EXTINCTION AND HABITUATION

DESCRIPTION OF THE STRATEGY

Classical Conditioning

Ivan Pavlov in the early 1900’s demonstrated the ease with which a response could be ‘classically conditioned’, a phenomenon that would ultimately form the basis of behavior therapy. Pavlov repeatedly presented a bell to dogs just prior to the appearance of meat powder. The meat powder was an ‘unconditioned stimulus’ because it naturally made the dogs salivate without any earlier learning. After repeatedly hearing the bell before receiving the meat powder, the dogs learned to salivate in response to the bell, prior to getting the
meat. This indicated that the bell had become a ‘conditioned stimulus’ to elicit salivation, and mouth watering was now a ‘conditioned response’ to the bell.

Based on this discovery of the way animals readily learn associations between stimuli, John B. Watson used the classical conditioning model to establish a fear response, like a phobia, in a young boy called Little Albert. Albert was only 11 months old when Watson conditioned the boy to fear small white rats. For this infant, the rat initially evoked no fear. However, pairing the rat with an unexpected loud noise elicited a clear fear response. Soon, Albert showed fear to all manner of stimuli that resembled white fur, including a Santa Claus mask. The spreading of the conditioned response to related stimuli (‘stimulus generalization’) helps explain why an individual with a dog phobia is likely to become afraid of all dogs, and not simply the dog that may have initially bitten him or her.

Classical Extinction

Once a conditioned response has been established by means of repeated pairings of a conditioned stimulus with one that is unconditioned, it is difficult to change the response unless you weaken the association between the stimuli. This process of unlearning is called ‘classical extinction’. If the conditioned stimulus is no longer paired with the unconditioned stimulus, eventually the conditioned response starts to disappear. In other words, if the bell were repeatedly presented without meat powder, the dogs would gradually stop salivating in response to the
In this way, conditioned fear responses or other maladaptive behaviors can be extinguished. Classical extinction does not actually make the conditioned response disappear; rather, it becomes inhibited or suppressed. This is evident from the ease with which the conditioned response can be reinstated, or show ‘spontaneous recovery’ over time, indicating that the original learning has not been permanently lost.

Therapies based on classical conditioning are focused on helping the client unlearn the association between the conditioned and unconditioned stimulus, so that the unhealthy response can be extinguished. This unlearning can happen in a number of ways:

In ‘counterconditioning’, the conditioned stimulus is paired with a response that is incompatible with the unhealthy reaction, such as pairing a fear-evoking stimulus with a relaxed feeling. This approach underlies Joseph Wolpe’s theory of ‘reciprocal inhibition’, which involves countering anxiety with a feeling that inhibits the fear response, such as relaxation, sexual arousal, or assertiveness. A healthy behavior eventually replaces the undesirable response. The pairing of the relaxation response with progressively more fear-evoking objects, situations, or images is known as systematic desensitization. For instance, an individual who fears heights could be taken to a moderate height and then encouraged to stay at this height while doing relaxation exercises until the fear response diminishes. When the client could remain at the height without feeling much anxiety, she
would then be ready to move to a more challenging height. Over time, the unhealthy fear response is extinguished through repeated pairing with relaxation, a feeling that is incompatible with fear.

In addition to coupling fear with relaxation, counterconditioning has been used in sex therapy to help treat sexual disorders, such as those related to performance anxiety. In this case, the anxious couple is prompted to pair sexual situations that would normally provoke anxiety with pleasurable feelings, like arousal. In a process known as ‘sensate focus’, pleasurable touching that does not include intercourse is encouraged, thus reducing anxiety associated with the pressure to perform and creating positive associations with sexual activity. Similarly, in assertiveness training, the client is taught to respond with confidence in situations that normally evoke anxiety.

Habituation

Even without pairing the negative conditioned response with an incompatible positive response, repeated exposure to a feared situation or image while remaining in that situation will eventually lead to a reduction in the fear response. Reduced strength of the conditioned response following numerous presentations of the evocative stimulus is known as ‘habituation’. This process forms the basis of a variety of exposure therapies. The common theme involves repeated exposure to the stimuli that evoke the negative response (often fear), and staying in the situation.
By not circumventing the anxiety, the avoidance behavior is not reinforced because the person is challenged to experience the fear. Through exposure, the person learns to tolerate anxiety and experiences mastery. Exposure can be in vivo (i.e., to the actual situation, such as touching a live spider) or imaginal (e.g., imagining holding a spider), and can be done gradually (e.g., first looking at a picture, then watching a spider from far away, and eventually picking it up), or done through flooding, which involves exposure to a highly arousing stimulus for a prolonged period of time. Whatever the form of exposure, clients are encouraged to face their fears and remain in that situation until the fear lessens.

Habituation occurs for a number of reasons. The person gets used to being in the situation and realizes that the imagined catastrophic outcomes do not come true. For instance, a man who is afraid of water learns that he does not drown and can cope even in a frightening situation. In addition to cognitive changes, from a behavioral perspective, the person breaks the established association between the unconditioned and conditioned stimuli. Further, physiological changes occur that naturally lead to a reduction of the conditioned fear response.

