce planting. There is certainly a contingency between planting and blooming flowers, and the presence of blooms for weeks probably means the size of the consequence is sufficient to function as a reinforcer for planting. But the consequences are not immediate. In fact there is a significant delay between the planting actions and the blooms. There is even significant delay between planting and any signs of growth of the plants.

So … are the blooms functioning as reinforcers for the planting actions? It seems likely that if the flowers failed to appear for several years, the planting would cease. Such a change in the frequency of planting actions suggests extinction has resulted from discontinuation of a reinforcement contingency. For this reason, it seems reasonable to call the blooms a reinforcer for planting. But because of the long delay between planting and blooms, there is reason to believe that other reinforcers may be involved in maintaining the planting. For example, for a person who can state that planting produces blooms, the statement "There will be blooms in a few weeks" that follows the planting may reinforce the planting.

It is unknown at this time whether all increases in frequency of an action due to response-consequence contingencies are instances of the same process, or whether long-delayed consequences and immediate consequences affect behavior as a result of different (perhaps related) processes. In the case of the behavioral relation between planting and blooms, the contingency is sometimes close to perfect, which may reduce the importance of immediacy. Also, consequences other than the blooms may help bridge the gap between the planting and the blooms.

> The time between the occurrence of an action and the occurrence of a consequence (12) _____ (does/does not) affect how well the

consequence functions as a reinforcer.

A temporal gap of a few (13) _____ gives consequences maximum power to reinforce actions.

There (14) _____ (are/are not) situations where long delayed but highly contingent consequences appear to function as reinforcers.

Effects of Deprivation and Satiation

The power of some consequences to function as reinforcers can be temporarily altered. If you were allowed a large bite of your favorite cookie (that you will walk a mile to get) immediately after each occurrence of shuffling a deck of cards, and at no other time, is it likely that the rate of shuffling would increase? The answer is "It depends". Even though the contingency is strong, the effort is little, and the cookie immediately follows the shuffling, it still may not function at this time as a reinforcer for shuffling.

Whether the cookie bites function as a reinforcer depends on how much cookie you have recently imbibed. If you have just eaten yourself sick on those cookies, the bite of cookie following your shuffling will probably not increase the frequency of your shuffling. On the other hand, if you have not eaten anything for several hours, or if you have not eaten your favorite cookie recently, bites of cookie contingent on shuffling would probably increase the rate of shuffling.

The point is that recent events can temporarily alter the reinforcing effectiveness of some consequence. Cookie bites may ordinarily reinforce any number of actions; but at the moment they may not have the power to reinforce any action. Its power is temporarily suspended due to the recent excessive availability of food, including the favorite cookie.

The scarcer an event has been in a behavioral environment, the more powerful its reinforcing effect is likely to be when it is part of a contingency. The more abundant an event has been in a behavioral environment, the weaker its reinforcing effect is likely to be when it is part of a contingency. Recent scarcity is called *deprivation* and recent abundance is called *satiation*.

How scarce the event must be, and how long the scarcity, depends on many other factors. If the scarce event is something that is necessary for survival, like food, then biological factors probably account for increases and decreases in the power of food as a reinforcer for any actions that produce food. If the scarce event is a social commodity, like praise, then what counts as "scarcity"

is relative to the individual behaver's personal history. If Mary usually praises many of Trey's actions each hour, she may need to find a way to avoid praising Trey for, say, the half hour or so before dinner in order to maximize the effects of her praise for good manners. She would be creating a little scarcity of praise in Trey's recent past in order to enhance the effectiveness of praise for good manners. Of course, there is no way of knowing in advance whether this period of scarcity would be sufficient to temporarily increase the value of her praise as a reinforcer for good manners.   The point is that it is important to consider the recent scarcity of the event that follows the wanted behavior.

> The power of some consequences to function as reinforcers can be temporarily (15) _____ .
>
> An event has a greater reinforcing power for some act if the event has recently been (16) _____ (abundant, scarce) in a behavioral environment.
>
> Recent scarcity is called (17) _____ .
>
> An event's reinforcing power temporarily decreases during a time period in which that event has been (18) _____ (abundant, scarce) in a behavioral environment. This is called (19) _____.

Conclusion

Response-consequence contingencies can increase the frequency of actions in a behavior stream, but the effectiveness of the consequence as a reinforcer depends on many things. We have discussed here four factors that contribute to the reinforcing effectiveness of a consequence: the importance of a tight contingency, the relation of the amount of the reinforcer to the amount of behavior required, the importance of keeping the time short between response and consequence, and the effect of recent scarcity or abundance of the event that is the consequence in a current contingency.

By this time, it is probably evident that behavior and behavioral environments constitute a very lively subject matter. This makes them very interesting but also very hard to study. First, the actions that are the empirical basis of behavior analysis are very brief events, so sometimes we have only a second or so to observe a behavioral event. Then re-enactments of an action are never quite the same and, indeed, sometimes change greatly across repeated re-enactments, so we must keep an eye on the environment surrounding them to even know if several actions are part of the same operant unit. Next we have the business of environmental events that can have different functions at

different times: sometimes a consequence functions as a reinforcer and sometimes it doesn't. You will find later that the same event can function in different ways for different behaviors at one and the same time. These facts of life delayed the scientific study of behavior until the 20th century. Now that humans are learning how behavior works, we can learn to improve our behavioral environments as much as we have improved our physical environments.

Behavior is hard to study scientifically because:

The actions that behavior analysts study are very (20) _____ events.

It is hard to know if two different events are repetitions of the same action or part of the same (21) _____ unit.

Environmental events can have (22) _____ behavioral functions at different times.

Behavior and Its Causes: Reading # 9

Punishment

In behavior analysis, a punishment process refers to the reduction in frequency of an action that results from a contingent relation between occurrences of the action and the consequences that follow those occurrences.   A punishment procedure is implementing a contingency between an action and a consequences that results in decreased frequency of that action. The consequences in a punishment procedure may be the addition of stimulation contingent on the action, in which case the procedure is called punishment by contingent stimulation. Or the consequences may be the subtraction of an object or an opportunity contingent on the action, called punishment by contingent withdrawal. Consequences that decrease the frequency of behavior are often called "aversive events".

As a technical term in behavior analysis, "punishment" does not mean the same thing as it means in everyday language. Generally, people think in terms of punishing *people*. In behavior analysis, *actions* (not people) are punished. The point of punishing *actions* is to decrease their frequency.

There is a very big difference between punishing people and punishing actions. The point of punishing *people* is to hurt them, to obtain retribution or "make them pay". It is a way of evening the score. In our society (an most others we know about), punishing *people* is an acceptable way to behave. When we humans set out to punish *people*, any change in their behavior is a side effect – it is not essential to accomplishing the punishment. To the contrary, when we set out to punish *actions*, any hurt the behaving person suffers is a side effect – it is not essential to accomplishing the punishment.   Because punishing people and punishing actions sometimes have the same results, it is easy to confuse them.

It is very important to understand whether one is interested in hurting a person or in decreasing frequency of some action. If what someone is interested in is hurting a person, behavior analysis will *not* be of much use to them. There are many ways of hurting people that require no understanding of behavior principles and most people learn, quite easily, many actions that hurt others. They need no help from behavior analysts to succeed and the principles of behavior won't help them much.

On the other hand, if it is important to decrease the frequency of some action in a behavior stream, a punishment procedure might be something to consider. In that case, it is important to understand the principles of behavior analysis and to consider the ethical issues involved. For example, a person who considers using punishment to decrease the frequency of an action has an ethical responsibility to consider all the possible results of the punishment procedure. It is also important to weigh the benefit of the proposed behavior change against any unwanted side effects of the procedure. The benefits and side effects include those that directly affect the behaver and those that affect other people. These issues can be very complex and even point in conflicting directions. There are no easy answers and the best anyone can do is to consider carefully all the relevant issues before making a decision regarding whether or not to use a punishment procedure to decrease the frequency of an action. In the sections below, we will discuss some specific things to consider.

     In our society, it is considered acceptable to punish (1) _____.

     The behavioral procedure of punishment is designed to punish (2) _____ and not to punish (3) _____ .

     The point of punishing actions is to decrease their (4) _____ .

     Punishment procedures may have unwanted (5) _____ and these must be considered before implementing such a procedure.

What Constitutes "Problem Behavior"?

Most people hardly notice actions of others that are socially desirable – for example, actions that enhance productivity or improve interpersonal relations. But an action that annoys us or endangers something we value gets our attention very quickly. For this reason, "behavior change" to most people means "getting Sam to stop doing X". For the people who live or work or play with Sam, the behavior of X is a problem. But is it a problem for Sam?

