

TWO - FACTOR THEORY OF LEARNING: APPLICATION TO MALADAPTIVE BEHAVIOR

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Abstract: *Two-factor theory of avoidance remains one of the most influential theories of learning. It addresses a question of what works as a reinforcement of avoidance behavior, and proposes that: 1. an organism associates stimuli in the environment with aversive stimuli, and this allows these stimuli to evoke fear; 2. the avoidance response is reinforced by eliminating these warning stimuli or by escaping from them, and therefore causes fear reduction. The theory stresses interplay between stimulus learning (classical conditioning) and response learning (operant conditioning through fear reduction). In the article, the explanation of some clinical problems through two-factor theory is addressed.*

Keywords: *classical conditioning, operant conditioning, two-factor theory, psychopathology, natural phobias*

In the middle of the 20th century it seemed that behaviorists were so tied with the learning theories that they viewed Pavlov's and Skinner's laws as universal as Newton's law of gravitation. From the position of *militant environmentalists* (Seligman, 1993) they stated that all behaviors are learned under influences from the environment. However, due to the disagreement of their younger followers we can look at the learning from different perspectives, especially from the perspective of a third type of learning, and answer the question if the conditioning is more complex than it seems.

A critique of the learning theories stresses that neither classical or respondent conditioning (CC) nor operant or instrumental conditioning (OC) are able to explain from their positions the whole process of conditioning, especially *avoidance conditioning*. Representatives of OC outline this process by negative reinforcement which is studied during escape and avoidance conditioning. Laboratory experiments confirmed that escape avoidance is relatively simple. An animal learns to press a bar and thus switch off an electrical shock. Avoidance conditioning is more complex and from many aspects more important because it is „relevant for some aspects of human behavior“ (Gross, 1992, p. 145). However, if OC will not overstep its boundaries and will remain focused only on observable behaviors it will prevent them to explain the whole process fully. Several theories tackled this problem. However, according to Walker (1984), only one theory succeeded in resolving it by implementing covert

behavior into the process of conditioning and thus explaining not only avoidance conditioning but also the role of avoidance in human pathology. It was a two - factor theory.

Two – factor theory

By observing someone the change appears also in our behavior. To learn a new behavior we need no rehearsals, no overt responses, and no reinforcement. We know it before we perform it. This conclusion was reached not only by Albert Bandura but also by Hobard Mowrer (1960) who introduced **two-factor theory** focused on the interplay of *classical and operational contingencies*, and on this basis explained *avoidance conditioning*.

H. Mowrer believed that under some circumstances there is a need to overstep boundaries of the observable and analyze the data which are not directly observable because stimuli from environment do not trigger the overt behavior directly, but they do it through **mediators** (thoughts and emotions). In contrast to overt behavior, emotions and thoughts are not directly observable and measurable. It is possible only to assume about them on the basis of overt behavior observations. Therefore thoughts and emotions are called covert behavior or covert responses. They function on the same principles as overt behavior.

Mowrer's experiments with animals represent a good analogy with human psychopathology (Stampf, (1987). In an experiment, rats got an electrical shock immediately after the sound of a buzzer. A buzzer was a warning stimulus (unconditioned stimulus, US), and evoked pain and an emotional response of fear or anxiety (unconditioned reaction, UR). After a few associations, a fear originally triggered by a shock was triggered by a buzzer. Even after the shocks were stopped, the rat responded by fear on originally neutral stimulus (a buzzer). A buzzer, in this case a conditioned stimulus (CS) evoked an emotional response of fear. So far everything was processed in the framework of CC. At this point Mowrer overstepped it and penetrated into the territory of OC. On the basis of OC, an animal learned to react differently. To avoid a shock and to reduce a fear, it jumped over a barrier and escaped. This behavior was *negatively reinforced* through the avoidance of shock before it acted. An animal learned to *avoid* a neutral CS (a buzzer). The process is called **avoidance conditioning**. Lets' summarize what has happened:

1. Based on the CC principles, an animal learns to fear a buzzer because it is paired with a shock. This conditioned fear is called anxiety.
2. Based on the OC principles an animal learns to avoid a source of fear. To avoid shock it runs away. Because a buzzer is paired with a shock, an animal learns to escape from a harmless stimulus, from a buzzer. It is called conditioned avoidance. Escape weakens fear and a response is reinforced by consequences.

At the beginning, Mowrer's theory changed only a view of the learning process. Later, it changed the view on psychopathology, and became a basis for various therapeutic interventions, and promoted H. Mowrer into a position of a leading researcher and theoretician in this area.

Before we move to applications of two-factor theory on clinical problems, we have to mention traditional behavioral models of psychological disorders. It will help us to pin point in which aspects a two-factor model is distinguished from them.

