The Advantages of First Wave Behavior Therapy and Problems with the Others

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Behavioral approaches to psychotherapy have a very long and honorable history (Dollard & Miller, 1950; Kazdin, 1978; Guercio, 2018, 2020a, b; Skinner, 1953). Founded on basic research in learning, especially the work of Pavlov in classical conditioning and of Skinner in operant conditioning, a number of *ad hoc* behavioral therapies were developed in the first part of the twentieth century. For example, Salter (1949, pp. 105–106) successfully treated a case of blushing by instructing his client to practice blushing as often as possible. He described the rationale as being based on Pavlov's work (!)These approaches were systematized and expanded by researchers such as Wolpe et al. (1964) in therapy for neuroses and by Skinner's students (e.g., Lindsley, 1956) in therapy for a wide range of conditions and have been incorporated into behavioral case formulation methods (Sturmey, 2008). The so-called cognitive revolution (O'Donohue et al., 2003) ushered in new models of psychopathology and new treatments referred to as cognitive behavior therapy and more recently a third wave of behavior therapies (Kohlenberg et al., 1993; Linehan, 1993) emerged based on Skinner's (1957) *Verbal behavior* and research stimulus equivalence. This chapter provides an overview of this history and concludes that a return to basic learning theory as the basis of behavior therapy would provide a reliable compass and make for plain sailing.

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Before the First Wave

There are many historical and cultural practices and observations that appear to reflect behavioral conceptions of the control of behavior and behavioral technology (Kazdin, 1978). Predating Skinner's (1968) *The technology of teaching* by a few centuries, Maimonides, the twelfth century Jewish philosopher, described how recalcitrant students could be encouraged to study Torah first with edible and tangible reinforcers; and as those reinforcers lose their potency, with money; and, as wise people become indifferent to money, they too can be encouraged to study by conditioned reinforcers such as obtaining esteem of their peers and job titles reflecting professional and personal eminence and sagacity (Leshtz & Stemmer, 2006). More recently in the eighteenth and nineteenth century there were precursors to the token economy, good behavior game, peer-to-peer instruction, and pyramidal training in school settings (Kazdin & Pulaski, 1977; Stiliz, 2009). Finally, Jarius and Wildemann (2017) described a number of informal and amusing descriptions of classical conditioning throughout literature dating back to the seventeenth century. Thus, many behavioral cultural practices, observations and specific forms of behavioral technology were developed before the science of behavior analysis as a kind of folk technology and wisdom.

The First Wave

First Ripples

Before there was psychology or even physiology, scientific ideas and functionalist ideas developed in the eighteenth and nineteenth century. Gentlemen scientists *in embryo* and technocrats assembled libraries, collected cabinets of curios, conducted experiments in their homes, and met together to learn from one another, solve business problems using scientific methods. They addressed the problems of mining, surveying, constructing canals, making better pottery and belt buckles, breeding better animals and crops, and finding better cures for illnesses. In so doing they developed what were to become engineering, geology, physics, chemistry, biology, physiology and scientific medicine (Uglow, 2002). They also learned the value of careful, systematic, reliable and public observation and manipulation of the environment to produce a body of public knowledge which could be skeptically evaluated independent of any specific person; be systematically applied to new problems; and integrated into a meaningful, consistent world view (Uglow, 2002). In so doing, they also removed the need for God and various kinds of animisms to explain natural phenomena and devalued authoritarian claims for expert status as the basis of knowledge.

Charles Darwin was such a gentleman scholar who was related to generations of similar people including the Wedgwoods; his own grandfather, Erasmus Darwin,

had written a preliminary version of biological evolution in a poem. Charles Darwin was also familiar with breeding of animals for food production, and as a hobby, and was familiar with crop breeding and agriculture. Thus, he was exposed to rational approaches to understanding; that: the earth had a very long history; that many organisms produced large numbers of offspring, few of which survived to be fertile; the physical and behavioral animal traits could be selected by people and nature; and that the animals and plants were adapted to function well and efficiently in a particular environment. His three main works *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life (1858), The Descent of Man (1874), and The Expression of the Emotions in Man and Animals* all presented a functionalist view of morphology and behavior in which the organism's structure and behavior both served a purpose, namely they contributed to the survival of the species. Alfred Wallace also proposed this view around the same time; Darwin and Wallace knew each other's work and corresponded perhaps influencing one another (McKinney, 1966). (Note that more contemporary evolutionary biology views the unit of selection to be the gene rather than the species and thus we can think about the function of the organism's structure and behavior to be to ensure the survival of the genes the organism carries, rather than the survival of the species (Dawkins, 1976)). Thus, the scientific study of humans required the scientist to ask the questions: What is that organ there for? Why does the animal do that? What advantage is there to the organism to behavior in that way?

A Russian Wave

The continuing expansion of biological science lead to the discovery of classical conditioning which is often attributed to Ivan Pavlov (1994b), although it seems possible that other earlier Russian physiologists were familiar and had already studied this phenomenon systematically (Jarius & Wildemann, 2017). Thus, many introductory psychology textbooks give the traditional account of classical conditioning which states that while studying the physiology of digestion, Ivan Pavlov serendipitously noticed that dogs secreted digestive juices and salivated at the sight of food before it was placed in their stomach or mouth and also salivated at the presence of the person who had fed them in the past. He also observed that the quantity and consistency of salivation depended on the stimulus properties of the items placed in the dog's mouth in a manner that appeared to facilitate formation of the food bolus, swallowing, and digestion.

Subsequently, Pavlov systematically demonstrated that an arbitrary stimulus – originally a metronome set at a certain speed – when paired with food could come to elicit salivation alone. The effect depended on the number of pairings, and temporal relationships between the metronome and food during pairings. In addition, when the metronome was set at other speeds, it would also come to elicit salivation even though this specific sound had not been paired with the food. This effect that was most clear when the speed was most similar to the metronome's original speed.