The first issue to consider is whether the behavior that is a problem for others is a problem for the individual who is performing it.   If Sam always beats his opponents at tennis, his great tennis playing is a problem for them. But it isn't a problem for Sam. The best way for Sam's opponents to solve the problem of Sam's always winning is to learn to play tennis better so they can win sometimes. This solution benefits everybody. It should be obvious that a decrease in the frequency of Sam's point-earning shots would not benefit Sam and would only benefit his opponents in the most superficial way. So Sam's great tennis playing should not be the target of a punishment procedure. (If you think Sam's great tennis playing would never be a target for punishment in the everyday environment, look around and see how often good work or good deeds result in immediate aversive consequences from others.)

Let's look at a problem where the issues are more subtle. If Sam always beats his opponents at tennis by miscalculating the points he has earned, the problem is not Sam's point-earning shots but Sam's miscalculating actions (whether or not the miscalculations are done knowingly). Would punishing miscalculations benefit all players including Sam? Clearly, the other players would benefit; but would Sam benefit? Well, he would lose more games so that wouldn't be a benefit. But he might keep more friends and that would be a benefit. If you asked Sam whether he would rather keep his tennis friends or always win the games, he would probably say he'd rather keep his friends. Why is he behaving, then, in ways that have lost tennis friends in the past? The answer is that the *wins* always follow soon after the miscalculations but the disappearance of the friends come so long after the miscalculations that they cannot affect those actions. This is true even if his earlier tennis opponents told him why they weren't playing tennis with him anymore (which he probably would have dismissed as their "jealousy").

So, a procedure that decreased Sam's miscalculations would probably benefit Sam overall and it would certainly benefit his opponents. Sam's miscalculations may be a legitimate target for punishment because they hurt others and, in the long run, hurt Sam. To deal with the problem, Sam's friends might agree to levy a fine on anybody who miscalculated points and a "miscalculation" would be defined as a calculation that benefited the calculator but was incorrect according to at least 2 other people (opponent and observer, 2 other players, etc.) If only Sam miscalculated, then no actions of the other players would result in a fine. If others miscalculated occasionally, then those actions would be fined as well as Sam's miscalculations. (What's good for the goose is good for the gander.)

Some problems are so obviously problems for the behaver as well as other people that little time need be spent in deciding if they are actually a problem. For example, actions that cause bodily harm to the actor ("self-injurious behavior") are clearly a problem, even if they also produce benefits (e.g., attention from significant others). Actions that cause bodily harm to others (physical aggression) are also clearly a problem. Actions that cause painful emotions in others -- hurt their feelings, or generate fear and anxiety, or erode their confidence – are usually a problem. They are particularly problematic if the emotional pain of others is the reinforcer that maintains the actions occurring at a high frequency.

This brings us to the issue of what reinforces the behavior of using a punishment procedure.   Because using a punishment procedure can cause pain to others, it is possible that some people might use a punishment procedure because doing so is reinforced by the hurt it causes. Most people going about their everyday business cause others some pain, knowingly or unknowingly, but they are not doing so in the name of treatment. They are simply doing what comes naturally. Even though "what comes naturally" may be the worst possible thing to do in terms of making the world a better place, we can blame it on our animal natures, or to the "deservedness" of the others' pain, or to whatever else suits our fancy. However, when pain is caused in the context of treating problem behavior, the people designing and carrying out the treatment cannot hide behind those shields. They

must squarely confront the motives for their own behavior in carrying out a punishment procedure. If "getting Sam stirred up" is fun for them, or "getting back at Sam for the pain he has caused them" is a reinforcer, then they are not suitable behavior change agents. Their own behavior is a problem in itself. The only socially legitimate reinforcer for the behavior of implementing a punishment procedure is the good that comes to the individual when the rate of a problem behavior decreases.

In behavior analysis, punishment procedures are recommended only after other, less intrusive, interventions have been tried systematically and failed. And they are generally reserved for serious problem behaviors or moderately serious problem behaviors that are occurring at a high enough frequency to be detrimental to the behaving individual himself. If a problem behavior is considered suitable for intervention with a punishment procedure, a decrease in the rate of the problem behavior should occur quickly – some decrease in the rate should be observed after a few administrations of the punisher. The punisher may have to be administered several times before the rate decreases enough to consider the problem over, but the decreasing rate means there will also be a decreasing number of administrations of the punisher as time goes by. So, as long as the rate is clearly decreasing, it is reasonable to continue the punishment procedure. If the rate of the problem behavior is not decreasing, the factors affecting punisher effectiveness need to be examined. If the punisher cannot be contingent and immediate, or the size cannot be adequate, or there is an abundance of punishers in the behavioral environment, then the procedure must be discontinued. The procedure cannot be considered a punishment procedure if it does not decrease the frequency of the behavior.
It is merely hurting the person and thus cannot be considered a behavior analytic treatment.

Many behavior analysts are unwilling to risk the possibility that their own behavior of implementing punishment procedures will be reinforced by causing others pain. Although we believe that punishing *actions* that are appropriately designated as problem behaviors is more humane than the standard practice in our society of punishing *people*, socially delivered punishment would be rare or nonexistent in a well-designed behavioral environment. Because our social environments are often not very well designed, problem behavior is sometimes significant enough to warrant implementing a punishment procedure.

Before considering a punishment procedure, one must be very clear that the person whose behavior is punished will (6) _____ from the decreased frequency of punished actions.

Sam's winning tennis shots (7) _____ (do/do not) qualify as an acceptable target for a punishment procedure.

Sam's miscalculating actions earn points but result in lost friends. The points are better reinforcers for miscalculations than lost friends are punishers because the points occur (8) _____ after the miscalculation.

The fine for miscalculating was imposed on (9) _____ (Sam/all players).

Sometimes actions that cause others pain are reinforced by the (10) _____ the others suffer.

Only if the rate of the problem behavior decreases can we say that a(n) (11) _____ procedure has been used.

Continuing a procedure that does not result in rapid decrease in frequency of a targeted problem behavior is unethical because it is a form of hurting the (12) _____.

Side Effects of Punishment Procedures

Although a well designed and well implemented punishment procedure is not likely to have nearly as many unwanted side effects as the everyday non-behavioral practices of punishing *people*, punishment procedures do sometimes cause pain and do often have costs as well as benefits. Here we will discuss only the costs to the

individual whose behavior is punished. In a later unit, we will discuss the costs to the person implementing the procedure and to society in general.

The events that are contingent on behavior in punishment procedures are called "aversive" because people usually work to avoid their occurrence. One result of aversive events is that they often generate emotional responses that we usually label "fear" and "anger." These emotional responses are the automatic biological results of aversive events and they include release of adrenaline, increases in blood pressure and heart rate, constriction of peripheral blood vessels, and crying. These biological changes are not harmful so long as they are the temporary effects of an aversive event. In fact, they are an important biological component of an organism's ability to learn. But if they happen very frequently over a long period, they may pose health risks such as cardiovascular disease and other stress-related conditions.

A punishment procedure does not pose the health risks associated with emotional responses mentioned above because the emotional responses will occur only occasionally and they will quickly decrease in frequency. They are part of the learning process.   However, continuing a procedure that is not behaviorally effective can cause harm. Continuing a procedure that is not effective is one way of punishing the *person*. Punishing *people* may very well pose health risks because there is no criterion by which to judge the procedure to be ineffective. Without the requirement of a success criterion, punishment of *people* can go on indefinitely. After all, the point of punishing *people* is to hurt the people; and constant emotional responding resulting from aversive stimulation can damage health. All humans, including behavior analysts, may be inclined to punish people on some occasions but they are not implementing behavioral procedures when they do so.

Although the emotional responses that accompany a properly administered punishment procedure do not pose health risks, there are other risks associated with emotional responses and, therefore, with punishment procedures. For example, along with the spurt of adrenaline and other physiological effects of an aversive event, there is also a brief time during which there is an increased likelihood of aggressive actions. Think about a person whose finger is pinched while closing a window. The person is likely to slam the window shut, pound the windowsill, or swear – all aggressive actions. As a biological effect of the aversive event, this tendency dissipates rather quickly along with the other emotional effects of the aversive pinch. The person can be taught to "hold his temper", that is to do something else (e.g., humming a tune or hugging himself to prevent alternative action) while the physiological responses subside. Sometimes people learn to do such things without specific training but most people would benefit from some specific training in ways of handling uncontrollable aversive events.

