

Learning Theory Principles for Psychotherapy

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Abstract

Almost all forms of psychotherapy depend on learning theory principles but most psychotherapists never learned them properly or else have forgotten them. The purpose of the present article is to provide a review and update of the four main types of learning and to illustrate how principles from them might be applied to improve psychotherapy. The four types of learning are verbal paired-associates learning, classical conditioning, evaluative conditioning, and operant learning. The first part of the article examines the four types of learning to identify their most important principles as far as psychotherapy is concerned. The second part of the article suggests how the main mental disorders treated by psychotherapists can be better treated by applying these principles. Lastly, given the public's very low access to psychotherapists, some easily learnable self-help treatments are discussed.

Keywords

Psychotherapy, Learning Theory, Applications

1. Introduction

Indications are that the success rate of psychotherapy is disappointingly low, and is probably becoming even lower. A meta-analytic review (Westen, Novotny, & Thompson-Brenner, 2004) of randomized clinical trials of what are regarded as empirically-supported therapies estimated that the percentage of patients who complete face-to-face psychotherapy and show statistically significant symptom reduction is far short of perfect: 67% for obsessive-compulsive disorder, 63% for panic disorder, 52% for generalized anxiety disorder, 51% for major depressive disorder, and just 40% for eating disorders such as anorexia and bulimia—and this is after exclusion of approximately two in every three otherwise eligible participants from the trials because of the co-presence of other mental disorders or the presence of a preexisting medical problem.

A major roadblock to improving psychotherapy is that most intending and currently practicing psychotherapists do not realize how strongly psychotherapy depends on learning theory and are not aware of the very different types of learning that underlie the various forms of therapy. The descriptions of psychotherapy on the official websites of both the [American Psychiatric Association \(2018\)](#) and the [American Psychological Association \(2018\)](#) fail to distinguish the types of learning involved. Nor do the designers of most education and training programs in clinical psychology ([McDaniel et al., 2014](#); [Robiner, Dixon, Miner, & Hong, 2014](#)) or in consulting psychology ([American Psychological Association, 2007](#)) make reference to the different types of learning that need to be understood for successful implementation of psychotherapy. The practitioner's situation is not helped by the fact that the widely used DSM-5 and the ICD-10 diagnostic systems for psychiatric disorders give little or no indication of the *cause* of the disorder ([Kendler, Zachar, & Craver, 2011](#); [Wakefield, 2007](#)) and therefore provide no guidance as to whether and what form of psychotherapy might be an effective form of treatment.

Table 1 shows the mental disorders most frequently treated by licensed psychologists in the U.S. ([Stamm, Lin, & Christidis, 2018](#)). Five of the top 10 disorder types treated frequently by psychologists can be classified as primarily learning-based: anxiety disorders and phobias; depressive disorders, noting that while most will be learned reactive depression a small and often undiagnosed percentage of these will be biochemically-based melancholic depression or bipolar disorder ([Parker, 2000, 2005](#)); trauma and stress-related disorders; obsessive-compulsive disorders; and somatic symptom disorders such as hypochondriasis and chronically experienced pain. Of the remaining five of the top 10, three of them—conduct disorders, substance addictions, and personality disorders—have a large learned component but have also been found to be partly caused by biochemical dispositions (see [Kendler, Prescott, Myers, & Neale, 2003](#)). The remaining two of the top 10, bipolar disorder and neurocognitive disorders, to which we should add melancholic depression and schizophrenia, are primarily biochemically caused and require prolonged psychopharmacological treatment, but nevertheless have stressful and dysfunctional behavioral consequences that could be lessened by the application of learning principles to psychotherapy during periods of relative recovery (see especially [Walker, Shearsby, & Steel, 2013](#)).

More specifically, the purpose of the present article is to provide a review along with an update on the four main types of learning and to illustrate how principles from them might be applied to improve psychotherapy. The four types of learning can be described as verbal paired-associates learning, classical conditioning, evaluative conditioning, and operant learning. The four types of learning are distinct because each is based on a different causal process during acquisition, which results in a different type of learned response performed thereafter. The following sections of the article examine the four types of learning in turn, identifying their most important principles as far as psychotherapy is concerned,

Table 1. The 20 mental disorders treated most frequently by licensed psychologists in the U.S.A., 2017 (Stamm, Lin, & Christidis, 2018).

Disorder	Treated frequently or very frequently (%)
Anxiety and phobias	85
Depression	84
Trauma and stress-related	57
Personality disorders	32
Substance abuse and addiction	30
Conduct disorder	29
Bipolar disorder	28
Obsessive-compulsive disorders	24
Neurocognitive disorders	20
Somatic complaints (e.g. hypochondriasis, chronic pain)	20
Sleep-wake disorders (e.g. insomnia, narcolepsy)	16
Neurodevelopmental disorders	16
Psychosis (e.g. schizoaffective disorder, schizophrenia)	9
Eating disorders (e.g. bulimia, anorexia)	9
Other not elsewhere classified	8
Sexual dysfunction	5
Dissociative disorder (excluding psychosis)	5
Gender dysphoria	3
Paraphilia	2
Elimination problems	2

and pointing out how the principles might be applied to improve psychotherapy's success rate.

2. Verbal Paired-Associates Learning

Verbal paired-associates learning, or VPAL, is based on the sheer repetition of the paired words and is the most basic and elementary form of learning. In verbal paired-associates learning, one word, call it S_1 , comes to reliably elicit another word, call it S_2 (see **Table 2**). The process is entirely one of repeated association—that is, *rote learning*. That it is not just a simple association, however, is evidenced by the fact that the $S_1 - S_2$ association is not bilaterally equal; that is, $S_1 \rightarrow S_2$ does not have the same strength of elicitation as $S_2 \rightarrow S_1$. For example, the word “Baltimore” is much more likely to elicit “Maryland” than is the word “Maryland” to elicit “Baltimore,” the reason being that these two words are much more likely to be heard, read, or written in the order Baltimore, Maryland.

Table 2. The four types of learning explained in terms of acquisition and performance.

Verbal Paired-Associates Learning (VPAL)	
Acquisition:	S_1 word repeatedly paired with S_2 word in text or conversation (e.g. sex-disgusting).
Performance:	S_1 word encountered (e.g. sex) and S_2 word (e.g. disgusting) comes to mind immediately as the response, R_1 .
Classical Conditioning (CC)	
Acquisition:	A potential conditioned stimulus, CS (e.g. going shopping) becomes associated with an unconditional stimulus, US (e.g. intense anxiety experienced during actual shopping).
Performance:	The CS (e.g. the very thought of going shopping) now reliably elicits memory of the US (e.g. anxiety in the shopping situation), which in turn brings on a reflexive conditioned response, CR (e.g. hesitation, postponement, or even behavioral “freezing”).
Evaluative Conditioning (EC)	
Acquisition:	As for CC except that the new US can occur simultaneously with or even closely follow the CS, and the UR must be an evaluative response, most often the “gut reaction” emotional response of strong liking (e.g. your partner, a long-time positive CS, is revealed to have an obnoxious habit, a negative US).
Performance:	The negative US (e.g. obnoxious habit) now overrides at least partially the positive evaluative CR (e.g. liking) and if the negative evaluative US is seen to recur and was not just a one-off, then the CS (e.g. seeing or thinking of your partner) elicits a more negative CR (e.g. liking of the loved one turns awkwardly to dislike).
Operant Learning (OL)	
Acquisition:	A behavioral response, R , is made, often accidentally, and it is followed immediately by a positive consequence, S^{reinf} . The R is then likely to be voluntarily repeated with the same result.
Performance:	R will be repeatedly performed if even just occasional reinforcement follows (e.g. hand-washing can become habitual even when your hands are not dirty).
Note:	If during acquisition there is a consistent prior stimulus present—a specific sign or situation, for instance—then this stimulus will become a discriminative stimulus, S^D , which acts much like a CS in <i>classical conditioning</i> . That is, whenever the sign or situation is encountered, the operant response is made almost reflexively. Same for a negative discriminative stimulus, S^A , which can serve as a CS-like signal to <i>not</i> perform the response.

Thus, we must distinguish which S-word becomes the stimulus, S_1 , and which S-word becomes the response, R_1 .