He referred to the initial situation as an Unconditioned stimulus (US) eliciting an Unconditioned response (UR) and after pairings, a conditional stimulus (CR) eliciting an Unconditioned Response (UR). (Today we conventionally use the mistranslation *conditional* stimulus from the original Russian) The effect of other speeds of the metronome on salivation was called generalization. Following the development of animal models of classical conditioning, Pavlov became interested in psychiatry. For example, as early as 1915, Pavlov (1915/1994a) published a paper, *Experimental Psychology and Psychopathology in Animals* which drew parallels between the apparently neurotic behavior of dogs and humans.

Pavlov's work became known in the English-speaking world by the 1910's. Thus, a few years later, Watson and Rayner (1920) demonstrated that in a human infant an arbitrary stimulus paired with a loud noise which elicited a startle response, also eventually came to elicit both startle-like behavior such as crying and fearful behavior and avoidance of those stimuli such as turning away. Here the loud noise was an US and the startle was an UR. The paired stimuli, such as a Santa clause mask, were CRs, and the fearful behavior was now a CR. This study suggested that some human fears were caused by classical conditioning.

Pavlov also developed another experimental model of neurosis this was done by giving the dogs an easy discrimination between a circle and ellipse and progressively making the discrimination more difficult by flattening the ellipse to be closer and closer to a circle. Following this procedure, the dogs not only failed to make the discrimination but their behavior became erratic and agitated, urinated and defecated in the cage and they attempted to avoid the experimental cage. Attempts to reinstate the discrimination by returning to very easy discrimination were difficult or unsuccessful (Gantt, 1944).

Pavlov began observations of psychiatric patients as early as 1918 (Pavlov, 1994b, p. 418) and in the 1930's, Pavlov attended psychiatric clinics for humans on a weekly to observe patients, discuss them with psychiatrists and attempt to analyze human psychiatric problems in terms of his work on respondent conditioning, individual differences in susceptibility to classical conditioning, and environmental factors making use of freewheeling parallels between dogs and people (Todes, 2014). He also attended a clinic for nervous dogs. He feigned amateur status in human psychiatry, while making numerous psychiatric diagnoses – human and canine –, such as depth phobia in dogs. For humans, he recommended rest and sleep, if necessary induced by bromides. He investigated a then popular but potentially lethal Cloetta Mixture for humans. Treatment of neuroses in dogs included similar treatments and castration (Todes, 2014). Pavlov's methods in psychiatry were speculative and included unsystematic data collection rather than true experiments on animals and thus were loose and unscientific but promulgated the idea that classical conditioning might be an important model for the acquisition and treatment of psychopathology.

Russian work on classical conditioning was very active throughout the first half of the twentieth century and much of it was not immediately readily accessible to the West, although it did eventually permeate behaviorism through Russian-born and native Russian-speaking researchers such as Gregory Razran, who periodically

reported back from his visits to the USSR and with Pavlov and Pavlov's students and colleagues (e. g., Razran, 1935). Razran went on to set up training in behavior analysis at Colombia University and then Queens College, New York[1] (Razran, 1971).

There were early several applications of classical conditioning to clinical problems during the 1920's and 1930's. One such example was the work of Mary Cover Jones (1924), who demonstrated the effectiveness of behavioral methods with childhood fears and phobias in a case series using methods including modeling, verbal instruction etc. The demonstration that is most commonly acknowledged was "By the method of direct conditioning we associated the fear-object with a craving-object, and replaced fear with a positive response" (p. 390). That is a Conditioned Emotional Reaction (CER) (fear) could be abolished by pairing the CS which elicited the CER with another stimuli that appeared to elicit incompatible behavior and by gradually introducing the CS in very small steps closer and closer to the child contingent upon the current distance in the presence of the craving-object, the former CS no longer elicited the CER. Next, the work of Edmund Jacobson (1934) should be noted. He developed progressive muscle relaxation training, conducted basic research on its effects on reflexes, developed protocols to train people to relax and applied to a wide range of anxiety and psychophysiological disorders. A third important study framed by classical conditioning was that by learning researchers Mowrer and Mowrer (1938) who evaluated the effect of an alarm to wake up children with nocturnal incontinence. They based this on what they called a "habit model" in which prior to training the full bladder elicited the emptying reflex. The bell was set off by initial urination and interrupted urination and the child was required to go void in the bathroom immediately. In so doing, they suggested, the bell through pairing came to elicit urination. They reported that they had applied this to nocturnal incontinence in 30 children aged 3–13 years and had eliminated nocturnal incontinence in *all* children within 2 months. They reported relapse in some children in homes with emotional problems and in other children the effects were maintained for up to two and half years, the end of their follow-ups. Similar results were reported by several independent researchers (e.g., Davidson & Douglass, 1950) and commercial urine alarms were marketed. Predating Wolpe's work, psychoanalyst Herzberg (1941) eschewed verbal therapy for an action-based approach to neuroses involving graded tasks that resemble graduated in vivo exposure focused on symptom reduction. He wrote "Of 100 cases of neuroses and perversions, 48 were cured or very much improved, 47 broke off treatment early (3–39) interviews) with improvement evident for 12, while for 5 cases treatment appeared ineffective and was terminated by the therapist after 24–68 interviews" (p. 19). During World War II, several military physicians noted the similarity of many war neuroses to CRs, both in terms of presentation and acquisition, although Gillespie (1945) did not outline or report any examples of treatment based on respondent

[1] I teach classes on behavior analysis in the Razran Building, Queens College, New York. At one point we have a poem, since mysteriously disappeared, hanging on the wall of our faculty meeting room written by Skinner on the occasion of Razran's retirement which began "Gregory Razran/ was no has-ran".

extinction. Finally, Andrew Salter's (1949) *Conditioned reflex therapy* prefigured much of Wolpe's work. Based on a perhaps erroneous understanding of Pavlov's work, Salter used assertiveness training, pairing stimuli with positive imagery, hypnosis as relaxation to reduce anxiety and treat insomnia, smoking and overeating. In 1964 he went on to edit *The Conditioning Therapies* with Wolpe and Reyna. Thus, from the 1920's to the 1940's the was a gradual development of clinical applications of classical conditioning for a number of rather different problems.