If our finger is pinched several times while we are closing a window, our rate of closing that window may decrease in frequency. In this case, the punishment procedure is a by-product of the physical properties of our environment.   If a closed window is important to us, and our rate of closing that window is low, we may replace the window with another window. In this way, we can have a closed window but not have to suffer pinched fingers in the process. In the case of a punishment procedure implemented by a human, there is likely to be a similar tendency to "get rid of" the deliverer of the aversive stimulation. Because the person implementing the procedure is associated with the aversive event (whether the event involves contingent stimulation or contingent withdrawal), there may be a tendency to stay away from that person. This side effect of a punishment procedure is much less likely if the person implementing the punishment procedure also implements many reinforcement procedures (finds many desirable behaviors to reinforce). There is an informal rule that behavior analysts often follow, which specifies a desirable ratio of reinforcer deliveries to corrections or punisher deliveries. It is the 5:1 ratio. Be sure to find 5 reinforceable instances of behavior, and reinforce them, for every 1 aversive event that is introduced into a behavioral environment.

Another side effect of punishment is that it can suppress behavior without teaching any useful actions. If the *person* is punished, the result can be a general suppression of behavior. This can be especially detrimental if a person's behavioral repertoire is small in the first place– for example, that of a young child or a person with autism or mental retardation. When a particular *action* is punished, the learner may figure out an alternative, acceptable, action that can be substituted for the action that is punished. In applied behavior analysis, the learner is never left with the problem of figuring out for herself what to do instead of the action being punished. A behavior analyst has an ethical obligation to teach specific alternative actions that produce at least as much

reinforcement as the problem behavior is producing when the punishment procedure goes into effect. Sometimes, of course, alternative actions are already available to the person whose actions are punished. In this case, the behavior analyst must be certain that those alternative actions are actually reinforced.

Consequences that decrease the frequency of behavior are called (13) _____ events, whether the procedure is punishment by contingent stimulation or punishment by contingent withdrawal.

Aversive events often cause (14) _____ responses we call fear or anger.

The emotional responses include increased blood pressure and heart rate and they can damage health (15) _____ (True/false) if they occur too often or too continuously.

An ethically implemented punishment procedure may result in temporary increase of emotional responses but not for long enough to damage health, because if the behavior does not quickly (16) _____ in frequency, then the procedure must be discontinued.

One side effect of punishment procedures is that the behaving person tends to stay away from the person who implements the procedure. This side effect can be avoided if the same person reinforces desired behavior 5 times more often than that person (17) _____ undesired behavior.

Another side effect of punishment is that it can suppress behavior without producing any useful (18) _____ behaviors.

Conclusion

Punishing people and punishing actions are not the same thing but they do both result in emotional responses. Punishing people can result in health problems when the punishment is frequent or unavoidable. When *actions* are punished, the emotional responses that accompany aversive events are temporary and they decrease in frequency as the punished action decreases in frequency. Even so, punishment procedures sometimes have the side effects of aggression and escape from the presence of the punishing agent. In a well-designed behavioral environment, little or no socially delivered punishment would be necessary. In the world we live in at present, punishment procedures may sometimes seem appropriate. If they are used, contingent reinforcers should be at least 5 times as frequent as punishers in a person's behavioral environment.

Behavior and Its Causes: Reading #10: Issues in Aversive Control: Part I

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Coercion in Society

Does the death penalty deter murders? For children in our schools to become disciplined, is punishment necessary? Is painful stimulation a useful way to keep autistic and retarded children from destroying themselves and their environment? Such questions are often answered with intense conviction, usually in the affirmative, because our society depends almost exclusively on the use of coercion in all spheres of human interaction.

The coercion I am referring to is the use of aversive events or the threat of aversive events as a means of social control.   Many people find it hard to imagine any other way of maintaining social order. Even when we try to influence through encouragement, flattery, praise, or reward, we often at the same time imply that failure to meet demands and expectations will cause even rewards that have already been earned to be taken away. We often give money, status, recognition, and love just to maintain an advantage in our interactions with others. We bestow or arrange these desirable outcomes mainly so that we can then take them away if our child, spouse, business associate, or student stops satisfying our own needs, or fails to meet the requirements we have set. Most of us are not very skillful in bringing out the best behavior others have to offer. When we try, we almost always have coercion waiting in the wings. The application of non-coercive forms of control has been insignificant in comparison to humanity's habitual recourse to coercion.

Yet, evidence from the analysis of behavior tells us that even when coercion accomplishes its immediate aim, it is often self-defeating in the long run. Yes, we can get people to do what we want by threatening them with dire consequences if they don't. And we can get people to stop doing what we don't want by punishing those actions. But when we do, we sow the seeds of personal disaffection, isolation from society, neurosis, intellectual rigidity, hostility, and rebellion.

We can arrange for children to **escape** our displeasure or **avoid** loss of privileges or even physical pain by learning what we believe they need to learn. But many children whom we teach that way (with negative reinforcement) often become contemptuous of teachers, hating school and avoiding the labor of learning. Later, as adults, they may speak admiringly

about teachers who "tolerated no nonsense," but at the same time, they escape or actively avoid opportunities for continued education or training. And children who have been exposed only to coercive teaching are likely to follow that same model when they become teachers or parents themselves. Coercive practices in formal education and in the home continue from generation to generation and are accepted as "standard practice" by the community.

The use of aversive events or the threat of aversive events as a means of social control is called (1) _____.

Although (2) _____ sometimes has an immediately desired effect, it is often self-defeating in the long run.

When children learn in order to escape our displeasure or avoid loss of privileges, they often hate school and (3) _____ the labor of learning.

At home, physical and verbal abuse can indeed keep children -- and spouses -- subservient to ones own needs and desires. You can rule your family by "laying down the law," punishing all infractions. Parents can express displeasure with children, and spouses with each other, by beating or isolating them, by taking away possessions and privileges, or by ceasing to communicate -- isolating the offender from their affection. Any of these punishments may make the offense less likely to recur. But they don't teach the other person what to do instead. And eventually these forms of family coercion turn the home into a place to be escaped from. Before actual escape is possible, many people who are reared under tyranny learn the ways of coercion themselves, and end up as problem children, appropriating more than their share of the family's time, finances, and emotional resources. Later, as parents, not knowing any other way, they become family tyrants themselves. Coercion transforms marriage into slavery, and acts of love into mere rituals, formalities to be observed for the sake of keeping peace or avoiding terror. Among the consequences are to be found divorce, dropout, mental illness, and suicide.

Relations at work are equally coercive. Employers can keep workers at their benches by threatening to fire them if they get up, and workers can secure higher pay by threatening to strike. The success of the labor movement has surely reduced exploitation and raised living standards, and it seems clear now that these goals would never have been attained except by coercive techniques. And yet, modern institutionalized negotiation, that ritualized war dance of threat, counter-threat, and compromise, has turned worker productivity into a bargaining chip, to be maintained no higher than the contract specifies. This has produced many shops in which workers who

exceed production quotas are ostracized and attacked by their coworkers. On the part of owners and management, institutionalized negotiation makes matters of compensation, fringe benefits, profit sharing, simple personal respect, and general human concern for workers' welfare into counter-chips, to be valued as the means to end a strike threat or to terminate an existing work stoppage. A frequent result of this mutual coercion is a shift of energy and attention from an organization's mission to the maintenance of bargaining positions. Productivity both of labor and management declines as employer and employee alike come eventually to do little more than what is needed to counter each other's threats. Any instance of unauthorized cooperation might undo the delicate balance of coercion and counter-coercion.

A system of justice that is based solely on punishment for breaking the law does indeed keep many people on the straight and narrow, and provides satisfaction for those who seek revenge on lawbreakers. A coercive legal code also generates evasion and defiance by many who are subject to the system, and brutality by many who administer and enforce the system. Most nations, including the superpowers, claim to be peace-seeking, to arm themselves for defense only. A national policy of carrying a "big stick" - to be used, of course, only in retaliation against aggression -- can indeed keep other countries in line economically and militarily. Such coercion also creates jealousies, animosities, and eventual countercontrol. Modern terrorism is an extreme example.

> One problem with punishing undesirable behavior is that it does not teach the person what to (4) _____ instead of the undesirable action.
>
> Some ways that people escape coercive social environments are divorce, dropping-out, mental illness, and even (5) _____ .
>
> Mutual coercion between management and labor ultimately (6) _____ (reduces, raises) productivity.
>
> In the technical terms of behavior analysis, coercion involves controlling behavior through (7) _____ and (8) _____ reinforcement. (name the 2 behavioral procedures)

Behavior Analysis

On humanitarian grounds, many people have questioned the desirability and long-term utility of society's everyday means of controlling the behavior of other people. Nobody likes to be punished, and some people do not like to punish others. But we can do better than simply appeal to our prejudices

about what is good or bad. The science of behavior analysis contains a body of principles and data that can provide some objectivity in making the decision about whether or not to punish. Punishment has been intensively investigated in the behavior laboratory but the public has been told little about what we have found out and what the implications are for the conduct of everyday affairs.