Word association was a commonly employed technique in *psychoanalysis*,

which was the first formal type of psychotherapy. German and Austrian psychoanalysts were the first to employ word association as a diagnostic device. This began with Kraepelin, who in 1892 invented the first recognized diagnostic system in psychiatry and who used word associations to study state-associated alterations in word responses caused by drugs and by stress and fatigue. Soon afterward, in 1910, Freud's pupil and later colleague and intellectual rival Jung developed the first formal word association test to detect what he called "complexes" or what we might today call "emotion dysregulation." Meanwhile, the Americans Kent and Rosanoff, also in 1910, developed the first well-known set of word association norms. In psychoanalysis, the therapist presents potentially traumatic words such as "spouse" and "uterus" interspersed with neutral words, to look for paired associations that might signify subconscious mental conflict.

The most useful principle of verbal paired-associates learning is the *rapid responding principle*, which is that *rapid responding prevents response editing*. If patients or prospective patients are given S_1 , in the form of a cue word or maybe a short cue phrase, and asked to speak aloud as quickly as possible the top-of-mind associations to it in the form of R_1 , R_2 , R_3 , and so forth, then these responses are likely to reveal not only the patient's true thoughts but also thoughts that are usually suppressed by conscious editing. Getting at true thoughts is particularly important because of the widespread tendency for patients in therapy sessions to tell "white lies." [Blanchard and Farber \(2016\)](#) found that the topics that patients most often admitted to lying about to their psychotherapist were their real self-doubts, suicidal thoughts, their use of hard drugs or alcohol, and sexual problems. Further, approximately half the patients admitted to underreporting how bad they really feel, and almost half admitted to underreporting the severity of specific symptoms. Psychotherapists should also note the tendency of many patients to pretend aloud that the therapy is more effective than they really think it is and to say they are hopeful about a cure when they're not. The use of rapid word association might be a good way of getting at the truth in these situations.

3. Classical Conditioning

A second fundamental learning process is classical conditioning, here abbreviated CC, and called "classical" because it was the first type of learning identified and is often known as Pavlovian conditioning after its most famous inventor, the Russian physiologist I.P. Pavlov in the late 1800s and early 1900s, although Pavlov's work was predicated as early as the 1860s by the Russian physiologist Sechenov (see [Hilgard & Bower, 1966](#)). Pavlov's theory of classical conditioning remains highly relevant today, especially for the treatment of anxiety disorders. The process underlying classical conditioning is shown in [Table 2](#) earlier.

There are two causal accounts of how the conditioned stimulus, CS, produces the conditioned response, CR (see [Schwartz, 1978](#), or the later book by [Domjan, 2018](#), for the dual-process viewpoint). Pavlov's traditional theory is an S-R

theory in which the (C)S comes to elicit the (C)R *directly*, following the conditioning procedure in which the initially neutral CS is paired with a natural stimulus, the US, that elicits an unconditional reflex response, the UR. With the cognitive revolution of the 1970s, a second, *indirect-process* account emerged which can be called S-S-R theory. In this more cognitive account, the CS elicits not the CR but rather a *mental representation of the US*, in the form of verbal thought or visual image (Bugelski, 1979; Dadds, Bovbjerg, Redd, & Cutmore, 1997). Thus, in this indirect case, it is not the CS but rather the occurrence of the mentally experienced US that produces the CR. For example, a psychotherapist's vivid verbal description of a spider (CS) will lead most people to visually imagine the spider (Mueller, Sperl, & Panitz, 2019), and it is this visual image of the US that elicits the CR of fear. Whereas there is evidence for both conditioning processes, it seems that the indirect process, CS → US, provides a better account of classical conditioning in mental disorders, where thoughts or images of the US are common (and thus only the indirect process is shown in the table). The direct process, CS → CR, better characterizes the other type of conditioning, evaluative conditioning, which will be examined shortly.

The principles of classical conditioning are now numerous (see Domjan, 2018 for an update of these; and see FeldmanHall & Dunswoor, 2019, for examples in the domain of everyday social behavior) and so only the principles most likely to be of use in psychotherapy will be mentioned here.

One important principle in classical conditioning is that the effective number of acquisition trials—that is, CS-US pairings—is greater in *appetitive* conditioning, where the US is positive, than in *aversive* conditioning, where the US is negative. Appetitive conditioning usually requires numerous pairings of the positive US with the to-be-conditioned CS, whereas aversive conditioning usually requires far fewer pairings of the negative US with the to-be-conditioned CS. An everyday illustration of this, where the sight of the food or even just mention of the food is the CS and the taste sensation is the US, is that food preferences often take a number of samplings to learn, whereas food aversions are often permanently established after just one sampling (Rozin & Kalat, 1971). Another illustration of rapid aversive conditioning is that post-traumatic stress disorder, PTSD, can sometimes result from exposure to, or participation in, just *one* horrific event.

A second important principle in classical conditioning is that of *forward conditioning*, whereby the CS should *precede* the US. Generally speaking, if the CS is presented with or after the US then classical conditioning will not occur. The optimal “window” for presenting the CS is very short, ranging from 0.5 of a second before the US to just 0.2 of a second before (Domjan, 2018). Present the CS too early and there is too much possibility for other stimuli to be attended to and to interfere with the acquisition. Present the CS either with or after the US and the necessary causal sequence for classical conditioning is not met. A clear example of this is shown in aversive conditioning with alcoholics (Vogler,

Lunde, Johnson, & Martin, 1970). In the conditioning group, a mild electric shock, the negative US, was administered to the alcoholic's finger after the CS of taking a sip but not swallowing the alcohol, and two such deconditioning trials daily administered over a 2-week period resulted in an average of nine weeks of abstinence before relapse. However, in the control group, where the same number of shocks were delivered at random times *not* contingent on alcohol in the mouth, there was an average of only one week of abstinence, and the fact that there was any delay at all in relapse was probably attributable to felt commitment from volunteering to take part in the study.

The other conditioning principle important for psychotherapy is known as the *compound stimulus effect* or the *associative competition effect* (Kamin, 1969; Rescorla & Wagner, 1972). This effect relies on the observation that "a CS never occurs in isolation but is always compounded with contextual (background) stimuli" (Allen, 1993). The Rescorla-Wagner Formula for the effect of other stimuli in the conditioning situation on the targeted CS is somewhat daunting at first glance but is well worth practitioners taking the time to understand. Technically, the formula is:

$$\Delta CS_{target} = US(CS_{target} - \sum CS_{all\ other})$$

which, in words, says that the percentage amount of change, Δ , in the predictive value of the target CS on any given conditioning trial will depend on the percentage intensity of the US—the intensity of an electric shock, for example—multiplied by the predictive value of the target CS on the previous conditioning trial minus the sum, in percent, of the various predictive values of all *other* CSs present on the conditioning trial.

This reduction in the effectiveness of a CS due to the presence of another CS is known as the *principle of response blocking* or simply *blocking*. Response blocking can take two different forms. The first is interesting and nonobvious. If the to-be-conditioned CS is inadvertently presented in the presence of another CS that has previously been conditioned to elicit the *same* CR, new learning will be blocked and will not reliably be established. The other is more obvious and applies to so-called de-conditioning. If the CS conditioned to a particular CR is presented together with another CS that has been conditioned to an *oppositely valenced* CR, then the first CS will gradually be deconditioned and its CR will be extinguished. This explains why it is surprisingly difficult to obtain single-stimulus conditioning *or* deconditioning in real-world settings.

4. Evaluative Conditioning (EC)

Whereas classical conditioning works on reflexive physiological and emotional responses, evaluative conditioning (EC) works only on purely *evaluative*, or in everyday terms "like-dislike," responses (De Houwer, Thomas, & Baeyens, 2001). Of all the learning processes, EC is the process that clinical psychology practitioners, and probably most clinical psychology academics, are least likely to know about.

The causal process in evaluative conditioning is the same as in classical conditioning (see **Table 2** earlier). In EC, an initially neutral stimulus (the would-be CS) is paired with a strongly liked or strongly disliked US and, eventually, after a number of pairings—few in the case of a disliked US and many in the case of a liked US—the now-conditioned CS becomes capable of eliciting, on its own, a like-dislike CR that can resemble but rarely fully equal the strength of the UR (see the comprehensive review and meta-analysis of effect sizes by [Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010](#), effect sizes which are referred to in the following). Nevertheless, there are a number of very important principles of evaluative conditioning, EC, that *differ fundamentally* from those of classical conditioning. These were identified by Belgian psychologists in the late eighties and early nineties (see [De Houwer et al., 2001](#)) and the main ones are listed below.