The South African and European and Wave

Today, it is hard to appreciate how strongly the psychoanalytic illness medical model held sway almost without challenge until the 1950's in all fields of mental health practice both in terms of understanding the causes and treatment of mental health issues and in terms of professional practice. Following the decline of "moral treatment" in the middle of the nineteenth century, with its emphasis on personal responsibility, environmental design, optimism, and exhortation of patients to change, the medical model supervened. Medical practitioners ruled the roost in mental institutions, and brought in microscopes to find the organic causes of these illnesses (e.g., Turner, 1920). A mental illness was seen as an illness; problematic behavior was a surface symptom of those illnesses; treatment of those surface symptoms was useless and wrong and would only lead to symptom substitution; a doctor's job was to discover the illness and give it a name (Ullmann & Krasner, 1965a). The implications for treatment were unclear, but there were still left over nineteenth century treatments such as bromides, hydrotherapy, spinning chairs restraint and seclusion (Alexander & Selesnick, 1966). Even if much of this was ineffective or even dangerous to patients, at least sick and probably dangerous people could be sequestered, prevented from passing on their contaminated genes, and the public kept safe. Two examples illustrate this state of affairs. First, after the publication of Mowrer and Mowrer's (1938) paper, psychoanalytic commentator Michaels (1939) and a note from the journal's own editorial board doubted the results published in their own journal, suggested that a behavioral analysis and treatment of nocturnal enuresis must be superficial and incomplete, the results could not be true, that symptoms substitution must be just around the corner. Second, on my first clinical psychology practicum in about 1984 my supervisor asked me to come take a look in a filing cabinet of hundreds if not thousands of clinical psychology reports from the preceding 20 years. Using the same format, each one thanked the physician for the referral and reports the IQ, neuroticism and extraversion followed by a "Yours sincerely". That is what British clinical psychologist largely did until the mid-1970's; they were physicians' technician handmaidens, a kind mental phlebotomist.

Much of that changed with the work of Joseph Wolpe's (1958) *Psychotherapy by reciprocal inhibition.* Wolpe was a South African physician who became frustrated in treating trauma in veterans of World War II ineffectively with psychotherapy and began searching for effective alternatives. His 1948 medical thesis was on

conditioning and fears based on the work of Pavlov (Poppen, 1995). From this thesis, the work of earlier researchers and practitioners such as Jones (1924), Herzberg (1941), Salter (1949) and discussion of war neuroses in terms of classical conditioning, Wolpe used the notion of reciprocal inhibition of anxiety, that is, presenting an alternate stimulus or engaging in other behavior that elicits a physiological state incompatible with autonomic arousal. He noted that this could be done in numerous ways. These included being assertive defined as talking in a loud, clear voice with marked intonation, responding quickly, making eye contact with the conversation partner, not acceding to other people requests immediately, expressing one's own opinions which sometimes disagree with those of others, contradicting others, and accepting compliments, or even somewhat pushy with others people. Reciprocal inhibition could also be done using role play in the office using behavioral skills training with the therapists. It could be done using abreaction, such as deliberately and assertively provoking a marital argument over a past injustice resulting in a sense of relief from anxiety (Wolpe, 1952). It could sometimes be done pharmacologically, through hypnosis, or Jacobsonean relaxation training. Sometimes, but not always, the reciprocal inhibition could involve systematic desensitization by thinking or imagining progressively more threatening stimuli while maintaining a state of relaxation. It is interesting to note that he commented that the first two methods were appropriate for social fears and relaxation was appropriate for fears of inanimate objects, such as weather (Wolpe, 1952). Subsequently, others have also used other procedures to induce relaxation such as massage, eating or playing in children.

Wolpe (1952) reported the application of these methods to a series of 70 cases, mostly of anxiety and mixed anxiety/depression and found that 86% were "cured" or "much improved". Patients were had previously participated in psychoanalysis fared less well, according to Wolpe due to the iatrogenic effects of psychoanalysis training their patients to focus on their past rather than the controlling present. With an eye to the economics of treatment, he also compared the outcomes and treatment times and found that psychotherapy by reciprocal inhibition also took many fewer sessions that traditional psychoanalysis which often took years rather than weeks and quite often could not even be completed. Wolpe subsequently worked directly with Eysenck and his group at the Maudsley clinic, and worked went on to work in the USA alongside people such as Lazarus (Poppen, 1995), did battle with psychotherapists misrepresentations of his work (Wolpe, 1959), and spent considerable efforts disseminating this approach through professional training, conferences and more popular books (Wolpe, 1990) and combatting formulaic, non-analytic, inadequate behavioral practice (Wolpe, 1977). Jumping on the bandwagon in the United Kingdom, Hans Eysenck (1952) rattled the saber in Britain and also declared psychoanalysis ineffective and could be applied scientifically and effectively for treatment anxiety disorders (Eysenck, 1960). Clinical work based on classical conditioning expanded rapidly in the 1970's to include a wide range of problems and variations in specific techniques and this became the basis for many graduate courses in clinical psychology in Britain and elsewhere to prepare new professionals for treatment in mental health in the 1970's.