The science of behavior analysis had its roots in philosophy, then separated itself off as a branch of the emerging discipline of psychology, and now is in the process of disengaging itself from psychology. The parent has not yet let go (nor, for that matter, has the grandparent), and struggles to maintain its administrative dominance, but the lines of intellectual fracture are clear. Psychology, as its name suggests, is the science of the mind. Any interest in behavior turns on what it can tell psychologists about the mind. Behavior analysis is the science of behavior and the interest is on relations between behavior and the environmental events that relate to behavior. The science of behavior analysis contains a body of principles and data that can provide some objectivity in making the decision about whether or not to punish.

The great power of behavior analysis as a tool for human good lies in its usefulness in producing and maintaining the social, academic, and work behavior needed to keep a society strong. But because our society focuses almost entirely on unwanted behavior, behavior analysts are most frequently called on to deal with unwanted behavior -- self-destruction or property destruction by people with retardation or autism, children's conduct that family or school personnel find distressing, and violations of social norms by adults. For the most part, behavior analysts have been very successful in answering society's call for help, even where other approaches have failed. Because the society they serve insists they focus on unwanted behavior, behavior analysts have learned, perhaps better than any other professionals, that society cannot solve social problems in any permanent way without first taking into account what we know about the use of coercion in general. And when we look at the overall picture and ask whether or not punishment is a viable, long-term solution, the clear answer is "No."

Exceptional cases, of course, do arise. Sometimes we punish because we are fallible human beings and make mistakes. Sometimes we lack relevant knowledge in specific situations, and our unsuccessful use of other treatments drives us to apply punishment to save someone from self-destruction. For example, the immediate suppressive effect of a single punishment can give us an opportunity to apply nonpunishing techniques effectively. These kinds of marginal cases pose no problems. As long as they remain marginal, common sense tells us that we have to use whatever effective means are at hand. Mistakes, a temporary lack of relevant information, or an occasional emergency may justify punishment as a treatment of last resort, but never as

the treatment of choice. To use punishment occasionally as an act of desperation is not the same as advocating the use of punishment as an everyday technique of behavior management.

Behavior analysis contains a body of scientific principles and data that can provide some (9) _____ regarding whether or not to punish.

The power of behavior analysis in human societies is its usefulness in (10) _____ and (11) _____ the social, academic, and work behavior needed to keep a society strong.

Because society in its excessive focus on unwanted behavior has called on behavior analysts to deal with such behavior, behavior analysts have learned that society (12) _____ solve its social problems in any permanent way with punishment.

Contrary to the picture spread by uninformed critics, coercion is not the basis of behavior analysis. Besides showing us that any use of punishment is regrettable, behavior analysts have devised many effective alternatives. A unique contribution has been the countless demonstrations, within and outside the laboratory, of how to use positive reinforcement effectively. By positive reinforcement, I refer to the procedure of increasing desired behavior by ensuring that a valued consequence follows instances of that behavior. Some behavior analysts, like some psychologists, some psychiatrists, and some educators, do advocate and use coercion as a therapeutic and educational technique. Public regulation is resisted on the sensible grounds that the treatment of the ill, the uneducated, and the developmentally disabled should be left not to politicians or to the well-meaning but uninformed public, but to the professionally qualified. But it is not correct for behavior analysts to claim exemption from public regulation on the grounds that their training qualifies them to use punishment and other forms of coercion. Such a claim is incorrect because competence in the application of punishment is not the mark of a qualified behavior analyst. I know of no training program or degree, whether in psychology, psychiatry, education, or behavior analysis itself, that qualifies its recipient to use punishment as a standard procedure. The good intentions of any professionals, behavior analysts included, cannot exempt them from the empirical findings that punishment generates counter-control and counter-coercion. Further, the effects on therapists themselves cannot be overlooked: coercive therapy produces coercive therapists.

The unique contribution of behavior analysis has been the countless demonstrations, within and outside the laboratory, of how to use positive reinforcement effectively. General principles and specific therapeutic and educational technologies have evolved, with probably more solid

documentation in the experimental and clinical literature than any other methodology has ever achieved. Positive reinforcement, not coercion, is the hallmark of behavior analysis.

Applications of punishment to solve behavior problems are part of the widespread social acceptance of the almost exclusive use of coercion in all kinds of human interaction. Once we look at the uses and effects of punishment in all aspects of our lives, we can see that behavior analysis has positive contributions to make in many spheres of human activity - education, diplomacy, the rule of law, the family unit. Behavior analysts are in the best possible position to alert the public that considerable evidence exists in favor of the use of positive reinforcement for generating and maintaining behavior conducive to productive and satisfying work, play, and social relations. Behavior analysts and therapists of all kinds would serve themselves, their clients, and our society best by inviting restrictions on the use of punishment within the professions. This would have the effect of fostering non-punitive and more lasting solutions to society's problems.

> Whether used by behavior analysts or by other professionals, or by lay members of society, (13) _____ generates counter-control and counter-coercion.

> (14) _____ reinforcement is the hallmark of behavior analysis.

> Behavior analysts have evidence supporting the use of positive reinforcement for generating desired (15) _____ of all kinds.

Does the Complexity of Conduct Defy Analysis?

The factors that govern our everyday conduct do interact in ways that are complex, ever changing, and often not directly analyzable.   Although the arguments made in this book are based on basic research methods and findings, I have also taken many liberties in moving from the laboratory to the world outside. I have extrapolated from the carefully controlled conditions that guarantee the reliability of experimental findings. I believe the extrapolations are justified; the laboratory has taught us a great deal more about human affairs than even many investigators have been willing to acknowledge

Steel ball bearings rolling down inclined planes in undergraduate physics laboratories seem unrelated to leaves falling from trees in the forest, yet all falling bodies obey the same physical laws. Can we say, similarly, that although subjects being punished for pushing a button in the behavior

laboratory bear little obvious resemblance to a child being spanked for saying a "bad" word, all punished actions obey the same behavioral laws? There is much evidence that is the case. Such an assertion cannot, of course, be proved experimentally because the everyday world is not subject to the experimental controls of the laboratory. But that is true also of falling leaves, and those extrapolations from laboratory findings placed people on the moon on the very first try. The proof of such applicability comes not from experiments, but from practical experience and informed extrapolation of scientific principles.

> In all sciences, principles formulated as a result of experiments in laboratories are used to guide actions in the everyday world. This extrapolation assumes that operant **behavior in** the laboratory and outside obeys the same (16) _____ laws.

A Guiding Principle

The prevalence of coercive control disposes us to accept punishment and threat as natural and inevitable; and we often suppose that the only alternative to coercion is no social control at all. A misunderstanding of behavioral processes is one reason for society's general failure to explore and develop alternatives to coercion. As we discover and analyze the origins of ever more complex behavior, we have to conclude that there is no such thing as "no control". The absence of control is an illusion. The combined influences of heredity, biology, and our physical and social environments shape everything we do. Contrary to "no control" as the only alternative to coercion, we do not even have the option of choosing between coercive control and no control. The option we have is a choice between coercion and positive reinforcement. Which kind of control do we want? Will we construct a coercive or a non-coercive social environment? Will we exercise our control through coercion using punishment and negative reinforcement or through positive reinforcement?

All three kinds of contingencies those of positive reinforcement, negative reinforcement, and punishment are powerful sources of behavioral control. But they differ in important ways. Negative reinforcers strengthen whatever actions make them cease or disappear whereas positive reinforcers strengthen whatever actions produce them. Negative and positive reinforcement contingencies are alike in that they both increase the frequency of behavior they follow; therefore they have a productive and sustaining role in behavioral repertoires. Punishment contingencies, whether punishment by contingent withdrawal or by contingent stimulation, decrease the frequency of behavior. Therefore the net effect of punishment is a net loss of behavioral options. So one of the main problems with punishment is that it diminishes a persons effective behavioral repertoire and that amounts to diminishing the person.

That is the reason that ethical standards of behavior analysts require that punishment of dangerous or destructive behavior be accompanied by a program of positive reinforcement to shape and maintain an alternative behavior. At the very least, any intervention should leave a person with a repertoire that is equal in its number of behavioral options as the repertoire the person had at the start of treatment. Furthermore, the net amount of reinforcement available should be at least the amount he could obtain before the start of treatment.

So in terms of their effect on frequencies of operant behavior, negative and positive reinforcement contingencies are alike and they differ from punishment contingencies. However, when it comes to their effects on how we feel about the people who use the procedures, negative reinforcement and punishment are more alike and they differ greatly from positive reinforcement. Why does this matter? As it turns out, our feelings about people are correlated with the likelihood that we will approach (or avoid) them. Our feelings about others are also correlated with the likelihood that we will treat them well when we have the opportunity to deliver positive or negative reinforcers. A world where everyone is controlled through coercion is a world in which everyone uses coercion to control the behavior of others. So negative reinforcement and punishment are alike in that they generate a general tendency to avoid and escape the people who use them. So, spouses controlled by negative reinforcement and punishment are likely to seek divorce; children so controlled play hooky, quit school, run away from home, or simply stay as far away from their parents as they can. Employees quit at the earliest opportunity.