Firstly, whereas in classical conditioning the US can take many forms (such as a loud noise in the ear or a puff of air to the eye or, in many of Pavlov's experiments, meat powder presented to a dog), the US in evaluative conditioning works best if it is *strongly negative* or *strongly positive*. For instance, an electrodermal shock works better than a negative verbal stimulus (an average effect size of 1.2, double the effect size of 0.6 for negative verbal USs in W. Hofmann et al.'s meta-analysis); and chocolate, which is strongly positive for most people, works better than the mere word “chocolate” ([Bezzina, Lee, Lovibond, & Colagiuri, 2016](#)). Too strong a negative US, however, can result in avoidance or inattention. Graphic pictorial warnings on cigarette packs, for example, which are mandated in Australia, Canada, and the U.K., but not in the U.S., have been a failure in reducing smoking ([Mayerl, Stoltz, & Friedl, 2018](#)). In a recent forced-exposure trial of the pictorial warning packs in the U.S. among smokers who are seeing them for the first time ([Peters et al., 2019](#)), there was a dropout rate of over 50%, coupled with no effect on quitting intentions among those who completed the trial.

Secondly, whereas classical conditioning reliably works only with forward presentation of the CS, evaluative conditioning has been shown to work equally well with what is known as *backward* or after-the-US presentation of the CS (effect size 0.5, the same as for forward presentation), although *simultaneous* presentation of the CS and US works slightly better than either (effect size 0.6). This flexible timing of the CS presentation is an important advantage for the implementation of EC in psychotherapy.

Thirdly, whereas awareness of the CS-US pairing is not necessary with the classical conditioning of physiological or emotional reflexes (most of these reflexes becoming conditioned subconsciously), *awareness* of the pairing is necessary for evaluative conditioning. The necessity of awareness for EC to take place was proven conclusively in an experiment by [Högden, Hütter, and Unkelbach \(2018\)](#) in which, in the control condition, the possibility of becoming aware of the CS-US contingency was completely prevented.

Fourthly, EC-conditioned like-dislike responses, unlike classically conditioned responses, are *extremely resistant to extinction*—that is, after acquisition is

complete, the CS alone, without the US following it, will for a long time continue to elicit the CR. This means that evaluatively conditioned responses are very hard to change. The persistence of evaluatively conditioned responses is obvious in the case of horrific or disgusting-looking CSs but is similarly strong, surprisingly, for attractive-looking CSs such as, for most people, the sight of highly sugared foods or the sight of a highly attractive celebrity promoting almost any product or service.

Fifthly and finally, it is important to note that evaluative conditioning, for some as yet unknown reason, does *not* seem to work with *children under the age of 12* (effect size 0.1 in Hofmann et al.'s meta-analysis, not significantly different from zero). EC *does*, however, work well with normal adults (effect size 0.6) and thus presumably with older teenagers, and it works even better with patients hospitalized for psychosis (effect size 0.8).

Positive evaluative conditioning has been all but overlooked in psychotherapy. The focus in Beck-type (Beck, 1972) cognitive behavior therapy, CBT, for example, is on eliminating *negative* beliefs; and in the increasingly popular Acceptance and Commitment Therapy, ACT (see Hayes, 2004), the focus is on confronting and accepting *negative* beliefs. The conditioning of positive beliefs is the main process operating with so-called *self-talk therapy*, or autosuggestion (see (Wikipedia, 2021)). The best-known example of self-talk therapy is Coué's (1922) well-known "Every day, in every way, I'm getting better and better." However, positive self-talk, such as repeating to yourself "I am a lovable person," has been shown to work only with already *high self-esteem* individuals, and then to have only a small effect. Among individuals with chronically *low self-esteem*, positive self-talk typically backfires because the person tends not to believe it and actually feels worse after saying it (Wood, Perunovic, & Lee, 2009). Lilienfeld, Linn, Ruscio, and Beyerstein (2010) are similarly skeptical of self-talk attempts to make yourself feel *happier*, especially if you are feeling very depressed or anxious.

What does not seem to work, either, is for people to ask their friends and work colleagues "Are you okay?" or, in textspeak, "RUOK?" Informal testing by the present author suggests that this increasingly common practice encouraged by many mental health professionals is ineffective with people who are actually feeling depressed or anxious because they will routinely answer that they *are* okay unless the question comes from a partner or close friend. What they should not do is admit their depression or anxiety to work colleagues or to their supervisor or boss. The reason is that they will be discriminated against. For example, Jacobson (2014) found in a 2010 U.K. survey of employers that about 40% of them said they considered it a significant risk to hire a person with a mental illness, because such a person may cost the company time and productivity, will tend to be unreliable, and consequently may be overlooked for promotion.

Several self-help techniques based on positive evaluative conditioning are suggested in the applications section of this article.

5. Operant Learning (OL)

The fourth of the causal processes in psychology is operant or instrumental

learning (the term “operant” seems preferable because it emphasizes that the response operates on the environment to bring about reinforcement, and the term “learning” is preferred because it implies an active responder as contrasted with the passive responder assumed in “conditioning”). Operant learning was first identified by Thorndike in 1898 (see Hilgard & Bower, 1966) and was illustrated by his well-known “cat in a puzzle box” experiments from which he derived the basic *law of effect* covering reward and punishment. Operant learning was then much more comprehensively expanded and investigated by Skinner (1938, 1953, 1957, 1969) in his life’s work on learned voluntary behaviors and how they can be acquired with positive reinforcement and changed with positive reinforcement of alternative behaviors. Most recently, Skinner’s ideas have been picked up, without much acknowledgement by the way, in the procedure known as *contingency management*, which is used, as discussed later, in the treatment of addictions.

Operant learning involves what looks like a “reversed,” that is, R-S, causal process whereby the reinforcing stimulus follows the response, thus $R \rightarrow S^{\text{reinf}}$ (see Table 2 earlier). Skinner, in the opinion of learning theorists including Hilgard, successfully got around the objection of reverse causality by arguing that the reinforcement is actually a prior cause because it causes an increase in the *probability*—though, as a strict behaviorist, Skinner was never comfortable with this non-behavioral term—of repeating R as the *next* response, thus $S^{\text{reinf}} \rightarrow R_{\text{next}}$. Here, R, or actually $p(R)$, is observed as a subsequently increased response rate. Similarly for punishment, which causes a decrease in the probability of repeating R.

With operant learning, as with classical conditioning, there are numerous principles that have been identified over the years (see especially Reese, 1966, and for psychotherapy in particular see Foxx, 2013). Again, some selectiveness will be imposed to list only those principles that appear to be most important for psychotherapy.

One very important causal principle is the *stimulus control principle*. Skinner demonstrated that the operant response \rightarrow reinforcer relationship, $R \rightarrow S^{\text{reinf}}$, can be brought under the control of a preceding stimulus in a procedure that looks very much like CS control over the CR in classical conditioning but is less mechanical or forceful. It is less mechanical or forceful because in operant learning we are dealing with voluntary motor responses rather than involuntary reflex responses. This controlling stimulus, which usually requires a large number of pairings with the response, is called a “discriminative stimulus,” S^D , because it serves as a discriminable environmental signal that the response, if voluntarily performed, will be likely to be reinforced. The full causal process therefore can be represented as $S^D \rightarrow R \rightarrow S^{\text{reinf}} \rightarrow R_{\text{next}}$. A controlling discriminative stimulus can alternatively be *negative*, in that it signals the *absence* of upcoming reinforcement. The negative discriminative stimulus is called “S delta” and symbolized by a superscripted triangle on the S, thus S^Δ . An everyday example of an S^D is that a green traffic light serves as a discriminative stimulus that it is safe to

proceed, while a yellow and definitely a red traffic light serves as an S^A to *not* proceed.