When an individual initially becomes frightened, she or he experiences a dramatic increase in fear arousal, produced by the ‘fight or flight’ system, which is operated in large part by the body’s sympathetic nervous system. The cardiovascular system is activated and blood is pumped to the skeletal muscles to prepare the body for emergency action. This system is very adaptive when a
person is in real danger because it prepares the body to either escape from the danger or fight the aggressor. However, in anxiety disorders, it essentially acts as a false alarm because it primes the body to respond to a danger that does not actually exist. Fortunately, this system is designed for emergencies, and our bodies cannot maintain such a heightened state of arousal for an extended period of time. After the initial peak in anxiety, the autonomic nervous system becomes more active to return bodily functions to their normal levels. Thus, the fear response can be extinguished by simply allowing the frightened individual to habituate or become accustomed to the situation.

**Aversive Therapy**

A conditioned response can also be extinguished by pairing it with another undesirable response. This is useful when the unhealthy behavior is maladaptive but desirable to the person, such as an inappropriate sexual impulse. In this case, the desired behavior can be paired with aversive stimuli to change the positive associations. For example, an individual with pedophilia could be exposed to sexually evocative pictures of young children while simultaneously experiencing brief electric shocks to reduce the pleasurable feelings associated with the pictures. Alternatively, a person who abuses alcohol could pair drinking (an initially pleasurable activity) with a medication that will elicit nausea to reduce the positive associations to alcohol. In this case, it is important that the aversive
stimuli be sufficiently negative so that the person does not merely get used to it and habituate.

Operant Conditioning

Even before Pavlov was making dogs salivate through classical conditioning, Edward Thorndike was investigating learning processes in hungry cats that learned through trial and error how to escape from a box to obtain food. When the cats were rewarded with food, they increased the behaviors that enabled their escape. Thorndike labeled the relationship between behaviors and their consequences the ‘law of effect’. In its original version, this law simply states that responses that lead to positive outcomes will increase while responses that lead to negative outcomes will decrease.

B.F. Skinner was very interested in behaviors that increase or decrease because of the consequences that follow them, and felt that most complex behaviors fit into this category. These behaviors are termed ‘operant’ because they operate on the environment to bring about a given outcome. Skinner noted that behavior would increase if it was followed by a reward (‘positive reinforcement’, such as getting dessert after finishing homework), or if it was followed by a negative stimulus being removed (‘negative reinforcement’, such as having less homework assigned following good conduct). Analogous decreases in behavior follow positive and negative punishments.
Operant Extinction

Similar to classical extinction, where the association between a stimulus and a conditioned response is weakened, in operant extinction, all reinforcers or positive outcomes are withheld from a behavior that was previously rewarded. Accordingly, the undesirable behavior diminishes because it no longer leads to pleasant consequences. For example, an individual with anger management problems who typically gets his or her way after yelling loudly should consistently not be reinforced following yelling. Instead, the person might be reinforced after negotiating in a reasonable manner. In this way, yelling is extinguished while negotiation is differentially reinforced.

A variation on operant extinction can also occur using punishment, such as instituting ‘time outs’ where a child who has misbehaved has all reinforcers removed for a period of time. Extinction is most effective when it is consistent (i.e., the positive reinforcement is reliably withheld following the behavior) and alternative desirable behaviors are rewarded. So, although time outs do involve decreasing a behavior by withholding reinforcers, it is more clearly an example of negative punishment than pure extinction.

RESEARCH BASIS

Classical Extinction Techniques

Applied relaxation in systematic desensitization has substantial support as an adjunct technique in the treatment of a range of anxiety disorders, likely due to
the client’s increased ability to feel more in control while in the presence of the fearful stimulus. Similarly, sensate focus, concentrating on pleasurable sensations that stem from sensual activities rather than emphasizing orgasm and intercourse, has received considerable support in the extinction of unhealthy responses in sexual arousal disorders.

Habituation-Based Therapies

Exposure therapy has been widely demonstrated as an effective treatment for anxiety, especially when used in combination with other techniques, such as ‘cognitive restructuring’ (changing maladaptive thought patterns). Exposure in conjunction with response prevention has been used to successfully treat obsessive-compulsive disorder (OCD), and more recently, has shown favorable effects in reducing anger and aggressive behavior. Satiation therapy has been used to treat maladaptive sexual arousal and involves prolonged exposure with the expectation that maladaptive arousal will be reduced over time through satiation or boredom with the inappropriate stimuli. While some support exists for this technique, treatments that encourage maladaptive arousal raise a number of ethical concerns.

Aversion Therapies

Aversion therapy has demonstrated favorable short- and long-term results in the treatment of alcohol and cocaine dependence, especially in combination with other treatment modalities, including detoxification and counseling. In
contrast, research on aversion therapy to treat maladaptive sexual disorders suggests that such therapies may reduce arousal; however, there are few well-controlled studies and little support for its long-term effectiveness.