> Coercion is generally viewed as an alternative to no control but "no control" is not an option. "No control" is a(n) (17) _____.

> The option is that between control by coercion and control by (18) _____ reinforcement.

> Negative reinforcement and positive reinforcement are alike in that they both (19) _____ the frequency of operant behavior.

> Punishment and negative reinforcement are alike in that they both generate a tendency to (20) _____ and (21) _____ people who use them.

The everyday concept of coercion, then, amounts to behavioral control through negative reinforcement and punishment. Positive reinforcement does control behavior, no less than coercion does. But it teaches us new ways to act, and supports what we have already learned, without creating coercion's characteristic by-products - violence, aggression, oppression, depression,

emotional and intellectual rigidity, destruction of self and others, hatred, illness, and general unhappiness. We usually punish in order to prevent conduct that we consider harmful, dangerous, or undesirable for other reasons. We justify coercion in the name of education, civilization, morality, and self-defense: "Without the stick, children will not learn"; "laws must have teeth"; "the certainty of hellfire is needed to balance the pleasures of sin"; "human savagery and competitiveness must be countered in kind"; "an eye for an eye"; and so on.

But we do not have to punish in order to stop people from acting badly. We can accomplish the same end with positive reinforcers, without producing the undesirable side effects of coercion. One way to stop people from doing something without punishing them is to give them positive reinforcers for doing something else. This is probably the most practical non-coercive technique of behavior management. Instead of decreasing the frequency of unwanted conduct by punishing those actions, we can strengthen desirable actions that replace the undesirable ones.

Acceptance of coercion is so pervasive that some people find it hard to believe they could influence others effectively without threats of dire consequences. An overworked and incorrect bit of folk wisdom pronounces the carrot to be of no avail unless backed up by a large stick. The carrot without the stick may take a little longer but the net effect will be higher frequencies of many more desirable behaviors. And the best part is that the spouses, children, students, or employees will stick around to contribute more of their behavior to the home, the school, or the company. The advantage for society is that those whose behavior has received much positive reinforcement are more likely to control the behavior of others through positive reinforcement rather than through coercion.

> Technically, coercion is the use of (22) _____ or (23) _____ reinforcement to control behavior.

> A significant advantage of positive reinforcement is that it teaches (24) _____ behavior.

> One way of getting around the need for punishment is to give positive reinforcement for (25) _____ something else.

> Using positive reinforcement to support the behavior of others is likely to result in their using (26) _____ reinforcement to teach us and maintain our behavior.

Behavior and Its Causes: Reading #11: Issues in Aversive Control: Part II

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The Alternative of Positive Reinforcement

Negative reinforcement and punishment do not, of course, cause all the world's problems, nor will positive reinforcement solve them all. Also, we may not be in a position to control those important consequences of others' conduct. Some would argue that such control, even if possible, would not be desirable, but that argument usually rests on the assumption that all control is coercive. It need not be. In the sections that follow, we shall try to illustrate how noncoercive control might help to alleviate or prevent some of the problems that coercion does create.

Behavior analysis started with a few laboratory experiments in which non-human animals pressed levers for food. Within 50 years the research resulted in experimentally verified principles and clinically verified applications in many areas of human conduct: teaching and learning in schools both for challenged and typical pupils, college education, skill training, criminal rehabilitation, managing mental illness, improving children's conduct in homes and schools, marital counseling, industrial productivity, litter in public parks, stuttering, self-examination for breast tumors, compliance with physicians' recommendations, smoking cessation, weight control, and many more. One by one, each of these complex problem areas proved amenable if not to complete solution, at least to amelioration by methods based on positive reinforcement. More recently, considerable success has come in the analysis of economics, concept formation, and language. With this history of reinforcement for their own efforts, behavior analysts are naturally eager to push forward into areas of greater complexity.

In what follows I shall not be trying to tell the world how to solve all its problems by using positive reinforcement. I am simply proposing a guiding principle: Positive reinforcement works and coercion is dangerous. Looking for something to reinforce positively, rather than zeroing in on something to punish, could be our standard way of interacting with each other. Our training does not make it easy. Parents, teachers, police, therapists - all those whose job is to influence others - learn to look for undesirable actions and then to punish them out of existence. They are rarely taught to look for desirable actions and then to strengthen them with positive reinforcement. Those few who characteristically use positive reinforcement stand out. Teachers, parents, religious leaders, political figures, and others who work that way are much

loved, even though they control our actions very effectively. The following suggestions are intended only to indicate some of the ways we might approach behavior management and behavior change through positive reinforcement.

> Coercion (1) _____ (does/does not) cause all the world's problems, and positive reinforcement (2) _____ (will/will not) solve all the world's problems.
>
> The guiding principle espoused by the author is positive reinforcement (3) _____ and coercion is (4) _____ for society and its individual members.

Positive Reinforcement at Home

We enter parenthood without anyone ever having taught us how to fulfill that responsibility. We learn quickly that children make special demands. Before they can talk they learn to express and enforce those demands in the only ways possible for them. At first they cry and scream because it is the only way they have to communicate with us. These bring the immediate satisfaction of their needs to the top of the adult priority list. It is the very important job of those adults to teach them other ways of communicating, so that they turn from crying and screaming to taking care of their own needs, asking for help, and cooperating with others for mutual satisfaction. If we fail to teach them these things, their crying and screaming may turn to aggression, destructiveness, and more subtle forms of misbehavior.

Even very small children can develop an arsenal of coercive practices. Reinforcing those practices perpetuates them, often transforming the children from lovable bundles of joy into the proverbial "monsters" to be escaped from, avoided, and when all else fails aggressed against.   Punishment may produce the peace a desperate parent needs at the expense of the inevitable side effects - but it offers the chastened child no alternative course of action, no way to adapt constructively. Providing a diversion instead of a punishment would leave the child interacting productively and happily with the environment. Instead of scolding or isolating a crying child, we can often stop the tears by bringing out a plaything. Parents who react not by punishing but by giving their children opportunities to obtain positive reinforcers find themselves with happy, self-reliant, competent children. Households that practice positive reinforcement enjoy an additional benefit; occasions for punishment rarely arise.

If positive reinforcers become available when a child is behaving badly, will the child not learn to misbehave, to do more of the same? That does happen. Anyone who has wondered about the possibility is well on the way to a useful understanding of how conduct is controlled. Used unskillfully, positive

reinforcement can strengthen conduct that is just as unwanted as any of coercion's side effects. If we provide affection, attention, and other reinforcers only when our children misbehave, the result will be continued misbehavior. It is not difficult to create little monsters. But if there is plentiful positive reinforcement for desired behaviors in the household, occasional misbehavior will remain just that - occasional; the children will learn that they do not have to act up in order to get us to attend to their wants.

Observant parents will learn to recognize signs of impending trouble. Children do not ordinarily just burst into misbehavior without having given signals that all is not right. They may complain, cling, reject favorite playthings and activities, imitate a younger sibling, or display any of a number of negativisms that characteristically precede an outbreak. The alert parent will not wait for the outbreak, but will immediately try to get the child to do something good so they can reinforce it.

> An important job for adults is to teach children socially acceptable ways of (5) _____.
>
> Giving children plenty of (6) _____ to produce positive reinforcers results in competent and happy children.
>
> If plenty of (7) _____ reinforcement occurs for desired behavior, an occasional reinforcement of undesired behavior will have no significant effect.
>
> When the situation starts going awry, observant parents can preclude problems by arranging an opportunity for good (8) _____ and then providing positive reinforcement.

Sometimes people misunderstand the principle of reinforcement and take it to mean handing out good things independent of anything a child is doing. This neglects the need for a contingency between behavior that is desired and the reinforcing event. The extreme outcome of completely unconditional giving is the spoiled brat, who may continue that way into adulthood. We all know adult brats who expect everything to be provided for them no matter what they have or have not done, who act as they please, paying no heed to the consequences their actions have for anyone else. We do not, of course, recommend a "you scratch my back and I'll scratch yours" relationship with our children. The power of positive reinforcers lies in their usefulness in teaching our children how to live happy and productive lives, but without making them feel that they always have to do something special to earn our love and support. We want them to feel secure, to know that support, affection - the whole supply of reinforcers - is still available even though they might have done something wrong. We have to strike a balance. We have to maintain

contingencies of positive reinforcement and at the same time generate trust and security. Our children must know that we will still be there and waiting even if they fail to meet a contingency successfully.