The other major principle in operant learning is that *the schedule of reinforcement entirely determines the rate of operant responding*. A *fixed-ratio* schedule, such as gradual stretching out of the reinforcements so that eventually, say, 10 responses are required before reinforcement is delivered, produces a high rate of responding, followed by a pause after reinforcement before responding resumes (psychotherapy example: by trial and error you can determine the response rate required in bursts of high-intensity exercise sufficient to relieve depression; [Maddock, Casazza, Fernandez, & Maddock, 2016](#)). A *variable-ratio* schedule, such as, on average, 10 responses required while the actual number varies randomly from, say, 1 to 20, will produce a very high rate of responding with *no* pauses (psychotherapy example: casino and online gambling is reinforced on a variable ratio schedule and thus can become addictive and since there is no way of changing this schedule, response prevention is the only realistic solution). A *fixed-interval* schedule, which consists of reinforcement presented on the next response after a fixed time interval, will produce a generally low rate of responding but in a “scalloped” pattern whereby the response rate declines after the reinforcement but starts to accelerate to a high rate as the interval elapses (psychotherapy example: therapy sessions could be scheduled at non-regular intervals to reduce the rate of anxiety-induced missed appointments). A *variable-interval* schedule, too, will produce a generally lower rate of responding but this time in a cumulative “straight line” pattern; the variable interval schedule can sustain responding for very long periods because little physical effort is required in the low rate of responding.

Skinner's most important applied discovery relating to the schedule of reinforcement is undoubtedly *partial reinforcement*, referring to the fact that after the first series of continuously reinforced learning trials to acquire the learned behavior, partial—meaning here “occasional” or “intermittent”—reinforcement of the behavior thereafter will produce a more lasting behavioral response than will continued continuous reinforcement (for commonsense descriptions and everyday examples of this, see Skinner, 1953, 1969). It should be noted that although the partial reinforcement principle, as it is now commonly called, was identified in conjunction with operant learning, it applies also to both classical conditioning and evaluative conditioning (this is because in both cases a positive US essentially serves as a positive reinforcer, S^{reinf} , whereas a negative US serves as a punisher, S^{pun}). Occasional omission of the US in later CC or EC acquisition trials will result in more reliable performance of the CR.

6. Learning-Based Treatments for Mental Disorders

To this point, we have discussed theory and applications in terms of the four types of learning, which (as a reminder) are verbal paired-associates learning (VPAL), classical conditioning (CC), evaluative conditioning (EC), and operant

learning (OL). In this final section we turn things around by looking at the most frequent *mental disorder problems* treated by psychotherapists—see **Table 1** earlier—and pointing out which of the four types of learning might be best suited to treat them. By way of a preview, the mental disorder problems discussed here are: 1) fear and anxiety responses in specific phobias, specific anxiety disorders, and PTSD; 2) mental rumination, characteristic of depression and anxiety disorders; 3) behavioral inhibition in depression; 4) self-evaluative responses, notably the self-esteem loss that accompanies body dysmorphic disorder and eating disorders; 5) addictions to illegal substances; and 6) dysfunctional operant behaviors.

Fear and Anxiety Responses

Fear is the likely response when *presently* faced with a previously proven harmful stimulus, whereas anxiety is the likely response when *anticipating* a likely harmful stimulus. The mental and physiological responses during fear and anxiety are similar but it is the presence or absence of the stimulus that differentiates fear from anxiety, respectively.

In psychotherapy, blocking by introducing a competing CR is widely used to treat phobias, situational anxiety disorders, and more recently post-traumatic stress disorder, PTSD. The most famous method of what is somewhat simplistically known as “exposure therapy” was developed by the Temple University psychiatrist [Wolpe \(1969\)](#) and called *systematic desensitization*, otherwise known as *reciprocal inhibition*. The procedure employs the classical conditioning principle of response blocking, but in a stagewise, graduated manner. The anxiety, phobia, or trauma sufferer is first taught deep relaxation (designed to inhibit the fear response), then while relaxed is exposed to a series of USs in the class that elicits the fear response—spiders and snakes for most people, social situations for others, and pictures or videos of traumatic events for still others—but starting with a weak version of the US and then gradually continuing with successively stronger versions so that the patient becomes adapted, with the relaxation response gradually replacing the fear response.

Systematic desensitization, as the name suggests, requires the therapist to obtain or set up a graded series of fear-eliciting stimuli. For example, [Hofmann \(2012\)](#) used a patient-rated CS hierarchy for treating tarantula spider phobia using stimuli ranging from watching video clips with close-ups of tarantulas, rated just 30 on a 0-to-100 fear scale, to standing directly in front of a terrarium with a tarantula inside, rated 65, to touching the tarantula’s abdomen with an index finger, rated 90, to the full-strength stimulus of holding a tarantula in the hand, rated 100. Systematic desensitization typically requires a very large number of deconditioning sessions but it—and a closely related technique called prolonged exposure therapy, discussed below—has proven to be just about the only effective non-medication method for curing specific anxiety disorders, including PTSD. The notable exception is *generalized* anxiety disorder where the fear-eliciting stimuli have generalized to be broad and diverse and even may be

impossible to pin down (hence the wide use of antianxiety medication for GAD).

Another form of exposure therapy is “forced exposure,” or what is more vividly described as *flooding* (see especially [Wolpe, 1969](#)). In flooding, the US is presented repeatedly at *full* strength until the CR is either “punished away” if the US is positive, or “adapted to” if the US is negative. Flooding is especially useful for treating CRs learned from *positive* USs, such as high-calorie and highly sugared food and beverage addictions. (Risking overdose, flooding is too dangerous to use with addiction to illicit drugs.) The forced consumption induces nausea or even sickness as a strong negative US replaces the positive US and produces an avoidant CR.

The third form of exposure therapy, this time with a *negative* US, is known as *prolonged exposure therapy*, or PET ([Foa, Keane, & Friedman, 2000](#)), and has also proven successful for treating specific anxiety disorders, specific phobias, and PTSD. Post-traumatic stress disorder is usually the result of single-trial learning from having experienced a major traumatic event such as a graphic killing in war, a bombing, a natural disaster, or in more everyday terms, unfortunately, a sexual assault, a random shooting, or a motor vehicle accident. Prolonged exposure therapy is actually a combination of systematic desensitization (since the conditioned stimuli are presented in an increasingly aversive sequence) and flooding (because the patient is prevented from escaping from the CSs and is thus “flooded” by the end of the sequence). PET differs from systematic desensitization, however, in that the patient is not taught relaxation as an alternative response but rather is forced to face the CSs until the fear response subsides. Thus, the conditioned response differs: in systematic desensitization the CR to be learned to the CS is relaxation, whereas in prolonged exposure therapy the CR to be learned is habituation.

The practical problems with all forms of exposure therapy are that they are not easy to implement, require an experienced therapist who is well-trained in learning theory, and are very demanding of office time. These problems probably explain why so few psychotherapists have tried it. The best option is to refer the patient to one of the 100 or so clinics across the U.S. ([Palmer, 2019](#)) equipped with the new VR (virtual reality) technology. Using software such as Emory University School of Medicine’s Bravemind (see [Rothbaum et al., 2014](#)), VR environments can be set up to represent almost any CS or US needed for exposure therapy. Psychotherapists can easily learn what VR therapy is about by checking the websites of companies such as Psious.com, a Barcelona-based company with affiliates in the U.S. and the U.K. which offers 70 or so VR “training environments,” and Luminalvr.com, a Melbourne, Australia-based company which has developed stunningly real VR stimuli. Other explanatory VR demonstrations can be found on YouTube. While the range of mental disorders that appear to be treatable by VR therapy is extensive, psychotherapists are well-advised to read the contraindications of VR therapy summarized by [Lake \(2018\)](#), which warn against the use of VR for patients with medical problems such as migraine headaches, seizures, or vestibular imbalance, which could

be triggered by VR; and also heavy drug-using or psychotic patients, whose hallucinations or delusions could be worsened by VR's so-called immersion experience.

Mental Rumination

Mental rumination is the presence of persistent, repetitive, self-oriented, and distinctly negative *thoughts*—usually experienced as one or maybe two monotonously repetitive thoughts in major depression and obsessive-compulsive disorder, but usually “swirling” across several loosely related thoughts in anxiety disorders. In depression, rumination seems to center around lamenting that you have been attacked by depression through no fault of your own. In an anxiety disorder, on the other hand, rumination tends to be filled with thoughts about what the cause of the anxiety might be and what its consequences are likely to be if it continues. In both cases, the learning process involved with the rumination appears to be verbal paired-associates learning, which occurs involuntarily and is maintained without reinforcement.