A second thread of behavioral treatment of psychopathology related to classical conditioning is procedures based on respondent extinction (Sturmey et al., 2020). When CS is repeatedly presented in the absent of the US after a certain number of presentations it no longer elicits the CR. This is known as respondent extinction. Thus, clinical applications of this procedure involve identifying the CS and presenting the CS until it no longer elicits the CR. Respondent extinction can be distinguished from habituation, a non-associative form of learning, in which an unlearned response diminishes with repeated presentation of a stimulus, such as a startle to a loud noise. This can be distinguished from respondent extinction because the stimulus that is presented in respondent extinction is a CR and the organism has a learning history to establish that stimulus as a CR. Skinner (1953) noted a possible role for respondent extinction in classical psychotherapy. Exposure to verbal stimuli in a non-punitive environment might result in relief from anxiety through respondent extinction. So, by the mid-1960's procedures based on this principle were developed including implosion and flooding. The original implosion procedure was a two-step hybrid of behavioral and psychodynamic models of anxiety. In the first step patients are exposed imaginally to stimuli directly related to their fear, such as a snake. In the second step patients are exposed imaginally to scenes based on a psychodynamic hypothesis concerning the hidden basic problem such as scenes of sexual conflict, guilt, shame or fear of aggression (Stampfl & Levis, 1967). In contrast, flooding involves maximal in vivo exposure without any form of relaxation or reciprocal inhibitionuntil the person is calm and fearless (Boulougouris & Marks, 1969). For example, one might take a person with snake phobia and require them to pick up a large living snake, look at it, describe it and wear it around them until the fear undergoes respondent extinction which might take approximately 2 h and sometimes only *one* session (Ost, 1996). These procedures based on respondent extinction have been applied extensively to anxiety disorders (Wolitzky-Taylor et al., 2008), obsessive compulsive disorder, trauma-related psychopathology (Paunovic, 2011; Paunovic & Öst, 2001).

Today many forms of therapy are direct and explicit applications of reciprocal inhibition and respondent extinction. Other forms of contemporary psychotherapy may well incorporate these procedures, but may only acknowledge them indirectly, through vernacular language or sometimes do not acknowledge them at all. For example, a treatment package for anxiety or stress might involve journaling of events that provoke worry and anxiety. If such as procedure is effective, one might attribute its effectiveness to "working through one's problems". A more parsimonious explanation might be that through journaling the person engaged in a self-managed form of respondent extinction. Reference to "working through one's problems" is a vernacular, non-scientific term and so is not readily amenable to investigation whereas self-managed respondent extinction opens up the door to investigate this phenomenon and maximizing its potential benefits by identifying and using the variables that control self-control and respondent extinction.

The American Operant Deluge

A second strand of behaviorism comes from operant learning a predominantly American intellectual heritage. Thorndike (1913) demonstrated trial and error learning in cats when he showed that hungry cats learn to exit carefully constructed puzzle boxes to access food more and more quickly with experience and concluded that consequences "stamped in" behavior. Around the same time, Watson's (1913) manifesto called for an objective account of psychology and an exclusion of mentalistic causes of behavior. He wrote: "Psychology as the behaviorist views it is a purely objective experimental branch of the natural science. Its theoretical goal is the prediction and control of behavior. Introspection forms no essential part of its methods, not is the scientific value of its data dependent upon the readiness with which they lend themselves to interpretation in terms of consciousness …" (p. 158). It is interested to note that his early career included ethological work involving extensive observation of the behavior of terns setting the scene for the primacy of observational data and functionalism. He also thought that behavioral psychology should be a pragmatic and useful science that could advise people how to teach, how to raise children and how to make money in business foreshadowing many of the applications of behavioral analysis in the late twentieth century.

Skinner (1938) took these strands and recognized the fundamental differences between Pavlov's work and what he called operant learning. He viewed classical conditioning as limited as it could only explain a limited part of behavior based on inherited reflexes with survival value related to unchanging aspects of the environment such as gravity or threats to the organism's integrity. Operant conditioning, however, was much more important as it explained the broad swath of behavior related to organism's adaption to an ever-changing unpredictable environment. Skinner spent decades conducting basic research on learning in highly controlled conditions with non-human animals identifying the environmental variables and their parameters that did indeed control and predict behavior. The Skinner box was a method for studying and measuring behavior objectively focusing on the cumulative number of responses over time, using small *N* (often one subject) experimental design and inductive methods to accumulate vast quantities of replicable data to permit cautiously built up generalizations from individual studies and individual organisms (Skinner, 1938). Morris (2013) identified Skinner's (1945) *The Operational Analysis of Psychological Terms* as a founding article for behavior analysis because: (1) it named the philosophy of science as radical behaviorism, meaning "thorough" or "root"; (2) it incorporated private verbal behavior as behavior; and (3) it incorporated private events such as consciousness as verbal behavior occasioned by behavior, such as behaving consciously, rather than consciousness causing behavior. They also noted that it was not until the 1980's that Skinner write about variations and selection by consequences as common features of biological and cultural selection and selection of operant behavior during the lifespan.

Contemporary with Skinner's early work were two other important developments which could be considered in the operant tradition. First, Dunlap (1932,

1942) developed the procedure of negative practice in which a problematic response is repeated for an extended period of time without reinforcement of that response. Dunlap applied this to both motor behavior, such as tics, stammering, and typing errors (Dunlap, 1932) and "affective and ideational habits" (Dunlap, 1942, p. 273). The second is Mowrer's (1939) classic analysis of anxiety using two factor theory in which he wrote "anxiety is thus basically anticipatory in nature and has great biological utility in that it adaptively motivates living organisms to deal with (prepare for or flee from) traumatic events in advance of their actual occurrence, thereby diminishing their harmful effects" (p. 563). This quote illustrates both the two factors that control anxiety – antecedent stimuli that in the past have been paired with threats and subsequent avoidance of these antecedent stimuli. It is interesting to note that this analysis of anxiety foreshadows Estes and Skinner's (1941) empirical demonstration of this model of anxiety.