Behavioral models of psychological disorders

Behaviorists view all behaviors, adaptive and maladaptive, as gained according to the same principles of CC and OC. The medical model of psychological disorders is completely denied including the differentiation between stimuli and pathology lying beneath them. Opposite to psychoanalysts who emphasize the past, the focus is on *present behavior*, which should be first *operationalized*, i.e. defined in terms of observable and measurable behavior, and changed afterwards.

According to behaviorists, all types of abnormal fears are learned and gained through CC. Any neutral stimulus acting simultaneously with the fear reaction gains the ability to evoke consequently fear (Wolpe, 1962). For fear to grow into phobia, it should be generalized. Through generalization, the fear is shifted on stimuli similar to CS. A person learns to fear and avoid not only specific objects associated with US (for instance one crowded square) but a group of stimuli (crowded squares in general). Learning theories support this finding by numerous pieces of evidence. For instance: Many phobics suffering from the phobia of dogs reported that before the offset of phobia they were attacked by a dog. Laboratory experiments with animals and humans showed that if US is highly traumatizing only one-attempted trial is enough to make an association between UC and CC to produce long-termed UR. Despite a number of supporting evidence, there is a lot of counterevidence. CC cannot be applied to all phobias. A strong fear of snakes, bacteria or airplanes is experienced by many people who never experienced any direct contact with the object of their fear. On the other hand, not everybody who experienced trauma developed a phobia. It is possible that the learning process through CC is a part of the etiology of some phobias, but also different processes are involved, especially preparedness to learning (Ohman, 2000).

In a laboratory research, A. Ohman confirmed that some phobias are learned easier than other phobias. Those phobias which are easier learned are natural and more frequent. An example is represented by snake and rat phobias which occur more often than rabbits or ladybirds phobias. It seems that the basic perceptual qualities of the objects of these phobias as ugliness, speed and fast movement. These and similar findings are consistent with the *preparedness to learning* (Ohman, 2000).

Similarly, A. Rachman (1984) believes that direct conditioning plays a role only in a limited number of phobias. However, opposite to A. Ohman, he does not regard preparedness to direct conditioning as relevant but he views as possible the preparedness for observation and learning from instructions and information. His view is supported by Badelly (1990) who states that phobias are not required by a coincidental association between a stimulus and a worried situation but they can be learned through imitation, and they have a tendency to be associated with some objects and not others.

CC runs into difficulties when explaining the *offset* of phobias. However, the biggest difficulty it faces is when trying to explain *the maintenance* of naturally occurred phobias (snakes, heights), because it fails to explain the reason for of their *extinction*.

Exactly this point was pin pointed by H. Mowrer. By all means his two factor model can be labeled as a main theoretical attempt to explain maintenance and the extinction of phobias.

Explanation of phobias based on two-factor theory

According to Mowrer, fear can be defined as an inner response which is gained by the same principles as overt responses, through observation, or as an inner state which is evoked by avoidance behavior. This concept of fear makes it approachable to emotional analysis in the same way as overt behavior.

H. Mowrer viewed symptoms of fear as *learned avoidance responses* serving to reduce anxiety. A phobic avoids stimuli such as cats, lifts, tunnels. An obsessive – compulsive person avoids dirtiness, disorder, anger. A schizophrenic avoids close relationships with people, and a hypochondriac avoids illnesses. If they do not avoid them they face a fear. If they do avoid them they reduce fear.

The two-factor model reveals how people learn to avoid particular stimuli. Let us illustrate this process on an example which offers two findings (Prochazka, 2000): It shows that experiments with animals are useful in understanding how people learn to avoid particular stimuli, but it also shows that the conditioning of disorders is much more complicated than illustrated in experiments with animals.

A teenage boy was frequently punished in his childhood. When talking with enthusiasm and a full mouth at lunch about his football team victory, a mother slapped him because it is not permitted to talk during lunch. When he presented his ideas, his father ridiculed him. When he expressed his disagreements, his father reprimanded him and his mother slapped him. He started to fear talking to his parents. In the language of conditioning, the stimulus that triggered his fear was represented by his parents, and throughout generalization by all people to whom he spoke. Later, at school, when he was due to deliver his presentation, a conditioned fear was elicited. When he „got sick” and thus „unable” to come to school and deliver his presentation, his fear was reduced, and his avoidance behavior was reinforced. Even though his teachers had no intention to harm him, he responded with anxiety and avoidance as if a symbolic slap waited for him in any surrounding. He developed social phobia, an irrational fear linked to the presence of other people. This debilitating condition forced him to avoid any social situation in which he was supposed to present himself and consequently be evaluated.