Not surprisingly, therefore, depressive or anxious rumination is extremely hard to overcome and can be very dangerous because it interferes with sleep and pushes damagingly high levels of hormones through the body, particularly the “flight” hormone, adrenal cortisol. In depression, moreover, the longer the rumination is allowed to continue, the longer will likely be the duration of the depressive episode being suffered at the time (see Nolen-Hoeksema, 1991, for a summary of this research, much of it conducted by her and her colleagues). The CBT technique known variously as “reprocessing,” “reframing,” or “reappraisal” of the apparent *cause* of the rumination is often recommended. However, Ford and Troy (2019) advise against it, pointing out that between a third and a half of reappraisal attempters feel worse afterward, especially if they are trying to reappraise what for them is a highly stressful event, and that reappraisal in the long term can cumulatively be harmful because the patient continuously avoids facing up to the negative event and trying to do something about it. Also, reappraisal cannot be expected when you’re only half awake, which is when ruminative thoughts usually start. For stopping a rumination episode after it has begun, medication does *not* seem to work; medication takes too long to get into the bloodstream to prevent rumination and, as mentioned above, it can lead to long-term addiction.

The only alternative that seems to work reliably to stop rumination immediately is the self-treatment that Nolen-Hoeksema (1991) calls *active distraction*. This is to deliberately engage in some other behavior incompatible with self-focused thoughts, such as jumping into a hot shower or better still a cold shower or swimming pool because it will get your blood circulation going. Getting to the gym works for some people, but less so going out for a walk or run because these activities might not be distracting enough to prevent rumination. It may be noted that Nolen-Hoeksema’s studies on active distraction were conducted with people prone to learning-based and usually milder, *reactive* depression. However, case-history reports in the literature (see, e.g. Morrison, 2014) suggest that ru-

minative behavior is *much the same* no matter what the *cause* of depression, so active distraction would also work with those suffering from the biochemical-based melancholic or bipolar depression. While initially you may have to force yourself into the distracting activity, this should eventually become easier. The reason is again learning-based: the distracting activity becomes negatively reinforced by escape from the rumination.

Behavioral Inhibition

As mentioned earlier and noted in **Table 1**, most of the major depression patients seen by clinical psychologists will be suffering from *learned* reactive depression rather than the more biochemically-based melancholic depression or bipolar disorder. Reactive depression is typically observed by a marked decrease in everyday activities, which is variously described as behavioral inhibition, behavioral paralysis, psychomotor retardation, or simply demobilization (Brown, 2000). What the psychotherapist needs to do is to identify the main event types that trigger behavioral inhibition. These are conditioned stimuli, CSs, in classical conditioning for inhibiting emotional responses, or negative discriminative stimuli, S^As, in the operant learning of behavioral inhibition.

Although this article has been skeptical of cognitive therapy overall, it has to be conceded that reactive depression may be the one mental disorder where a form of the cognitive approach, implemented by a trusted friend, may be effective in reducing behavioral inhibition. This therapy does not need a trained psychotherapist, however, and given the stigma of consulting a therapist as well as the difficulty of getting an appointment, a trusted friend is usually the best person to turn to or, on their part, to intervene if necessary. Fairly reliable signs that would justify intervention are repeated oversleeping, failure to answer phone calls and, when answered, evident hesitations and slowness of speech, and ducking out of social invitations. The [Healthline website](#) (accessed August, 2019) provides what would seem to be very sensible suggestions about what the friend should and should not do. Among the “do’s” are to listen and show sympathy, to offer to help with everyday tasks, and to extend regular but loose invitations to get together so that the sufferer does not feel so guilty for not accepting some of them. Among the “don’ts” are to not offer well-intentioned but useless advice such as “just stop thinking about it” or “others have it worse than you”; to not try to minimize the sufferer’s experience by comparison with others; and to simply brush off or ignore any reported thoughts about suicide.

Carers and friends of depression sufferers should take reassurance from the fact that the actual “going through with it” probability of suicide is extremely low: an extensive meta-analysis by Franklin et al. (2017) revealed that only 1.6% of deaths in the general population are by suicide and this rises to only 4% of deaths among hospitalized mental patients—and there are *no* reliable predictive signs, either, of actually committing suicide, not even reported thoughts or stated intentions of doing so.

Self-Evaluative Responses

Self-directed positive and negative evaluative responses frequently are caused

by *evaluative conditioning*, EC, as contrasted with classical conditioning. And if so, as explained earlier in this article, these responses will be extremely resistant to change. Self-evaluation, more commonly known as *self-esteem*, when dangerously low, is obviously worth trying to improve when this has as its cause poor or less than desired performance at school or at work. Here, simple power inductions may be successful. One of these is called “power priming” (Fast, Gruenfeld, Sivanathan, & Galinsky, 2009; [Galinsky, Gruenfeld, & Magee, 2003](#)) whereby actively recalling an incident in which you had high control over another person or over a particular action can increase the feeling of power and control, which carries forward to better performance of the task at hand. Worth mentioning here is the first rule in Jordan Peterson’s immensely popular book, *12 Rules for Life* ([Peterson, 2018](#)), which is “Stand up straight with your shoulders back.” This advice seems to be supported empirically by the fact that habitual slumping—measured as rounding of the shoulders by as little as 5° in the normal standing position—is quite highly correlated, at $r = 0.54$, with feeling chronically sad and despairing ([Do Rosário, Diógenes, Mattei, & Leite, 2013](#)).

A particularly troublesome and apparently increasing cause of self-esteem loss, however, is *appearance dissatisfaction*. A recent anonymous online survey of more than 3000 Australians aged 18 and older by [The Butterfly Foundation \(2018\)](#), an eating disorder charity organization, found that an almost unbelievably but nevertheless alarming 73% of those who responded want to “change how they look,” and 53% said they were “very” or “extremely” concerned about their overall appearance or about a particular body part, or parts. These high percentages would probably be similar if the survey were extended to older children and teenagers and to other young people in westernized countries, most of them constantly connected these days by social media. Whereas face and hair dissatisfaction are self-treated usually in some cosmetic manner which evaluatively “de-conditions” the dissatisfaction, actual body dissatisfaction can, in the worst case, lead to *body dysmorphic disorder*.

An evaluative conditioning-based self-help technique that may help to lessen the distress of body dysmorphic disorder—and *social anxiety* as well—is “power dressing” ([Molloy, 1988, 1996](#)) whereby choosing to wear “power-status” work clothing—visibly high-quality material, darker colors, and, for both sexes, a more formal and more masculine style of clothing as opposed to a casual or feminine style—can make you feel more confident and capable and consequently to be more effective in group settings such as meetings or presentations. For leisurewear, on the other hand, a review of research on women’s clothing choices ([Hartley, 2015](#)), found that colorful, well-fitting, and natural-fiber clothes can help to lift a “blue mood” and there seems to be no reason why the same would not apply to men’s leisure clothing choices.

But *eating disorders*—anorexia and bulimia in particular—are a different matter: negative self-evaluations in eating disorders, most experts would agree, are merely a secondary symptom accompanying a deeper psychological or psychosocial cause which might only be treatable by psychotherapy and perhaps

only by psychodynamic therapy. For a rare and excellent learning theory account of Freudian psychodynamic theory, see [Hilgard and Bower \(1966\)](#) and for a thorough defense of Freudian theory in modern terms, see [Westen \(1998\)](#). Those psychotherapists who treat the rarer problems listed in [Table 1](#) earlier—eating disorders, sexual dysfunction, gender dysphoria, and paraphilia—might be well advised to take a learning theory perspective on psychodynamic therapy.

Substance Addictions

Substance addictions are almost invariably acquired by *operant learning*, with the drug-taking behavior reinforced by a powerful sedating reinforcer such as alcohol or heroin and possibly tobacco, although this can be either a sedative or central nervous system stimulant depending on the smoker's fast or slow episodic smoking rate ([Eysenck, 1980](#)), or by an adrenaline-boosting amphetamine such as “ice,” or by a powerful dopaminergic reinforcer such as marijuana, MDMA (“ecstasy”), cocaine, and even the various forms of sugar, not just sucrose but also fructose in fruit and fruit juice. Thereafter, it is the anxiety or pain of withdrawal after the dose wears off which causes, as a discriminant stimulus, S^D , the operant behavior of re-dosing that signifies an addiction.