Like Watson, Skinner always had an eye on implications for applied individual human problems and broader social problems. At various times Skinner addressed solutions to broad social problems such as education (Skinner, 1968), world peace, recycling (Skinner, 1953), designing cultures (Skinner, 1966), understanding and changing language (Skinner, 1957) and having a healthy, happy and productive old age (Skinner & Vaughn, 1983). He designed better cribs for children and their caretakers, proposed better missile guidance systems in World War II guided, of course, by pigeons, and teaching machines where children learned without teachers being present. He also used it extensively in the control and management of his own behavior throughout his life enabling him to live a healthy, happy, long and productive life (Epstein, 1997). This intellectual heritage and the accumulation of behaviorally trained students resulted in a series of books on psychology and psychotherapy as behaviorists see it (Dollard & Miller, 1950; Keller & Schoenfeld, 1950) and on methodology of behavior analysis (Sidman, 1960).

Skinner's early work on mental health included the seminal study on acquisition and control of anxiety which demonstrated that stimuli that preceded aversive stimuli came to suppress ongoing adaptive operant behavior (Estes & Skinner, 1941). Other behaviorists, came out of the cold of psychoanalysis and provided behavioral accounts of psychotherapy (Dollard & Miller, 1950). Skinner (1953) expanded these ideas placing emphasis on behavioral self-management at the center of behavioral accounts of mental health issues. Namely, mental health problems reflected society's control of its members through positive punishment which resulted in avoidance of the punishing environment and punishing agents and the negative side-effects of positive punishment including anxiety and problematic behavioral inhibition (Estes & Skinner, 1941). Thus, if someone fails to learn to adapt to these conditions by managing their own social and physical environments to tolerate aversive stimulation and postpone positive reinforcement, then a person is at risk for problematic behavior such as avoidance, drinking too much alcohol etc. to reduce the aversive side-effects of one's history of positive punishment. Skinner proposed that the job of the therapist is refrain from directly instructing their clients to change their behavior, but rather to subtly and indirectly induce a repertoire of behavioral self-management in their clients. In so doing, clients can independently

discriminate the relationship between their own behavior and the environment and then rearrange their physical and social environments to manage this own behavior to reduce anxiety and depression and live in an adaptive, effective and apparently more autonomous way (Skinner, 1953). (See Table 1 for some examples of behavioral self-management and mental health).

The 1950's saw Skinner and his colleagues begin to apply operant analysis and interventions directly to alleviate human suffering. A possible isolated first example, is the report of operant conditioning of arm raising in an individual with intellectual disabilities considered incapable of learning by Fuller (1949). Subsequently, Lindsley (1956), a Skinner student, set up an operant laboratory and program of research in a mental hospital and first demonstrated control of lever pulling by schedule effects in people with schizophrenia which formed the basis of subsequent work on the token economy (Ayllon & Michael, 1959). Around the same time more traditional experimental psychologists began to evaluate reinforcement procedures

Table 1 Skinner's nine strategies of behavioral self-management and their application to mental health issues

Strategy	Example
1. Use self-restraint to decrease undesirable behavior and physical aid to increase a desired behavior.	Fold your hands on your lap to prevent moving your hands around in an embarrassing manner, resulting in decreased social anxiety. Place your relaxation tape next to your desk so it is easy to use and you are more likely to engage in relaxation training.
2. Change the stimulus, such as remove a discriminative stimulus for a behavior we want to reduce and present a stimulus to increase the probability of desired behavior.	Walk away from a nasty person to reduce anxious behavior. Place a reminder to use relaxation training after work on car driving wheel making it more likely you will use relaxation training.
3. Use deprivation to increase a desirable behavior and satiation to decrease an undesirable behavior.	Skip lunch to each more at a free dinner to eat more free food and save money. Drink a pint of water before going to a party to decrease future consumption of alcohol.
4. Manipulate emotional conditions.	Use mood induction to change future behavior, for example, rehearse one's grudges before going to ask for a raise.
5. Use aversive stimulation	Set alarm clock across the room to wake up and get to work on time.
6. Use drugs to change behavior	Drink a big coffee to increase the probability of working in the afternoon.
7. Operant conditioning	Watch a favorite show after completing relaxation training to increase the probability of practicing relaxation.
8. Punishment	Slap your own hand as you go to grab an extra drink of alcohol reducing the probability of getting drunk and saying something embarrassing.
9. Doing something else	Change the topic of conversation or walk away when someone talks about embarrassing topics that provoke anxiety.

on memory in individuals with intellectual disability (Locke, 1962) and Wolf et al. (1963) demonstrated that operant principles could be applied effectively to reduce problem behavior such as throwing plates both in the clinic and home in an individual with intellectual disabilities. These and many other developments took place in pioneer academic behavioral programs such as those at the University of Kansas (Baer, 1993), the University of Arizona (Thompson, 2017) and the University of Manitoba, Canada (Walters & Thomson, 2013). These programs addressed many applied issues for the first time using both basic research, such as showing operant reinforcement and extinction of thumb sucking (Baer, 1962), and applied work (Wolf et al., 1963). There was a close relationship between behavioral theory and practice and this was extended to many problems including the development of typical children (Bijou & Baer, 1961).

In Europe, the first meeting of the British Experimental Analysis of Behavior group took place around 1963 (Hughes, 2007). This group grew into the European Association for Behavior Analysis which has spawned numerous European national organizations. A similar group developed in Ireland in the 1970's (Leslie & Tierney, 2013). Both groups began as primarily basic groups which, in response to the need for effective practitioners in autism, have subsequently focused on applied work.

Morris (2013) conducted a careful analysis of basic behavior analysis publications prior to 1959 and 1967. They identified 36 ABA articles which included four clusters. These were as follows. (1) Ayllon's work (e.g., Ayllon & Michael, 1959.) with psychiatric patients in Saskatchewan dealing with reducing psychotic talk, hoarding, refusal to self-feed and teaching mealtime attendance and eating by training psychiatric hospital personnel to use reinforcement and extinction. (2) Work by Staats (e.g., Staats et al., 1962) at Arizona State University on operant procedure to teach reading using token economies administered by adult volunteers. (3) Wolf's (ref) work at the University of Washington to address problem behavior, toilet training, isolate play, regressed crawling reducing crying and increasing appropriate speech. (4) A group of 24 other articles some of which were isolate publications. Thus, the core start to behavior analysis was one based in the USA by a small number of geographically dispersed researchers.