It is obvious, that classically conditioned fear of an objectively harmless stimulus formed the basis of an operant avoidance response. But, in a contrast to the experiments with animals, the role in his fear was not played only by one stimulus as it is with animals (buzzer) but by the whole range of stimuli, and fear was triggered in relation to the whole context (parents, adults, presentations). The conditioning reveals one more difference between humans and animals. If more CSs are operating, the result is stronger avoidance which develops easier and is more resistant to extinction as if fear is associated only with one stimulus (Stampfl, 1987). In humans, the avoidance is conditioned not only by environment but also by what people *imagine or feel* in a given moment. The boy experienced fear at any imagination of emotional experience, and to avoid it he learned to avoid these images. It resulted into **avoidance repression** (Prochazka, 2003).

When he repressed his images, he was reinforced. His anxiety triggered by these images was reduced.

However, when people avoid the object of their fear they also avoid „reality testing”. This is a key to understanding why phobias are outstayed (Mowrer, 1960). In our example, after a boy learned to avoid social situations, he could not test that there is no danger lurking in them, and his maladaptive behavior outlasted.

Two-factor theory is suitable for the explanation of the maintenance of phobias (Stampfl, 1987) as it points out that avoidance is negatively reinforced by the reduction of fear while a CS is not present. Growing empirical evidence supports two-factor theory's as explanation of other psychological disorders as well, e.g. post-traumatic stress disorder (Davison, 2004). The theory proved to be very successful in the therapy of enuresis where it is regarded as „one of the clearest and lasting gains of behavioral therapies” (Houts, 1991, p. 147).

Criticism of two-factor theory

Two-factor theory was criticized by behaviorists on one side, and by representatives of different psychological schools on the other side. According to Rachman (1984), the avoidance is not motivated by a reduction of anxiety declared by Mowrer, but by *positive feelings* in safe places. To support his opinion he uses an example of agoraphobia, the disorder which he views as motivated by the search of safety signals. He believes that *safety signals hypothesis* is able to explain more accurately than two-factor theory why an agoraphobic prefers to leave the house in a presence of a person he trusts, and why he uses particular roads. The reason is that people and streets he trusts, represent for him *safety signals*. This hypothesis is also able to explain why the loss of a close person triggers an offset of phobia.

Representatives of a *synthetic perspective on instrumental action* (Bounton, 2007) point out other shortfalls of a two-factor theory. They stress the organism's *evolution history*, and point out that especially this aspect was omitted by a two-factor theory. They believe that avoidance learning was taught to occur rapidly if the required response resembled a natural defensive behavior. In the opposite case, learning will depend more on a feedback. M. Bounton (2007) remains consistent with the core ideas that underlie the theory and views them as valid now-a-days, while simultaneously being argumentative that avoidance behavior should be approached more complexly and more synthetically, because the field has become more ethological as was assumed by Mowrer, and more Pavlovian, and more cognitive in the sense that what is learned is not necessary identical with that which is performed in overt behaviors.

Conclusion

Despite many critical words, two – factor theory contributes to a better understanding of avoidance behavior, proving that two factors are still better than one. The main theoretical attempt to explain the maintenance of naturally occurred phobias is a two factor model stating that fear is learned by CC (1.factor), but CC is not able to explain the outstanding fear. According to the 2nd factor (OC), fear is reduced by escape

or avoidance of the object of fear. As an escape or avoidance is negatively reinforced a person has a tendency to repeat this behavior (OC). Because the avoidance of the object of fear prevents reality testing, the phobias prevail.

H. Mowrer believed that the findings he gained by the exploration of overt behavior can be directly applied to studies of mental and emotional life. If it stands that repeated overt response is extinguished if it is not reinforced than it can be expected that the repeated fear response at simultaneous blocking of expected pain or punishment will reduce a fear. This is not a trivial finding by any means, because it represents a base for many behavioral therapy techniques which effectively help people to face their fears.

DVOJFAKTOROVÁ TEÓRIA UČENIA: APLIKÁCIA NA MALADAPTÍVNE SPRÁVANIE

Abstrakt: Dvojfaktorová teória naďalej zostáva jednou z najvplyvnejších teórií učenia. Adresuje otázku, čo posilňuje odpoveď vyhnutím, a odpovedá na ňu tvrdením, že sú to dva procesy: 1. organizmus asocjuje podnety z prostredia s averzívnyimi podnetmi, čo umožňuje týmto podnetom vyvolať strach, 2. odpoveď vyhnutím sa posilní oslabením týchto výstražných podnetov alebo útekom od nich, čím sa zníži strach. Teória zdôrazňuje interakciu medzi podnetom (klasické podmieňovanie strachu) a odpoveďou (operačné posilnenie cez redukciu strachu). V príspevku sa zameriavame na objasnenie niektorých klinických problémov prostredníctvom dvojfaktorovej teórie.

Kľúčové slová: klasické podmieňovanie, operačné podmieňovanie, dvojfaktorová teória, psychopatológia, prirodzene sa vyskytujúce fóbie