Although substance addictions are primarily acquired by operant learning, they are worsened by a complex mix of classical conditioning of anticipatory reflex responses and negative evaluative conditioning toward the self. The operant learning that causes acquisition of the addiction is maintained by a tortuous pattern of reward and punishment constituting partial reinforcement, coupled terrifyingly with habituation to the dosage amount (see especially [Solomon & Corbit's opponent-process theory, 1974](#), and also see the more recent article by [Baker, Piper, McCarthy, Majeskie, & Fiore, 2004](#), which should but does not acknowledge the debt to the earlier learning theorists). Consistent with the previously mentioned lack of training for learning-based disorders, a 2013 survey of the directors of all APA-accredited U.S. clinical psychology doctoral programs ([Dimoff, Sayette, & Norcross, 2017](#)) found that fewer than 40% of universities had even one faculty member studying addiction, and less than a third offered specialized clinical training in addiction.

What is known as *contingency management*, first named apparently by [Elliott and Tighe \(1968\)](#) and extensively applied by Higgins and colleagues (see [Higgins, Silverman, & Heil, 2008](#)) to the treatment of substance use disorders, makes use of positive operant reinforcement in which positive behaviors such as attending therapy sessions and, most importantly, abstaining from the problem substance as objectively measured by urine tests, are rewarded immediately by the receipt of cash, vouchers redeemable for retail purchases, or inexpensive raffle tickets (the reward is thus contingent on the maintenance of abstinent behavior). The effective variables in contingency management follow Skinner's operant learning principles closely (see [Davis, Kurti, Skelly, Redner, White, & Higgins, 2016](#)). The main three principles seem to be: immediate reward, equivalent to shortness of the delay between the response and the reinforcer; sufficient du-

ration of treatment, equivalent to number of learning trials to reliably acquire the new response; and choice of an effective magnitude and type of the incentive. The choice of incentive can be decided on by pretesting several options with the population involved, and its magnitude can be adjusted over learning trials as appropriate.

The dropout rate from operant substance-abuse therapies, however, is distressingly high (Carol & Weiss, 2017) and attempting to operantly reinforce the good behavior of *not* re-dosing is most unlikely to work. Nor is the substitution of strong drugs with another drug such as methadone likely to work in the long run, and drug substitution brings its own risk of dependency and relapse.

The most effective long-term cure for substance addictions, in fact, appears to be *naturally occurring punishment*. Very few addicts actually seek medical or psychotherapeutic cures but rather come to realize through experience that you can lose your job or have to be hospitalized for strong drug addictions and you can suffer ill health or get a scary diagnosis and prognosis from your doctor for the less acutely serious addictions. Giving up or at least drastically cutting back on these habitual behaviors can then become negatively reinforcing by your being able to hold down a job or simply by feeling in better health. Positive social reinforcement or “support” by regular attendance at meetings of long-established group therapy organizations designed to discourage relapse, particularly Narcotics Anonymous or Alcoholics Anonymous, can also be helpful in maintaining abstinence.

Dysfunctional Operant Behaviors

All mental disorders produce unwanted operantly learned behaviors which in severe cases impair everyday functioning. These negative behaviors are usually secondary symptoms of the disorder except, of course, in the case of obsessive-compulsive disorder, OCD, where the negative behavior is the primary symptom. A Skinnerian perspective on operant behavior says that we should always use positive reinforcement to train or “shape” new positive behaviors and, less well-known, that we should “train out” negative behaviors only by *deprivation* of positive reinforcement, as in “timeout” from the reinforcing situation with misbehaving children at home or at school. However, as pointed out by Kazdin (2012), and contrary to Skinner’s (1948) sole advocacy of positive reinforcement, *physical punishment* may be necessary to subdue offenders if their behavior is likely to be physically damaging to others, or to subdue violent or psychotic patients or interpersonally aggressive individuals at home or at school or in public places. Kazdin adds that the alternative good behavior should be positively reinforced as soon as the situation becomes suitable for doing so.

The most common unwanted behavior in depression is actually *inactivity* or rather a slowing and lack of variety in activity. The best remedy for prolonged inactivity, not unexpectedly, is offered by *behavior activation therapy*, BAT. Lewinsohn and Graf (1973) have developed a useful and practical list of pleasant (positively reinforcing) activities for depression sufferers to try. Again, it should be noted that behavior activation should only be tried by those suffering from

minor depression or while experiencing remission from a more serious depressive disorder, because during a major depressive episode the sufferer is unlikely to be coaxed into doing anything.

Unwanted but otherwise harmless operant behaviors at home or at work may be lessened or delayed by applying the *Premack principle* of operant learning. David Premack (1965), famous for his innovative work on teaching apes to use sign language, proposed that it may not be food, for example, that is the positive reinforcer but rather the *act of eating*, itself. His stunningly simple principle is that if two responses have been learned that differ in their likelihood of being chosen when the person is given free access to both, the opportunity to perform the higher-likelihood response will serve as a reinforcer for the performance of the lower-likelihood response (see Domjan, 2018). This is a theoretically surprising idea because here we have a *response*, R, being the reinforcer instead of a stimulus being the reinforcer. The Premack principle is actually a formal recognition of a disciplinary technique that has been around for centuries, a modern example being “You don’t get to watch TV until you have done your homework.” Setting more enjoyable behavior as a reward for performing more onerous behavior can be an effective way of ridding yourself of procrastination and other bad habits. Psychotherapists would do well to recommend the Premack principle to their patients and, in discussion with them, suggest ways in which it might be self-implemented.

7. Conclusion

The purpose of this article has been to point out and demonstrate that there are well-established learning processes—verbal paired-associates learning (VPAL), classical conditioning (CC), evaluative conditioning (EC), and operant learning (OL)—which psychotherapists can employ to improve the mental health of their patients, either directly in face-to-face therapy or indirectly through therapy delivered and monitored by telephone or smartphone. Each of the four forms of learning has distinct and useful principles for preventing dysfunctional mental and overt behaviors, and psychotherapy could be improved greatly by incorporating them.

It is of no use, however, to point out the advantages of adopting learning-based techniques in psychotherapy if practicing psychotherapists are not likely to read about them or try them. The reality is that psychotherapists in practice are unlikely to have the time or the motivation to learn about and try new psychotherapeutic techniques, especially because most psychotherapists are operating under the “clinician’s illusion” that their current techniques are successful. Only rarely, other than in academic research, do they follow up with patients over the long-term to see whether their techniques are working, or if not why not. The main hope for learning-based improvement in psychotherapy would therefore seem to lie with clinical psychology teachers and their students in master’s and doctoral training programs. This is an opportunity, by the way, for women to lead in improving psychotherapy given that about 80% of those

currently enrolled in graduate school programs in clinical psychology are women (American Psychological Association, 2013).

Considerable attention throughout this article is paid to *self-help techniques* of psychotherapy, especially those that can be implemented via a smartphone or smartwatch by accessing mental health apps on the internet (Kazdin & Rabbitt, 2013). The need for computerized self-help techniques arises because of the low reach of traditional face-to-face psychotherapy. It is estimated in the U.S. that fewer than 30% of those likely to be suffering from a mental disorder actually seek treatment for it, and if they do, they are more likely to seek medical treatment than psychotherapy (Teachman, 2014). Furthermore, of those who *do* enter psychotherapy, just 50% complete the clinician-advised number of sessions (Prideaux, 2015). These figures indicate a very low reach for psychotherapy, and the 50% of patients who drop out of therapy suggests that it has a disappointingly low success rate. One solution is for today's young tech-savvy psychology academics to design more effective self-help apps to treat specific mental disorders, and these will be more effective if they are designed with up-to-date principles of learning.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this article.