By 1965, Ullmann and Krasner's classic *Case studies in behavior modification* reported many and diverse applications of this blossoming new technology to problems such as reinstating speech in a mute person with schizophrenia, several behaviors related to autism, restoring eating in a person with anorexia, hysterical blindness, trauma-related anxiety, fetishes, sexual inadequacy, stuttering, tics, school phobia, toilet training, tantrums, phobias, regressed crawling, crying, operant vomiting and hyperactivity. In addition, research had already begun to address important applied issues establishing people as conditioned reinforcers, group classroom procedures and training staff to administer group token economies. The work of Ferster is also especially notable for providing theoretical analyses of autism (Ferster, 1964) and depression (Ferster, 1973) (along with Lazarus [1968]) and the beginning of applied behavioral psychopharmacology using behavioral technologies (Ferster & Appel, 1963; Ferster & DeMyer, 1961). These papers went on to provide the basis for

applied work in behavioral activation (Lewinsohn, 1974) and early intensive applied behavior analysis (ABA) for children with autism (Lovaas et al., 1965).

Nineteen fifty-eight saw the founding of the *Journal of the Experimental Analysis of Behavior* which at first include experimental analysis but not treatment of some applied problems such as stuttering (Flanagan et al., 1958). In 1968 the first issue of the *Journal of Applied Behavior Analysis* was published, which included the seminal article *Some current dimensions of applied behavior analysis* (Baer et al., 1968). As with Ullmann and Krasner's volume, the *Journal of Applied Behavior Analysis* (*JABA*) published papers on a variety of mental health for the first five or so years similar to that in Ullmann and Krasner.

The founding of an applied journal required at least five methodological changes from the basic science. First there was a formalization of small *N* experimental design to specify specific designs such as reversal and multiple baseline designs among others (Sidman, 1960). Second, instead of collecting data mechanically on arbitrary, convenient responded usually measured mechanically as number of responses and presented as cumulative rate of behavior, human observers had to be trained to observe socially important and meaningful behavior reliably in natural settings. This required training of observers which could measure several different response parameters such as duration, latency etc. and was typically presented sessions by session, rather than as cumulative number of responses. Third, rather than programming machines to present stimuli in contrived environments designed to study basic learning, environmental changes were often implemented by changing the behavior of natural behavior change agents, such as family members and staff. These natural change agents needed training to do so. In order to present convincing evidence of a reliable relationship between the independent and dependents variables, experimenters had to show that the behavior of the change agents also indeed changed in the hoped-for manner and was functionally related to the behavior of the target persons. Fourth, in order to show that socially convincing and meaning changes had occurred, applied researchers had to show that treatment effects generalized and maintained over time in socially valued ways. Finally, applied researchers had to ask the participants and the people around them what they thought about the goals, methods and outcomes of applied behavioral treatment (Wolf, 1978). Like other fields, the development of practice out of basic research has resulted in unresolved tensions between the science and practice of behavior analysis and, even in research let alone practice, a certain drift of application away from its basic foundations.

Ripening and Expansion of Applied Behavior Analysis: 1980's–2020

ABA has addressed an incredible breadth of socially significant behavior since the founding of *JABA*. A description of that is not possible in this chapter. Rather, a few major trends will be highlighted.

First, Skinner's (1957) *Verbal behavior* was a behavior analytic account of what in the vernacular we call language or communication. Skinner defined verbal

behavior as behavior in which reinforcement was delivered through other people rather than directly by a nonhuman environmental event. For example, if one picks up a glass of water and drinks, drinking is reinforced without social mediation; if you ask someone to pass the glass of water and someone provides this then the reinforcement is socially mediated. In defining verbal behavior in this manner Skinner produced a radially different analysis of language. Thus, pointing, yelling, and texting for a glass of water were now verbal behavior even though they involved no spoken words. In contrast, someone engaging in echolalia saying "water" repeatedly alone in a room were not engaging in verbal behavior because the reinforcer was not socially mediated. Verbal behavior also defined classes of verbal operants not based on their topography or grammatical classes but on the basis of the controlling environmental variables. For example, a mand is controlled by the reinforcer it specifies and its conditions of deprivation. Thus, if one has not drunk for a long time and says "water", and that response is reinforced by water, then this is a mand. In contrast, a tact is a class of verbal behavior controlled by non-social antecedent stimuli, such as objects and reinforced by generalized conditioned reinforcers, such as praise. For example, if someone sees a glass of water and says "Water" and another person says "that's right" then in this example "water" may be a tact. Thus, response topography is unimportant, but the variables controlled verbal behavior are definitional.

Chomsky (1959) reviewed *Verbal behavior* negatively by from a structuralist perspective; Skinner did not reply and some assumed that Skinner agreed with the critique, although MacCorquodale (1970) among others did reply. Although there were a several empirical papers showing environmental control of verbal behavior (Krasner, 1958), ABA did immediately not take up the challenge of the implications of Skinner's *Verbal behavior.* Subsequently, Sundberg and Michael (2001) among others developed a completely new technology of teaching verbal behavior to individuals with intellectual disabilities and with autism. Further, Barnes-Holmes et al. (2000) used *Verbal behavior* as the basis of relational frame theory and acceptance and commitment therapy (ACT). So far, and unsurprisingly, there has been no effective technology to promote language or language-based interventions based on Chomsky's views after more than 60 years.