Nobody teaches us how to do these things. But if we have learned that relationships thrive on positive reinforcement, we will know at least to look for non-coercive ways to instill respect for others, pro-social actions, security and self-confidence in our children even while maintaining contingencies. The secret is to set up realistic contingencies that the child can meet. Do not ask for complexities too soon. Nothing breeds security and self-confidence like success. Also, provide real reinforcers, consequences that satisfy the child and not just the parent. Sometimes a pat on the head is not enough; a tight hug may be needed. And sometimes a cookie will be more effective than a kiss. Finally, the inevitable failures should be used as occasions for teaching, not for punishment. Teaching, itself, should be a reinforcing interaction, both for child and parent.

Sometimes things seem to have gone too far to be handled in any way except by punishment. The child is driving us up the wall with his whining; his temper tantrums are getting scary; his jabs at the baby are keeping us on edge. What do we do? First, take a quick look at what the child has been getting for acting that way; those reinforcers are keeping him going. His whining gets him whatever he is whining about; his temper tantrums get our full attention; being mean to baby brother keeps Mom's eagle eye on him. Should we just stop giving him those reinforcers? Do we just ignore all his misconduct, using an extinction procedure? That is a frequent suggestion, but it will not work by itself.   Children pick up objectionable ways to obtain reinforcers because that is the most effective way to obtain those reinforcers. They need those reinforcers. Instead of ignoring the child, give him those same reinforcers for doing something else. Instead of waiting for him to whine before reading him a story, make a practice of reading to him when he has been playing quietly for a while; instead of waiting until he beats his head against the wall to attend to him, give him applause and approval when he says his rhymes, dances, and plays constructively.   Even when busy doing other things, keep frequent contact with the child, looking in on his activities and talking to him about the games he is playing; do not make him threaten the baby in order to attract interest. And show him how to pat the baby gently, telling him when he does so that he is a sweet brother and that that makes you want to hug him. Then do hug him. In short, remember to differentially reinforce the behavior you want to occur in the situation where the misbehavior has been occurring.

Things don't always go as we plan, of course. Sometimes we end up having to deal with an emotional outburst that no rational treatment can possibly overcome. And then, too, emergencies arise that have to be dealt with

immediately or somebody will be hurt. Mild punishment may occasionally be necessary to put a quick halt to a dangerous situation. These are not occasions to be concerned about. In a relationship based on strong and frequent positive reinforcement, an infrequent punishment is not going to cause any long-term damage. If these mistakes or emergencies start to happen frequently, however, they are danger signals, indicating a deteriorating relationship.

> Always handing out "good things" independent of what a child is doing neglects the need for a(n) (9) _____ between desired behavior and the "good things". This results in children society calls "spoiled brats".
>
> General kindness and consideration generate trust and security. Children need to know that your supply of reinforcers is great and that you will give them a chance to try again if they fail to meet a(n) (10) _____ .
>
> Undesirable behavior is being maintained by some consequences. By making those consequences contingent on alternative, desirable (11) _____ we can teach children to behave well.
>
> In a relationship based on frequent positive reinforcement, occasional (12) _____ will not do any serious damage.

Positive reinforcement is not just for children. Loving support, helpfulness, kindness, and all the reciprocal amenities and responsibilities of conjugal living will keep a marriage going. But love given under coercion will only keep the coercion going. Waiting to be coerced into giving positive reinforcers is the same as asking to be coerced. Like parents who guarantee their children's misbehavior by reinforcing it, spouses who fail to positively reinforce kind and generous acts but submit to demands, threats and unkind criticisms will bring more of those upon themselves. It should come as no surprise when a coerced spouse escapes to more appreciative arms. How many alcoholics and workaholics, drug addicts and TV addicts are actually escapees from spousal coercion?

Noncontingent love, too, can spoil an adult just as effectively as it can a child. At any age, love that is always given unconditionally will teach the recipient that giving is a one-way street. Parents or grandparents who enjoy all the advantages of the family without having to pull their own weight can become egocentric, unappreciative, inconsiderate, and generally coercive, demanding satisfaction of their every want.

The elderly need contingencies of positive reinforcement just as much as anyone else to maintain their social and self-help behavior and to sustain their sense of security and worth. Young parents, whose children need them, can receive almost automatic positive reinforcement from their children's progress. Grownup children, no longer dependent, may still give their parents all respect and consideration but ask nothing in return. Unless the older ones have a successful and reinforcing life of their own, a huge void may open up in their existence. No longer needed - with no community to show its appreciation for what they can do - they will have little reason to behave. They may end up depressed and withdrawn. We do the elderly no favor to treat them with respect and kindness but to ask nothing of them. They need the positive reinforcers that have always come from the use of their skills and from their social interactions. Request their help with baby-sitting, finances, advice, influence, cooking, kitchen chores, housekeeping, transportation, home repairs, gardening, telephone calls, letter writing, and other family obligations; encourage and record reminiscences and family-tree data; get them to come along on family trips. Even physiological senility can be ameliorated to some extent by making requests and ensuring that positive reinforcement occurs when the requested behavior occurs. Deprivation of opportunities to achieve positive reinforcers is equivalent to unavoidable shock, a form of non-contingent punishment to which we unknowingly subject our elderly.

Positive reinforcement is mainly for children. (13) _____ (true/false)

Withholding positive reinforcement until it is demanded will make coercion more likely in the future. (14) _____ (true/false)

As people reach old age, they should not be expected to contribute behaviorally within the family. (15) _____ (true/false)

Deprivation of opportunities to earn positive reinforcers is a form of non-contingent punishment. (16) _____ (true/false)

Positive Reinforcement in Institutions

Those who pose threats to themselves or to society at large, or who cannot function independently, we frequently commit to institutions. There we permit them only limited social relationships, deprive them of freedom of movement and of opportunities for decision making, and preclude their obtaining most of the amenities that they could enjoy outside the institution. We often justify these institutions as instruments for beneficial change: "Schools" for the handicapped are supposed to teach their pupils new skills to help them overcome their limitations; "hospitals" for the mentally ill are supposed to cure

them; "correctional institutions" are supposed to rehabilitate lawbreakers (although some people see them more as a way to get revenge).

Locating these facilities in areas that are relatively unpopulated and difficult to get to (at least initially, before cities or suburbs grow up around them) indicates, however, what we really intend them for. They are supposed to keep the retarded, the insane, and the criminal out of sight. We hand these "humane" facilities over to members of the helping professions - physicians, nurses, psychologists, behavior analysts, physical therapists, speech therapists, rehabilitation counselors, teachers, social workers, and correctional officers - and consider ourselves free of the problems.

Their geographic isolation, their walls, fences, gates, and security towers, and the public tendency to ignore the very fact of their distance leave these institutions almost completely without control from the outside. Whatever humanitarian impulses might have led to their initial establishment, their freedom from public accountability turns most of them into little more than warehouses for those unable to behave in ways that fit into society. The immediate priorities of staff and administrative convenience, inmate docility, and obedience of rules and regulations replace longer-term educational, therapeutic, or correctional goals. Coercion then becomes the technique of choice for getting the inmates to 'behave."

An institution that is operated mostly for the benefit of the staff attaches little significance to the deleterious side effects of coercion. And so we find coercion prevailing in the institutional management of the retarded, of the mentally ill, and of those incarcerated for committing crimes. When public or judicial pressure for reform does arise, it is short-lived and usually ineffective because it concentrates on physical facilities and administrative procedures. Rarely does an investigation evaluate the rationale for managing the behavior of inmates. Through misunderstanding or incompetence, some institutional managers and members of the helping professions transform even positive reinforcement into an instrument of coercion.

> Geographic isolation of institutions makes them vulnerable to using (17) _____ to manage behavior of inmates.

> Coercion is likely when institutions are operated mostly for the benefit of the (18) _____ .

The Misuse of Deprivation

Those whom we have placed in positions of control over ourselves and others - teachers, military officers, prison guards, police, government officials - are so

accustomed to coercion that they often can comprehend no other way. If they do try positive reinforcement, their first impulse is to take something away from their controllees so they can then give it back in return for "good behavior." That is exactly what happened in some infamous prison projects that claimed to be using positive reinforcement. They imposed solitary confinement on inmates and then let them out for short periods if they showed the proper contrition; deprived them of food and then handed them morsels if they acted subserviently; denied them privacy and then gave them a few moments by themselves if they had not been seen engaging in suspicious social interchanges with other prisoners; gave them uninteresting jobs and switched them to more desirable work if they performed uncomplainingly and without resistance. And then, with any lapse, real or perceived, they re-instituted the deprivations.