References

- Allen, L. G. (1993). Human Contingency Judgments: Rule Based or Associative? *Psychological Bulletin*, 114, 435-448. <https://doi.org/10.1037/0033-2909.114.3.435>
- American Psychiatric Association (2018). *What Is Psychotherapy?* <https://www.psychiatry.org/patients-families/psychotherapy>
- American Psychological Association (2007). Guidelines for Education and Training at the Doctoral and Postdoctoral Levels in Consulting Psychology/Organizational Consulting Psychology. *American Psychologist*, 62, 980-992. <https://doi.org/10.1037/0003-066X.62.9.980>
- American Psychological Association (2013). By the Numbers. *APA Monitor on Psychology*, 44, 13. <https://www.apa.org/monitor/2013/03/numbers>
- American Psychological Association (2018). *Understanding Psychotherapy and How It Works*. <https://www.apa.org/topics/psychotherapy/understanding>
- Baker, T. B., Piper, M. A., McCarthy, D. E., Majeskie, M. R., & Fiore, M. C. (2004). Addiction Motivation Reformulated: An Affective Processing Model of Negative Reinforcement. *Psychological Review*, 111, 33-51. <https://doi.org/10.1037/0033-295X.111.1.33>
- Beck, A. T. (1972). *Depression: Causes and Treatment*. University of Pennsylvania Press.
- Bezzina, L., Lee, J. C., Lovibond, P. F., & Colaguiri, B. (2016). Extinction and Renewal of Cue-Elicited Reward-Seeking. *Behaviour Research and Therapy*, 87, 162-169. <https://doi.org/10.1016/j.brat.2016.09.009>
- Blanchard, M., & Farber, B. A. (2016). Lying in Psychotherapy: Why and What Clients Don't Tell Their Therapist about Therapy and Their Relationship. *Counseling Psychology Quarterly*, 29, 90-112. <https://doi.org/10.1080/09515070.2015.1085365>

- Brown, G. W. (2000). Emotion and Clinical Depression: An Environmental View. In M. L. Lewis, & J. M. Haviland-Jones (Eds.), *Handbook of Emotions* (2nd ed., pp. 75-90). Guilford.
- Bugelski, B. R. (1979). *Principles of Learning and Memory*. Praeger.
- Carol, K. M., & Weiss, R. D. (2017). The Role of Behavioral Interventions in Buprenorphine Maintenance Treatment: A Review. *American Journal of Psychiatry*, 174, 738-747. <https://doi.org/10.1176/appi.ajp.2016.16070792>
- Coué, E. (1922). *Self Mastery through Conscious Autosuggestion*. American Library Service. (Translated from the French by an Anonymous Translator)
- Dadds, M. R., Bovbjerg, D. H., Redd, W. H., & Cutmore, T. R. H. (1997). Imagery in Human Classical Conditioning. *Psychological Bulletin*, 122, 89-103. <https://doi.org/10.1037/0033-2909.122.1.89>
- Davis, D. R., Kurti, A. N., Skelly, J. M., Redner, R., White, T. J., & Higgins, S. T. (2016). A Review of the Literature on Contingency Management in the Treatment of Substance Use Disorders, 2009-2014. *Preventive Medicine*, 92, 36-46. <https://doi.org/10.1016/j.ypmed.2016.08.008>
- De Houwer, J., Thomas, S., & Baeyens, F. (2001). Associative Learning of Likes and Dislikes: A Review of 25 Years of Research on Human Evaluative Conditioning. *Psychological Bulletin*, 127, 853-869. <https://doi.org/10.1037/0033-2909.127.6.853>
- Dimoff, J. D., Sayette, M. A., & Norcross, J. C. (2017). Addiction Training in Clinical Psychology: Are We Keeping Up with the Rising Epidemic? *American Psychologist*, 72, 689-695. <https://doi.org/10.1037/amp0000140>
- Do Rosário, J. L. P., Diógenes, M. S. B., Mattei, R., & Leite, J. R. (2013). Can Sadness Alter Posture? *Journal of Bodywork & Movement Therapies*, 17, 328-331. <https://doi.org/10.1016/j.jbmt.2012.12.001>
- Domjan, M. (2018). *The Essentials of Conditioning and Learning* (4th ed.). American Psychological Association. <https://doi.org/10.1037/0000057-000>
- Elliott, R., & Tighe, T. J. (1968). A Technique for Controlling Behavior in Natural Life Settings. *Journal of Applied Behavior Analysis*, 1, 263-266. <https://doi.org/10.1901/jaba.1968.1-263>
- Eysenck, H. J. (1980). *The Causes and Effects of Smoking*. Temple Smith.
- Fast, N. J., Gruenfeld, D. H., Sivanathan, N., & Galinsky, A. D. (2009). Illusory Control: A Generative Force Behind Power's Far-Reaching Effects. *Psychological Science*, 20, 502-508. <https://doi.org/10.1111/j.1467-9280.2009.02311.x>
- FeldmanHall, O., & Dunsmoor, J. E. (2019). Viewing Adaptive Social Choice through the Lens of Associative Learning. *Perspectives on Psychological Science*, 14, 175-196. <https://doi.org/10.1177/1745691618792261>
- Foa, E. B., Keane, T. M., & Friedman, M. I. (2000). *Effective Treatments for PTSD*. Guilford.
- Ford, B. Q., & Troy, A. S. (2019). Reappraisal Reconsidered: A Closer Look at the Costs of an Acclaimed Emotion-Regulation Strategy. *Current Directions in Psychological Science*, 28, 195-203. <https://doi.org/10.1177/0963721419827526>
- Foxx, R. M. (2013). The Maintenance of Behavioral Change: The Case for Long-Term Follow-Ups. *American Psychologist*, 68, 728-736. <https://doi.org/10.1037/a0033713>
- Franklin, J. C., Ribeiro, J. D., Fox, K. R., Bentley, K. H., Kleiman, E. M., Huang, X. et al. (2017). Risk Factors for Suicidal Thoughts and Behaviors: A Meta-Analysis of over 50 Years of Research. *Psychological Bulletin*, 143, 187-232. <https://doi.org/10.1037/bul0000084>

- Galinsky, A. D., Gruenfeld, D. H., & Magee, J. C. (2003). From Power to Action. *Journal of Personality and Social Psychology, 85*, 453-466.
<https://doi.org/10.1037/0022-3514.85.3.453>
- Hartley, J. (2015, July 19). Can Clothes Affect Your Mood? *Sunday Life Magazine, The Sun-Herald*, 26.
- Hayes, S. C. (2004). Acceptance and Commitment Therapy, Relational Frame Theory, and the Third Wave of Behavior Therapy. *Behavior Therapy, 35*, 639-665.
[https://doi.org/10.1016/S0005-7894\(04\)80013-3](https://doi.org/10.1016/S0005-7894(04)80013-3)
- Healthline (2019). *How to Help Someone with Depression*.
<https://www.healthline.com/health/how-to-help-a-depressed-friend>
- Higgins, S. T., Silverman, K., & Heil, S. H. (2008). *Contingency Management in Substance Abuse Treatment*. Guilford Press.
- Hilgard, E. R., & Bower, G. H. (1966). *Theories of Learning* (3rd ed.). Appleton-Century-Crofts.
- Hofmann, S. G. (2012). *An Introduction to Modern CBT: Psychological Solutions to Mental Health Problems*. Wiley-Blackwell.
- Hofmann, W., De Houwer, J., Perugini, M., Baeyens, F., & Crombez, G. (2010). Evaluative Conditioning in Humans: A Meta-Analysis. *Psychological Bulletin, 136*, 390-421.
<https://doi.org/10.1037/a0018916>
- Högden, F., Hüttner, M., & Unkelbach, C. (2018). Does Evaluative Conditioning Depend on Awareness? Evidence from a Continuous Flash Suppression Paradigm. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 44*, 1641-1657.
<https://doi.org/10.1037/xlm0000533>
- Jacobson, R. (2014). Should You Tell Your Boss about a Mental Illness? *Scientific American Mind, 25*, 28-29. <https://doi.org/10.1038/scientificamericanmind0914-28>
- Kamin, L. J. (1969). Predictability Surprise, Attention, and Conditioning. In B. A. Campbell, & R. M. Church (Eds.), *Punishment and Aversive Behavior* (pp. 279-296). Appleton-Century-Crofts.
- Kazdin, A. E. (2012). *Behavior Modification in Applied Settings* (7th ed.). Wadsworth/Thomson Learning.
- Kazdin, A. E., & Rabbitt, S. M. (2013). Novel Models for Delivering Mental Health Services and Reducing the Burdens of Mental Illness. *Clinical Psychological Science, 1*, 170-191. <https://doi.org/10.1177/2167702612463566>
- Kendler, K. S., Prescott, C. A., Myers, J., & Neale, M. C. (2003). The Structure of Genetic and Environmental Risk Factors for Common Psychiatric and Substance Use Disorders in Men and Women. *Archives of General Psychiatry, 60*, 929-937.
<https://doi.org/10.1001/archpsyc.60.9.929>
- Kendler, K. S., Zachar, P., & Craver, C. (2011). What Kinds of Things Are Psychiatric Disorders? *Psychological Medicine, 41*, 1143-1150.
<https://doi.org/10.1017/S0033291710001844>
- Lake, J. (2018, September 3). Virtual Reality Graduated Exposure Therapy for Anxiety. *Psychology Today*.
<https://www.psychologytoday.com/us/blog/integrative-mental-health-care/201809/virtual-reality-graduated-exposure-therapy-anxiety>
- Lewinsohn, P. M., & Graf, M. (1973). Pleasant Activities and Depression. *Journal of Consulting and Clinical Psychology, 41*, 261-268. <https://doi.org/10.1037/h0035142>
- Lilienfeld, S. O., Linn, S. J., Ruscio, J., & Beyerstein, B. L. (2010). *Fifty Great Myths of Popular Psychology*. Wiley-Blackwell.

