



From direct contingencies to derived relations: the ever-developing nature of theory and practice in behavior analysis

Correspondence to:

Dr. Krystyna Pomorska
Institute of Psychology
University of Lodz
al. Rodziny Scheiblerów 2
90-128 Łódź, Poland
e-mail: krystyna.pomorska@now.uni.lodz.pl

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Krystyna Pomorska¹, Paweł Ostaszewski²

¹Institute of Psychology, University of Lodz, Poland

²Institute of Psychology, SWPS University, Warsaw, Poland

Abstract

Purpose: To illustrate the processes of development within the behavioral theory and the corresponding expansion of the areas in which it is applied, especially the advancement (conceptual developments) of the functional analysis of language inspired by Relational Frame Theory (RFT) research.

Views: Classical and operant conditioning are well-established behavioral learning processes, discovered and described at the beginning of the twentieth century. They provide the tools for analyzing, establishing and modifying the functions of stimuli and responses of the organisms through manipulation of the environment. Although B. F. Skinner provided grounds for the functional analysis of complex behaviors such as language, it was not until the beginning of the twenty-first century that RFT was introduced. From this moment behavior analysts could use behavioral principles to explain how stimulus functions may change without direct learning. The practical application of the growing knowledge about Arbitrarily Applicable Relational Responding (AARR), a basic generalized operant described within RFT, allows us to analyze, explain and change behaviors that had hitherto been beyond the scope of behavioral therapy. The continued growth and development of behavior theory and practice holds the promise for an expansion of its application to new areas and populations in need. One such development is the functional analysis of verbal behavior e.g., relational frames, ROE (relating-orienting-evoking).

Conclusions: It seems useful to add advancements proposed by RFT to the behavioral toolbox with which we could effectively describe, explain and change behavior with precision, scope and depth.

Key words: behavior therapy, applied behavior analysis, relational frame theory, functional analysis of language.

WHAT MAKES AN INTERVENTION “BEHAVIORAL” FROM THE PERSPECTIVE OF THE FUNCTIONAL APPROACH?

Behaviorism is often associated with a unified system that dominated psychology in the 1950s before being overshadowed by cognitivism. However, this association is far from the truth as behaviorism, as a school of thought and field of psychology, incorporates many forms and sometimes conflicting views and has been developing continuously since its origins in 1913 [1-3].

In this article, we will present the main behavioral processes used in modern behavioral therapies, mostly from the perspective of the functional approach (also called functional psychology or functional contextualism, see: [4]). These processes have a central position in beha-

vioural science and practice, as they provide tools for analyzing behavior with precision, scope, and depth [5].

The term ‘behavior therapy’ describes a variety of interventions and practices rooted in behavioral science. The applications of behavioral principles and processes differ depending on the type of problem being addressed, the population treated, and the chosen model. In other words, there are many behavioral therapies [6]. Patients searching for the effective treatment of various symptoms, e.g., those related to anxiety, behavioral addictions, neurodevelopmental disorders, and interpersonal and intrapersonal problems, may not differentiate between the treatments within the behavioral tradition. For example, many different therapeutic models, based on applied behavior analysis, are dedicated to treating challenges and problems faced by individuals with neurodevelopmental disorders: PRT (pivotal response treatment [7]),

ESDM (Early Start Denver Model [8]), VB approach (verbal behavior [9]), and NDBI (Naturalistic Developmental Behavioral Interventions [10]), to name a few. It is worth noting that there is a growing debate within the field of behavior analysis about the ways in which interventions dedicated to individuals with ASD should be implemented [11, 12]. Such debates help to increase practitioners' awareness of the ethical standards for using behavioral techniques with vulnerable populations and the potential consequences for patients if the treatment is not implemented accurately. The perspectives, which often include critique, of individuals who have experienced such treatments themselves are invaluable source of information that can prevent the traumatization or re-traumatization of patients and should be constantly reflected upon.