My concern here is with the use of deprivation as an instrument of coercion. Taking away food, possessions, privileges, or rights just so that these can be given back in return for good behavior, and then taken away again to punish bad behavior, subverts the principle of positive reinforcement. Anyone who uses deprivation this way can expect the controllees to escape, fight back, and exert counter-coercion.

Of course, deprivation does contribute to the effectiveness of positive reinforcers. We have little interest in food right after a good meal, but food becomes increasingly valuable as a reinforcer as time since our last meal passes; the sexual appetite of sailors after a long sea voyage is legendary; although individuals vary widely, what we do with money depends greatly on how much we already have. Social intervention is not needed to ensure deprivation. Naturally occurring deprivations are built in and it is possible to make good use of them to help people learn what they need to learn to be productive and happy citizens.

As mealtimes approach in an institution, food becomes a stronger and stronger positive reinforcer. Retarded people and some of the mentally ill seem sensitive only to a small number of reinforcers, and food is one of the most reliable. The use of food as a reinforcer at mealtimes is a proven and powerful way to teach basic skills to the mentally retarded. (It is just as useful in teaching typically developing children.) Such teaching does not require us to deprive our pupils of meals if they fail to learn. Teaching methods are now available that guarantee learning, so meals need not be missed because of unsuccessful teaching. Even if we have not yet worked out a completely effective instructional program, pupils who have trouble learning do not have to go hungry. While we are perfecting our instructional plan, we can always let them earn a full meal by practicing something they have already learned.

Eventually, the conduct learned at mealtimes enables retarded pupils to function adaptively at other times, too. Their newfound abilities - carrying a tray from serving counter to table, using a fork and spoon, picking up spilled food, saying "please" and "thank you," make it possible to take them to cafeterias and restaurants where new choices become available to them, and they experience new environments. While on route to their treat, they can learn behavior pertaining to safe and enjoyable travel. Their world begins to open up as their behavioral environment expands. New reinforcers become effective, they become responsive to a wider range of antecedents, and their actions become more complex and relate to the environment in increasingly complex ways. They learn to recognize signs of approval as precursors of other reinforcers, so people's reactions take on significance, becoming reinforcers in their own right. When that happens, positive reinforcers like food need not always be forthcoming immediately; delay of gratification becomes possible. Food, one of the few effective reinforcers at first, gets these seemingly behaviorless inmates of the local institution for the retarded started. Before long, we find ourselves able to use the newly learned reinforcers to teach them more advanced behavior. Mealtimes then no longer need to be used as learning opportunities but can be simply enjoyed.

Deprivation can be an instrument of (19) _____ .

The practice of taking away privileges or objects that people already have so that they can earn them back is an example of using (20) _____ as a form of coercion .

Naturally occurring deprivation can provide opportunities to (21) _____ basic skills, which in turn allow the learner more options.

Time-Out and Its Abuses

As a means of social control, various forms of "time out" have long been a part of society's arsenal of coercive techniques. Does it differ in any important way from other kinds of punishment as an instrument of coercion? The basic feature of a time-out is the withdrawal of opportunities for positive reinforcement, so it a form of socially imposed deprivation. Time-out usually involves removing someone physically from a place where positive reinforcers are available to another place where few reinforcers are available. In practice, time-out may range from standing an obstreperous child in the corner to putting a violent patient into solitary confinement - the classical padded cell.

The withdrawal of positive reinforcement is just as coercive as the application of a shock, but because time-out inflicts no pain, it is often justified as a benign kind of punishment. This reasoning is similar to justifying the use of

drugs instead of straitjackets, ropes, or chains to immobilize an uncooperative patient. The cruelty lies less in the method than in the outcome. Isolation, physical restraint, and chemical restraint remove the victims from contact with all of the reinforcers that make life meaningful and worthwhile; drugs can turn them into zombies, and padded cells can turn them into raving maniacs. Both kinds of punishment put an end to all learning except for various forms of escape and avoidance that serve as mechanisms of countercontrol. When the power of the authorities is too great for reprisal or deception, depression takes over.

It is often forgotten that time-out will be an effective punisher only if the behaving person is removed from a positively reinforcing environment. That is what the name, 'time-out," refers to; it means time away from reinforcement. Removing an inmate or patient from some environment contingent on disruptive behavior will reduce the frequency of that behavior only if that original situation was one in which the persons behavior was being reinforced in the first place. If the environment in which the misbehavior occurs is not one where reinforcers for desirable behavior are frequently forthcoming, the time-out may actually reinforce the disruptive behavior. Our removing the person may provide stronger positive reinforcement than anything available in the original situation. When that happens, time-out itself becomes a positive reinforcer, making future disruptive behavior even more likely. We will strengthen the very conduct we attempted to punish.

Very brief periods of time-out as a form of punishment by contingent withdrawal may be a useful way to teach pre-verbal humans to discriminate between acceptable and unacceptable social or play behavior. For example, two young children playing together may become increasingly rambunctious as their actions set the stage for each to outdo the other. A parent may require them to sit for a minute or less in chairs in different rooms. He removes each of them from the situation where there are plenty of reinforcers and he does so without criticism or lecturing. The parents separating the children has an immediate effect on the behavior streams of both children it precludes their reciprocal escalation. If the parents action also has the effect of reducing the frequency with which such rambunctious behavior occurs, it is technically a punishment procedure. These two different effects one on the behavior stream and one on the repertoire should not be confused. It is possible that the parent's action of separating the children will have the immediate effect of calming them down but have no effect on future probability of the behavior.

It is likely the case that time-out will rarely be useful in situations designed to teach new behavior. For example, if the goal is to teach a person with developmental disabilities to dress himself, and the person refuses to participate, or actively misbehaves, then placing him in time-out is highly unlikely to have any socially useful effect on his behavior. When a person

refuses to participate in a learning program, that is a reflection on our teaching, not a reflection on the learner. The remedy is not to place the child in time-out, taking away further opportunities to learn, but to revise our teaching. Go back to something the person can do successfully, so that positive reinforcement again becomes possible, and use a shaping procedure to teach the new behavior. Proceed more slowly this time, and take advantage of available methods for reducing and even eliminating errors from the learning process. Arranging the teaching program so that almost all behavior that occurs is reinforceable is a powerful way to improve the learning of people who find learning especially difficult.

In summary, what is often described as the behavioral procedure of "time-out" is nothing more than a kind of coercion practiced by our society for hundreds of years. As a teaching tool, very brief time-outs may be useful in helping children, and others who cannot yet understand language, discriminate between what is socially acceptable behavior and what is not. When used in this way, it is critical to keep a close eye on the effect of the procedure on the frequency of the behavior it follows. It is easy to be fooled into thinking a disruption of an ongoing behavior stream means the behavior is less likely to occur in the future. The "time-out" that disrupts a behavior stream preventing continuation of an ongoing action could also result in an increase in the frequency of that action. In this case, the procedure is a reinforcement procedure because it has the effect of maintaining the undesired behavior.

> The basic feature of a time-out is the withdrawal of opportunities for positive reinforcement. (22) _____ (true/false)

> Time-out is rarely effective in situations designed to teach new actions. (23) _____ (true/false)

> Time-out may stop an ongoing behavior by removing the situation in which the unwanted behavior is occurring but it still may not have the effect of decreasing the frequency of the behavior. (24) _____ (true/false)

> Time-out is the only non-coercive punishment procedure. (25) _____ (true/false)

> Very brief time-outs may be useful in helping non-verbal humans learn to discriminate desirable from undesirable behavior. (26) _____ (true/false)

Behavior and Its Causes: Reading #12:
Issues in Aversive Control: Part III

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Positive Reinforcement in Prisons

Most youths incarcerated in reformatories have impoverished repertoires of behavior. From the beginning, even before their imprisonment, they had only a limited array of adaptive skills. Many reinforcers were out of their reach, and others were unknown to them. They were just as effectively deprived as if we had deliberately taken away their food, shelter, economic support, and all possibility of attaining the kinds of success that education and training make possible. Such deprivations are socially imposed rather than the natural results of biological processes.

This is not to suggest that criminality is confined to the poor or to the socially neglected. Serious crime exists at all economic and social levels. But homes and neighborhoods that suffer the harshest social and economic deprivation, and at the same time lack a tradition of upward economic mobility, also spawn the most visible forms of youthful criminality. Such communities do not place great value on - do not provide reinforcers for - conversing about anything except basic needs, reading anything longer than billboard phrases and newspaper headlines, writing anything more than signatures and perhaps a few expletives suitable for graffiti, or calculating anything more than the simplest cash transactions. People deprived of effective learning environments grow up unable to talk, read, write, or calculate. Written applications and job interviews are out of the question. Ambitions are limited to the immediate avoidance or escape from coercive contingencies imposed on the one hand by the Law and on the other by the chronic deprivations that accompany incompetence. Such histories result in lives that are entirely devoted to obtaining the primary reinforcers of food, shelter, alcohol, sex, and drugs. What is learned is the most reliable way - sometimes the only way open to them - of obtaining those reinforcers: Take them from someone else.