<https://doi.org/10.1038/scientificamericanmind0310-42>

- Maddock, R. M., Casazza, G. H., Fernandez, D. H., & Maddock, M. I. (2016). Acute Modulation of Cortical Glutamate and GABA Content by Physical Activity. *Journal of Neuroscience, 36*, 2449-2457. <https://doi.org/10.1523/JNEUROSCI.3455-15.2016>
- Mayerl, H., Stoltz, E., & Friedl, W. (2018). Responses to Textual and Pictorial Cigarette Pack Health Warnings: Findings from an Explanatory Cross-Sectional Survey Study in Austria. *BMC Public Health, 18*, e1-e9. <https://doi.org/10.1186/s12889-018-5342-8>
- McDaniel, S. H., Grus, C. L., Cubic, B. A., Hunter, C. L., Kearney, L. K., Schuman, C. C. et al. (2014). Competencies for Psychology Practice in Primary Care. *American Psychologist, 69*, 409-429. <https://doi.org/10.1037/a0036072>
- Molloy, J. T. (1988). *Dress for Success*. Warner Books.
- Molloy, J. T. (1996). *Women's Dress for Success*. Warner Books.
- Morrison, J. (2014). *DSM-5 Made Easy: The Clinician's Guide to Diagnosis*. Guilford Press.
- Mueller, E. M., Sperl, M. F. J., & Panitz, C. (2019). Aversive Imagery Causes *De Novo* Fear Conditioning. *Psychological Science, 30*, 1001-1015. <https://doi.org/10.1177/0956797619842261>
- Nolen-Hoeksema, S. (1991). Responses to Depression and Their Effects on the Duration of Depressive Episodes. *Journal of Abnormal Psychology, 100*, 569-582. <https://doi.org/10.1037/0021-843X.100.4.569>
- Palmer, C. (2019, September). Real Treatments in Virtual Worlds. *APA Monitor on Psychology, 40*-46. <https://www.apa.org/monitor/2019/09/cover-virtual-worlds>
- Parker, G. (2000). Classifying Depression: Should Paradigms Lost Be Regained? *American Journal of Psychiatry, 157*, 1195-1203. <https://doi.org/10.1176/appi.ajp.157.8.1195>
- Parker, G. (2005). Beyond Major Depression. *Psychological Medicine, 35*, 467-474. <https://doi.org/10.1017/S0033291704004210>
- Peters, E., Shoots-Reinhard, B., Evans, A. T., Shoben, A., Klein, E. G., Tompkins, M. K., Romer, D., & Tusler, M. (2019). Pictorial Warning Labels and Memory for Cigarette Health-Risk Information over Time. *Annals of Behavioral Medicine, 53*, 358-371. <https://doi.org/10.1093/abm/kay050>
- Peterson, J. B. (2018). *12 Rules for Life*. Allen Lane.
- Premack, D. (1965). Reinforcement Theory. In D. Levine (Ed.), *Nebraska Symposium on Motivation* (Vol. 13, pp. 123-180). University of Nebraska Press.
- Prideaux, J. (2015). The Age of Unreason. Special Report on Mental Illness. *The Economist*, July 11, 3-12.
- Reese, E. P. (1966). *The Analysis of Human Operant Behavior*. Wm. C. Brown.
- Rescorla, R. A., & Wagner, A. R. (1972). A Theory of Pavlovian Conditioning: Variations in the Effectiveness of Reinforcement and Nonreinforcement. In A. H. Black, & W. F. Prokasy (Eds.), *Classical Conditioning II: Current Research and Theory* (pp. 64-99). Appleton-Century-Crofts.
- Robiner, W. N., Dixon, K. E., Miner, J. L., & Hong, B. A. (2014). Psychologists in Medical Schools and Academic Medical Centers. *American Psychologist, 69*, 230-248. <https://doi.org/10.1037/a0035472>
- Rothbaum, B. O., Price, M., Jovanovich, T., Norrholm, S. D., Gerardi, M., Dunlop, B., Davis, M., Bradley, B., Duncan, E. J., Rizzo, A., & Ressler, K. J. (2014). A Randomized, Double-Blind Evaluation of D-Cycloserine or Alprazolam Combined with Virtual Reality Exposure Therapy for Posttraumatic Stress Disorder in Iraq and Afghanistan War Veterans. *American Journal of Psychiatry, 171*, 640-648.

<https://doi.org/10.1176/appi.ajp.2014.13121625>

- Rozin, P., & Kalat, J. W. (1971). Specific Hungers and Poison Avoidance as Adaptive Specializations of Learning. *Psychological Review*, 78, 459-486.
<https://doi.org/10.1037/h0031878>
- Schwartz, B. (1978). *Psychology of Learning and Behavior*. Norton.
- Skinner, B. F. (1938). *The Behavior of Organisms: An Experimental Analysis*. Appleton-Century-Crofts.
- Skinner, B. F. (1948). *Walden Two*. Macmillan.
- Skinner, B. F. (1953). *Science and Human Behavior*. Macmillan.
- Skinner, B. F. (1957). *Verbal Behavior*. Appleton-Century-Crofts.
<https://doi.org/10.1037/11256-000>
- Skinner, B. F. (1969). *Contingencies of Reinforcement: A Theoretical Analysis*. Appleton-Century-Crofts.
- Solomon, R. L., & Corbit, J. T. (1974). An Opponent-Process Theory of Motivation: I. Temporal Dynamics of Affect. *Psychological Review*, 81, 119-145.
<https://doi.org/10.1037/h0036128>
- Stamm, K., Lin, L., & Christidis, P. (2018, March). Mental Disorders Most Frequently Treated by Psychologists. *APA Monitor on Psychology*, 19.
<https://www.apa.org/monitor/2018/03/datapoint>
- Teachman, B. A. (2014). No Appointment Necessary: Treating Mental Illness outside the Therapist's Office. *Perspectives on Psychological Science*, 9, 85-87.
<https://doi.org/10.1177/1745691613512659>
- The Butterfly Foundation (2018). *Insights in Body Esteem*. Available Online at theButterflyfoundation.org.au
- Vogler, R. E., Lunde, S. E., Johnson, G. R., & Martin, P. L. (1970). Electrical Aversion Conditioning with Chronic Alcoholics. *Journal of Consulting and Clinical Psychology*, 34, 302-307. <https://doi.org/10.1037/h0029353>
- Wakefield, J. C. (2007). The Concept of Mental Disorder: Diagnostic Implications of the Harmful Dysfunction Analysis. *World Psychiatry*, 6, 149-156.
- Walker, P., Shearsby, J., & Steel, Z. (2013, April). Cognitive Behavioural Therapy for Psychosis: Lessons from History and Hopes for the Future. *InPsych*, 11-12.
- Westen, D. (1998). The Scientific Legacy of Sigmund Freud: Toward a Psychodynamically Informed Psychological Science. *Psychological Bulletin*, 124, 333-371.
<https://doi.org/10.1037/0033-2909.124.3.333>
- Westen, D., Novotny, C. M., & Thompson-Brenner, H. (2004). The Empirical Status of Empirically Supported Psychotherapies: Assumptions, Findings, and Reporting in Controlled Clinical Trials. *Psychological Bulletin*, 130, 631-663.
<https://doi.org/10.1037/0033-2909.130.4.631>
- Wikipedia (2021). *Autosuggestion*.
- Wolpe, J. (1969). *The Practice of Behavior Therapy*. Pergamon.
- Wood, J. V., Perunovic, W. Q. E., & Lee, J. W. (2009). Positive Self-Statements: Power for Some, Peril for Others. *Psychological Science*, 20, 860-866.
<https://doi.org/10.1111/j.1467-9280.2009.02370.x>