A second important trends has been the development and expansion of methods of conducting and using functional assessments and analyses for treatment of severe problem behavior. Beginning with Carr's (1977) conceptual analysis of the contingencies controlling self-injury, empirical studies demonstrated the important of functional analyses predicting the most effective treatment for severe problem behavior (Carr & Durand, 1985). The development of standardized functional analysis methods (Iwata et al., 1994) resulted in an enormous literature on functional-based treatment of severe problem behavior (Beavers et al., 2013; Hanley et al., 2003) including psychiatric symptoms, such as psychotic speech (Frojáan-Parga et al., 2019; Travis & Sturmey, 2010). It is conventional to distinguish three types of methods to conduct functional assessments and analyses. Indirect functional assessments include interviews and questionnaires completed by the clients or a relevant third party. For example, Durand and Crimmins (1992) developed the *Motivational*

Assessment Scale to determine the likely contingencies maintaining problem behavior. This has been extended to conduct indirect functional assessments for clinical problems such as smoking (Burrows et al., 2020). Direct functional assessments involve observing the behavior in the natural environment without changing the environment systematically such as in vivo recording of antecedents, behavior and consequences (Bijou et al., 1968) and scatterplots (1985). Finally, experimental functional analyses involve systematic manipulation of the environment using a small *N* experimental design. For example, Carr and Durand (1985) compared the effects of presenting little or no attention and easy and difficult tasks on children's problem behavior using reversal designs to demonstrate experimental control of problem behavior. Functional assessment and analysis methods have now been applied to a wide range of problem behavior (Sturmey, 2020) and populations and has been enshrined in special education law in the USA and professional standards.

A third major area of expansion has been work on stimulus equivalence and transfer of stimulus functions within stimulus classes. Stimulus equivalence is demonstrated when an individual learns to match stimuli from class A (written words) to class B (photographs) and class B to C (spoken words) and the individual then learns several untrained relationships (B→A; C→B and importantly C→A). This training approach is not merely an example of an efficient method of training; rather, it is a behavioral model of conceptual behavior and categorization and thus forms the basis of important aspects of language, conceptual and intellectual skills. Originally demonstrated in the context of teaching reading (Sidman, 1971), stimulus equivalence has been used as a model for understanding classification of stimuli such as perceptual classes and conceptual behavior such as "understanding" graphs (Fields et al., 2009; Maffei-Almodovar et al., 2017). This approach has also been expanded to develop novel programs to teach children with autism among others (Dixon et al., 2017).

An important aspect of work on stimulus equivalence with direct relevance to clinical work is transfer of function among members of a stimulus class (Dougher et al., 1994). Once an equivalence stimulus class if formed, conditioning a function to one member of that class, such elicitation following pairing of one member of the stimulus class with electric shock (Dougher et al., 1994) and extinction of such conditioned responses (Augustson et al., 2000) produces generalization to other members of the class without direct training. Transfer of function might account to generalization of fearful behavior shown in phobias to untrained stimuli not associated with initial classical conditioning. This phenomenon might be incorporated in new therapy methods (Dougher, 1998).

Fourth, ABA has been active in applying the notions of delay discounting to disorders related to the *pathology of positive reinforcement*. Delay discounting refers to the preference that some people have for small immediate, low quality reinforcers over larger, better quality delayed reinforcers. Choosing the former is referred to as impulsivity. This framework has been useful in developing contingency management programs and other procedures based on increasing tolerance for delay of reinforcement to reduce drug use and increase vocational behavior in drug addicts with multiple mental health problems (e.g., Higgins et al., 1994),

gambling (Dixon et al., 2003), ADHD (Binder et al., 2000), and health-related behavior such as smoking and obesity (Dallery et al., 2013).

A New Profession

The expansion of the many applications of ABA has resulted in the development of a new profession. The growing and unfulfilled need for effective therapies, especially for young children with autism spectrum disorders, resulted in a situation where behavioral practitioners were regulated to differing degrees often by *ad hoc* local regulations. Additionally, licensed professionals outside of ABA sometimes claimed competence beyond their training due to insufficient professional training and an incomplete understanding of ABA. This resulted in some situations where there was concerns over: (a) the excessive and inappropriate use of positive punishment; (b) practitioner competence; (c) difficulties for consumers, such as family members to discriminate the quality of service providers and had no clear mechanism to make complaints or protect themselves and family members from harm; and (d) no clear basis for funding from health insurance or other funding mechanisms (Michael, 1972).

Growing out of licensure for ABA in Minnesota and Florida (Shook et al., 2002) a national USA program of licensure was established. This included detailed task lists for professional training, required hours of supervised experience, approval of graduate training programs, a national exam, adoption of national guidelines by individuals state laws controlling licensure, disciplinary and complaints procedures to protect the public, professional insurance, and requirements for continuing post qualification education including ethics. More recently, like other professionals, ABA training has expanded to address diversity (Beaulieu et al., 2019), women's issues (Baires & Koch, 2019) and cultural competence (Wright, 2019). The upshot is that the number of licensed applied behavior analysts in the USA increased exponentially from almost zero in 1999 to nearly 14,000 by 2014, about 80% of practitioners being Masters-level practitioners (Deochand & Fuqua, 2016). In addition, many countries outside the USA now have programs for licensed behavior analysts (Martin & Shook, 2011). Today, most practice focuses on children and adolescents with autism and other developmental disabilities, but behaviorism continues to make an important contribution in many areas including behavioral case formulation and explanations of behavior change during non-behavioral therapies (Sturmey, 2008, 2020).

Problems with Waves Two and Three

Many of us like to defy our parents; psychotherapists in the 1970's were no exception in their willingness to defy their elder behavioral mentors by embracing the alleged cognitive revolution (O'Donohue et al., 2003). In so doing, many

professional mental health programs and professionals abandoned the philosophical and scientific roots of behaviorism in favor of mainstream psychological and psychiatric concepts, methods and practices at great costs to themselves and their patients.