Rather than insuring that all members of our society have the skills they need to obtain those reinforcers in socially acceptable ways, and opportunities to do so, our society attempts to lock the barn door after the horse is out. When the law catches up with youths the social system has failed to teach effectively, they are sent to "correctional" institutions that are supposed to "reform" them. After serving their term, they usually return to their old territory, having learned nothing that might help them produce reinforcers in more socially useful ways. If they have been changed in any way, it has been by a sharpening of their ability to keep from getting caught. Many do get caught

again, however. The threat of imprisonment failed to prevent their first lawless acts, and actual imprisonment fails to prevent their repetition. These failures are to be expected; coercive control provides no alternatives for the lawbreaker who lacks socially desirable kinds of competence. Deprivations imposed within prison walls are hardly more severe than the familiar realities outside. Thrown back into the same old scene, with no new coping behavior, and now labeled as criminals, subject to even greater restriction, it is not surprising that those released from prison often behave as they did before going to prison.

> People deprived of effective (1) _____ environments acquire few of the skills they need to produce an adequate number and range of positive reinforcers.
>
> The absence of socially useful skills in a behavioral repertoire makes socially undesirable behavior the most reliable way to obtain (2) _____.

Criminality is a complex problem - actually, many different problems, and with many roots. But in all its variations it is still behavior. Our everyday concern is not with an abstract concept, "criminality," but with criminal actions. It is unwarranted to assume that criminal acts are solely the product of behavioral contingencies. But it is equally unwarranted to ignore the importance of behavioral contingencies in shaping and maintaining criminal behavior and their importance in shaping and maintaining alternatives to criminal action. Certainly, to reduce the incidence of criminality by redesigning the environments it springs from is an exceedingly complex task. It is rarely possible to achieve the necessary control of the critical reinforcers, to eliminate the current negative reinforcers and replace them with positive. And so we dare not eliminate our prisons.

However one feels about the desirability of imprisonment, its failure to deter repetitive crime represents lost opportunities, even tragedies. Prisons and reformatories control reinforcers to an extent that is not permitted on the outside. While offenders are temporarily unable to engage in the acts that brought them to prison, it is possible to use positive reinforcement to teach them more acceptable forms of useful conduct. Before leaving prison, the offender could be equipped with new options, ways of surviving within rather than outside the law. Reducing the number of multiple offenders would also reduce society's ever-increasing need for new prisons.

The use of imprisonment as an opportunity for education has met with so little success that law enforcement professionals view the notion with nearly complete skepticism; proponents are "ignorant do-gooders." The lack of success and the resulting skepticism, however, come from the mistaken notion

that teaching can only be accomplished by coercion, particularly when the students are "criminals." Most educational programs within prisons have failed because they rely on coercive control. With positive reinforcement, it is possible to accomplish real corrections in misdirected life paths. A well designed learning program with high levels of positive reinforcement, instituted before youths have become habitual offenders, costs considerably less in the long run than to prop up the standard system of coercive control.

Prison as a Learning Environment

This is not just impractical theory. Positive reinforcement has been used successfully to replace juvenile offenders' incompetence with constructive skills, making new reinforcers available to them for the first time. A superb demonstration project that showed the effectiveness of a well planned and competently administered positive reinforcement system has been completely ignored by professionals in behavioral science and in law enforcement. In this project, new capabilities permitted youngsters, on leaving prison, to enter new environments and succeed there, without coming into conflict with the law. The techniques for getting them there are not difficult in principle, but they do require considerable effort. All correctional officers should be trained to use them. A book that describes a federally funded project that accomplished these objectives is A New Learning Environment by H. L. Cohen and J. Filipczak.

The project made courses available to youthful prisoners, starting with basic reading, writing, speaking, calculating, and remembering, and then going on to more advanced skills that made use of those prerequisites. The content and sequence of courses was carefully programmed. Guaranteeing that each course prepared students for the next one, and requiring high marks before they could move on, ensured success - continued reinforcement. No one was forced to take courses: punishment did not follow if anyone preferred the usual prison routine rather than participating. Simply making courses available was not enough, though. After all, if the youth had never experienced the advantages that elementary academic skills can bring, why should they have been interested in participating? Contrived reinforcers for learning were therefore necessary at first, until the students' new skills brought them into contact with more natural consequences. That is where a critical feature of the system, positive reinforcement for learning, entered the picture.

In order to get prisoners started, the project paid them for learning. That made it possible for those who did engage in the learning process to get things that would not otherwise have been available at all, regardless of how they acted in prison. High exam scores gained the learner a private space. Although sparsely furnished at first with a table, chair, bookshelf, and lamp items that made continued study feasible the space could be outfitted later

according to the owner's personal tastes and resources. How were they supposed to obtain those resources? Having secured the space, they could then earn credits by continuing to show new learning in their courses. They could save and use the credits like money to purchase items in a store. The stock in the store was tailored to the preferences of those who were working for credits.

Paying the students for learning simply set up school as another job that was available to the inmates. The credits, the store, the private space, and other privileges were actually part of the school program and could be earned only during school hours while the prisoners were on the job. That the reinforcers the participants enjoyed were actually earned probably helped account for the relative absence of resentment and hostility on the part of prisoners who did not take part. They all had their choice of jobs. Nobody was shut out. The reinforcers were available to anybody who selected that job as part of his prison duties.

Private ownership created new reinforcers

Wall decorations, furnishings, furniture, music, and TV became items worth working for, and learning continued. New skills created the potential for still more reinforcers, which the store made available: The ability to write letters turned stationery and writing materials into useful possessions; the ability to handle a job interview made certain clothing desirable for students who would soon be completing their prison term; the ability to read created a new pleasure, and books became desirable possessions. Having many more reinforcers worth working for, students were in a position to acquire increasingly complex behavior. They were allowed to begin using their credits to buy privileges they could not before have been trusted to handle: telephone calls, visits in privacy by friends and relatives, and, at first in conjunction with their courses, supervised trips outside the walls. The value of learning itself became apparent, and the students eventually came to use some of their credits to pay tuition for courses that they requested - a requirement they would also meet outside.

When these students left, they were able to do things that made new reinforcers available; their world had expanded both their behavioral repertoires and their behavioral environments. There was no guarantee, of course, that the old contingencies in their home environments would not take over again, but now they at least had a chance for something different. The evidence suggests that many capitalized on new opportunities that the non-punitive approach had opened up to them. Fewer returned to prison. And that was good for them as well as for our society.

Attempts to teach imprisoned people new skills usually fail because they involve (3) _____.

Cohen & Filipczak created an environment in which learning always resulted in (4) _____ reinforcement.

As Cohen & Filipczak's imprisoned students learned new skills, new (5) _____ became available and the student acquired increasingly complex (6) _____ .

By the time the imprisoned students were released, both their behavioral (7) _____ and their behavioral (8) _____ were greatly expanded. (use plural words and check spelling)

Conclusion

Any behavior that exists in a human repertoire exists because it has been useful either in the history of the human species or in the history of the behaving individual. The crux of the problem for society is that a behavior that has been useful to an individual in the short run may be detrimental to others, and even detrimental to the individual himself in the long run. In order for a society to exist, its members must be socialized to conform to standards of behavior that maintain social order. It is often easier to learn behavior that does not conform to social standards. It is easier to steal money than to work for it especially if your work skills are not very good. It is easier to cheat on exams than to study for them. It is easier to spread rumors about a competitor than to practice more and compete better. It is easier to force someone to submit to sex than it is to learn the social skills needed to obtain agreement. It is easier to shout louder or disallow disagreement than it is to persuade with facts and logic. But if those more difficult to learn complex behaviors are going to be acquired, our society must use positive reinforcement in shaping, fading, instructional training and other discrimination and generalization training procedures. Instead, our society has generally relied on coercion to reduce the frequency of actions that were easily acquired while society neglected teaching the desired behavior.   Our runner-up strategy is to force people to learn what society needs them to learn by allowing them to escape and avoid negative reinforcers by learning. The problem with this is that most of us learn only what we are forced to learn when learning is a form of escape or avoidance. And we often don't use what we have learned or pursue further learning when we are released from a learning environment where negative reinforcement reigns. When positive reinforcement is used to teach and maintain socially desirable behavior, occasional reinforcement can maintain that behavior for a lifetime.

Undesirable behavior is usually (9) _____ to learn than socially desired behavior.

If we want people in our society to learn to behave, and to continue behaving, in the complex ways needed to sustain our complex society, we must use (10) _____ reinforcement.