The "third wave" behavioral therapies that target a broad array of problems related to human suffering also vary: there are ACT (acceptance and commitment therapy [13]), DBT (dialectical behavior therapy [14]), FAP (functional analytic therapy [15]), the recently proposed IBT (interpersonal behavior therapy [16]) and process-based therapies (PBT [17, 18]).

Despite the differences, certain qualities of treatment allow these to be identified as "behavioral". Several assumptions guiding interventions within modern functional behavioral approaches can be listed:

- organisms behave (all actions/responses are behaviors),
- there are overt (observed from the outside) and covert (private) behaviors,
- behaviors can be organized in classes and patterns (operants),
- every behavior has a function, including the behaviors of patients (e.g., symptoms of disorders) and clinicians (e.g., application of a treatment); the function of behavior can be described as a mechanism through which behavior works,
- all behaviors are influenced by context (direct and historical).

Historically, it was assumed that there was a continuity of behavioral processes operating in both people and animals [19-21]. However, this view is now challenged [22]. Although all organisms learn through classical and operant conditioning, human behaviors (overt and covert) operate based on more complex processes than those of animals. An example of this is verbal behavior as defined by relational frame theory (RFT), such as arbitrarily applicable relational responding (AARR [2, 23]), which will be described later in this article.

Contemporary behavioral interventions not only target overt behaviors, but many also aim at changing covert behaviors – responses that are only accessible to the patient (thoughts, bodily sensations, emotions [24, 25]).

Depending on the clinical problems faced by clinicians, various processes guide behavioral interventions. The most widely used are classical (also called respon-

dent) and operant conditioning, as described in the following sections. Distinguishing between respondent and operant conditioning can be useful on many occasions. However, we would like to stress that learning often takes place under the influence of both.

Although we will try to reflect on how behavioral principles guide contemporary behavioral clinical practice, a presentation of all the behavioral techniques and behavioral therapies is beyond the scope of this article.

CLASSICAL CONDITIONING

Classical conditioning refers to the type of learning first described by I.P. Pavlov (e.g., see: [26]) in which a neutral stimulus (from a certain innate reflex perspective), when exposed before an unconditioned stimulus (a stimulus that elicits an innate unconditioned response), begins to elicit the same response. Once this relationship is established, the stimulus is no longer neutral. It becomes a conditioned stimulus and the response it evokes is called a conditioned response. This effect of learning can be modified: if the unconditioned stimulus is exposed after the conditioned stimulus is removed, the response gradually diminishes until it is no longer detected. This process is called extinction. However, it should be mentioned that, after a period during which the conditioned stimulus is no longer exposed to the organism, it can trigger the conditioned response again when represented in the environment. This process is called spontaneous recovery. It should be noted that classical conditioning works by adding an additional function to a given stimulus. The stimulus, such as the sound of a bell, which naturally evokes a response in the auditory system, can begin to induce salivation after being presented several times before eating (as in the well-known Pavlovian procedure). It is important to note that classical conditioning and its clinical applications are concerned with the functions of the stimuli. For example, in systematic desensitization [27], which is often used to treat phobias, the individual is gradually exposed to the feared stimuli while practicing relaxation techniques. This exposure begins with less anxiety-provoking stimuli and gradually progresses to those which are more anxiety-provoking. Through this repeated exposure the anxiety-provoking (i.e., avoidant) functions of the stimuli are altered (i.e., extinguished) and the fear response to the stimuli is replaced by relaxation. This behavioral process is called counterconditioning. Another example of counterconditioning is appetitive counterconditioning, which aims to change the aversive (avoidant) functions into pleasant (approaching) ones. This method has been effectively used in decreasing the behavioral distress of children undergoing invasive medical procedures, by pairing it with preferred activities [28].