The first sin was retreating to the office and in so doing abandoning observational data and observing their clients in the natural environment. The retreat to the office has meant that therapist, accepting client self-report of behavior change and of treatment integrity, have built a house of sand on foundations of sand. Some of what clients tell therapist is true, but it is often insufficient to be confident that the client's life is better because of the therapy. The retreat to the office has another related problem. It is difficult or often impossible to perform a functional analysis in the therapist's office. Although it is conceivable that analog functional assessments and analyses could be conducted in an office setting, the validity of such assessments would always remain in doubt as important elements from the client's natural environment could always be missing from the analog assessment. The second related sin is that by retreating to the office with their clients, therapists focus on client thoughts and feelings as the cause of problematic and non-problematic behavior rather than as covert behavior subject to functional analysis. Clients can readily shape the therapists' behavior in focusing on a search for causes in the past that are sometimes hidden in the false hope that revealing and understanding these historical causes will change current behavior.

Third, self-proclaimed second and third wave and cognitive therapists misrepresent and/or misunderstand traditional behavioral therapies. One aspect of this phenomenon is that if a therapy produces a change in behavior that is an interesting phenomenon to be studied and understood in behavioral terms, thus, Skinner (1953) speculated how traditional psychoanalysis might produce behavior change. A related problem is that often the new therapies include old procedures but do not fully admit to this. New therapies tend to highlight their new procedures and downplay the old ones. For example, descriptions of ACT tend to highlight new acceptance strategies and downplay the old procedures goals setting and self-recording. For example, ACT involves new and interesting verbal psychotherapy procedures such as the "milk, milk, milk" exercise in which the client repeats the word for about 45 s and reports that it loses its emotional and meaningful functions. ACT also involves goal setting and self-recording, although less attention-grabbing that the new procedures, this everyday component of ACT may be a key component of ACT. Thus, dismantling studies often find first wave procedures are the effective component of such packages and may be equivalent to the entire package. For example, Jacobson et al. (1996) famously demonstrated that behavioral activation alone produced the same outcomes as a cognitive behavior therapy package for depression. Nezu and Perrin (1989) similarly demonstrated that the problem solving protocol (a form of behavioral self-management) was responsible for change in treatment of depression, rather than changes in attributional style. A final example comes from a recent dismantling study of ACT compared the "engaged" components of ACT (values-guided choices, building valued habits etc.) with the "open"

components (acceptance, use of metaphors and defusing judgements and rigid self-stories), the full ACT package and a waitlist control. They found that on measures of overall distress, all components were superior to the WLC but that the engaged components produced significantly larger rates of reliable improvement (46%) than the WLC (17%) and open (27%) conditions (Levin et al., 2020) perhaps because the open components alone dot give the participants the tools needed for change that are in the engagement condition.

A related problem is the mislabeling of therapy procedures as "cognitive" or "behavioral." Sometimes the mis-labelling is in plain sight, such as labeling relaxation training as a cognitive intervention, other times it involves labelling any strategy that acknowledges private events as a cognitive therapy (Sturmey, 2005). The radical behaviorist position is simple: If there is a reliable relationship between what goes on in any kind of therapy – i. e., environmental events – and client behavior, it is a good idea to go investigate the learning that underlies that change. The results are likely to be disappointing to therapists seeking novelty as it is likely to involve considerable demystification, everyday explanations and environmental control of the behavior of therapists and clients (Skinner, 1953).

Sixth, many writers in mental health do not know behaviorism sufficiently to make a good critique of radical behavioral explanations of behavior change in therapy based on an accurate account of behaviorism (see O'Donohue & Kitchener, 1998). Three examples include some of the following. First, some critics have stated that behavioral treatments have focused excessively on contingencies. For example, Novacco (1997) wrote that "traditional behavior therapy has a tendency to neglect attention to environmental fields by focusing primarily on contingencies …" (p. xiii). In the same volume, Stenfert Krose (1997) proposed that traditional behavior therapy rejected introspection and that learning was in fact cognitively mediated, and that there were new procedures such as problem solving and self-control. This implies that such approaches did not exist before and were new cognitive therapies, whereas Skinner (1953) described the status of cognition as covert behavior to be analyzed and self-control could be framed within a radical behavioral approach. Second, some critics fail to make some basic distinctions correctly, for example, the distinction between habituation and respondent extinction. Third, some critics make the error of elevating and reifying thoughts and feelings to the cause of behavior or inventing metaphors of broken computers, broken brains, faulty images etc. as the causes of behavior.

Finally, the substitution of questionable paper and pencil psychometric self-report measures as the outcome variable in many CBT and third wave outcomes studies instead of actually measuring the behavior to be changed directly makes the outcome literature for second and third wave behavior therapies highly questionable.

Treasures from the Deep or Flotsam and Jetsam?

We are awash with a tidal wave of new therapies, including new second and third wave behavior therapies. This is not necessarily a bad thing: There are some new therapy techniques which gives therapists and clients a choice between different procedures and some of the new procedures will suit some people more than the old procedures. Some of the new procedures have already jumped the low barrier of evidence-based practice by conducting many RCTs of third wave therapies and may be more effective than earlier therapies.

But, is this treasure from the deep or flotsam and jetsam?

By inadvertently abandoning behavioral principles or throwing them overboard, perhaps in the enthusiasm for some new behavioral principles, extension of existing principles, or lack of training in behaviorism, cognitive therapist and new wave theoreticians and practitioners have lost some three fundamental things: The philosophy of the science – behaviorism – the basic science – the experimental analysis of behavior – and the applied science – ABA. Doubtless behaviorists will continue to paddle their canoe against the currently prevailing tides and apply the philosophy, concepts and methods of behaviorism to all kinds of therapies. Hopefully, second and third wave behavior therapists will remember their distant behavioral histories and at least adopt some valuable measurement practices from the first wave such as collecting observational data on the behavior of therapists in their natural environments. Some are indeed doing just this (e.g., Parga et al., 2017).

Psychotherapy has been at sea for more than 50 years. There is a lifeboat available and it is radical behaviorism. One wave is enough!

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