**Operant Extinction Techniques**

Treatments that incorporate principles of operant extinction have been used successfully to treat anger problems, especially in youth. In addition to using positive and negative reinforcement and punishment, such treatments also improve communication skills and attempt to address the client’s distorted perceptions regarding social interactions. Operant extinction techniques have shown the greatest support when reinforcement and punishment are consistent.

**RELEVANT TARGET POPULATIONS AND EXCEPTIONS**

Habituation and extinction techniques provide the foundation for a variety of successful behavioral treatments. For instance, relaxation training and exposure therapy have been used to treat each of the anxiety disorders, including specific phobias and panic disorder. Further, female sexual arousal disorder and male erectile disorder typically improve following sensate focus treatment. Aversion therapy, on the other hand, has historically been used to treat substance dependence and paraphilias, but ethical concerns and questionable long-term maintenance limit its current use.

Operant extinction is frequently used to reduce undesirable behaviors among children with behavioral problems or to lessen repetitive and sometimes
harmful behaviors seen in developmental disorders. However, it may not be an
appropriate technique for self-injurious behaviors that need to be eliminated
quickly due to a potential increase in either the behavior itself or in aggression
when reinforcers are initially withheld (known as ‘extinction burst’).

COMPLICATIONS

The principles underlying habituation and extinction have successfully
been used to treat the range of anxiety disorders, sexual dysfunctions and
numerous childhood behavior problems. Notwithstanding, the procedures are not
without complications. Because of the potential for spontaneous recovery (return
of a previously extinguished response), it is important to insure that behavior is
extinguished across multiple contexts to increase the generalization and
maintenance of gains. Other complications include the ethical concerns about
using extreme punishments in aversive conditioning. Further, the removal of
positive reinforcers for operant extinction requires a great deal of control over the
environment, which can make it difficult to implement outside of highly restricted
settings. Finally, as mentioned earlier, the potential side effects of extinction,
such as increases in undesirable or aggressive behavior, make it less ideal for
behaviors that need to be terminated quickly, though the risk of these
consequences is substantially reduced by combining extinction with other
interventions, such as differential reinforcement.
The complications surrounding habituation relate to the need to have clients remain in the situation until their maladaptive response is sufficiently diminished. This can be difficult for therapists who run their practice on a traditional therapy hour. Additionally, although rare, there are some individuals whose anxiety increases over time during exposures, rather than showing the usual habituation pattern. This ‘sensitization’ is especially likely if exposures are very brief.

CASE ILLUSTRATION

Alex, a 63-year-old married grandfather who had recently retired from his position at an accounting firm, sought treatment for OCD. For the past 9 years, he had been concerned with keeping his home exceptionally orderly and spent many hours a day rechecking his accounting work for errors. The cleaning and checking behaviors made him unproductive at work, precipitated his early retirement, and caused numerous arguments with his wife who felt intense pressure to keep the house immaculate. Although the OCD symptoms had been present for nearly a decade, Alex did not seek treatment until his symptoms escalated following retirement.

When Alex left his position, his daughter asked him to help care for his two young grandchildren. Alex adored his grandchildren and was thrilled to spend more time with them. However, with the increased responsibility for their care, he felt extremely fearful that his grandchildren might be hurt in some way if
his home was not flawlessly clean and organized. Although Alex recognized his fears were illogical, he spent up to 6 hours a day compulsively cleaning, even combing the fringe on the dining room rug. In addition, Alex did not cook for fear of messing up the kitchen, and would not permit his wife to cook or allow his grandchildren to have friends over for fear they would make things untidy and be harmed.

Following a thorough assessment, Alex agreed to start exposure with response/ritual prevention and was gradually exposed to situations that made him anxious. With the therapist’s help, Alex prevented himself from cleaning or doing other rituals. A fear hierarchy was developed, starting with relatively easy exposures that centered on different approaches to creating a mess (such as leaving a towel on the floor), and leading to extremely challenging tasks (such as allowing spaghetti sauce to boil over and leaving the mess for 24 hours). In each case, Alex would create the mess, which would evoke anxiety, and then remain in the situation until his anxiety had diminished to at least half of its original strength, with exposures lasting from 30 minutes to 2-3 hours. During each exposure, Alex allowed his anxiety to habituate so that the conditioned fear and avoidance responses would eventually be extinguished. His anxiety was regularly monitored throughout exposures using a verbal scale from 0 (completely calm) to 100 (extreme fear, like panic). After each weekly exposure with the therapist, Alex was instructed to repeat and practice the exposure at least 5 times during the
week (preferably for at least 40 minutes a day) and to insure that in each case he remained in the situation until habituation had occurred. After eight months of regular exposures with repeated practice between sessions, Alex was only cleaning one hour a day and no longer exhibited extreme avoidance behaviors.

SUGGESTED READINGS


KEY WORDS

Classical conditioning, operant behavior, extinction, habituation, exposure, counterconditioning