OPERANT CONDITIONING

Operant conditioning, as originally described by Skinner [19, 20], is a learning process in which the consequences of an organism's behavior regulate the future occurrence of that behavior. The function of a behavior is to evoke consequences in the environment, but the consequences also have functional properties for the behavior. They make the future occurrence of the behavior either more or less likely. Consequences that make the behavior more likely are called reinforcement, and consequences that make the behavior less likely are called punishment or extinction (in the case of the discontinuation of the reinforcing consequences that maintained the behavior [29]). The behavior of the organism always takes place in an environment in which specific stimuli can be detected (in fact, the stimuli detected can also come from inside of the body). The stimuli, which occur before or during the behavior of interest, gradually acquire a controlling function over the behavior. The most important controlling function of stimuli on behavior is the discriminative one. A stimulus is discriminative if the behavior to which it relates is more likely to be performed when the stimulus is detected by an organism. This does not mean, however, that the stimulus will automatically evoke the behavior. One of the necessary conditions for the response to occur when a discriminative stimulus is detected is the presence of motivating operations [30]; for example, deprivation of attention in social settings may increase its motivational properties. The triad of events described above – stimulus, behavior and consequence – is often simplistically referred to as the ABC contingency (i.e. antecedent, behavior and consequence), an applied behavior analytic and typical unit of analysis (to understand and change behavior one always has to see it in the context of antecedents and consequences).

The process of operant conditioning can be used in a variety of ways in clinical practice. One way of dividing procedures rooted in operant conditioning is by altering the context before the behavior or after its occurrence. Context can be altered through the use of consequences, i.e., reactive strategies, which involve the application of planned consequences, such as reinforcement after the socially desirable behaviors targeted in the intervention. An example of this is contingency management, which involves providing consequences (reinforcing, punishing, or withholding reinforcement) that are contingent on patients' behavior, such as abstinence from drug use [31].

Another way to alter the context in therapeutic settings is to manipulate the antecedents' variables related to the targeted behavior, i.e., proactive strategies. Examples of antecedent-based strategies include modifying the task demands, modifying the physical environment (e.g., reducing the number of stimuli to prevent distraction),

teaching replacement behavior (e.g., communication and social skills), providing choices or access to reinforcement prior to the behavior (non-contingent reinforcement) [29].

To change any behavior by means of behavioral techniques it is crucial to know its function and related contextual variables. Clinicians in the field of behavior analysis identify behavioral functions by conducting functional assessment, i.e., systematically searching for reinforcing consequences associated with the response and related contextual variables: stimulus discrimination (abbreviated as SD) and motivational variables. There are several tools for conducting functional assessment, such as structured interviews, questionnaires, checklists, direct observation, and experimental functional analysis (direct manipulation of the elements of the context that are expected to control the behavior of interest). Functional assessment has been successfully applied in guiding interventions aimed at treating problems related to self-injurious behavior, aggression, property destruction and feeding and eating disorders, to name a few [32]. Preceding interventions with functional assessment helps practitioners conform to ethical standards [33]. For instance, some problematic behaviors of patients may serve communicative functions, and it is not ethically justified to decrease communication with punishment-based procedures. What behavioral specialists do instead is to replace them with socially appropriate behaviors that are developmentally available to patients.

One of the specific type of behaviors that is interesting to behavior analysts because of its social importance is imitation, defined as acquiring or modifying existing behaviors by observing the actions of others [29]. It is considered generalized operant behavior, which means that the variety of topographies of behavior (e.g., examples of imitations) are shaped and maintained by the history of their consequences. Generalized operant behavior is characterized by the fact that it is not always directly reinforced, but rather is maintained through a history of reinforcement in similar or related contexts. For instance, when someone observes another person's behavior being reinforced, they are more likely to engage in that behavior in the future, because in the past doing so provided reinforcement to themselves. Not every behavior serves as a model for imitation. One of the key factors that influence imitation is the extent to which the observed behavior is perceived as relevant or meaningful for the observer.

Imitation is applied in clinical settings in the form of video or in vivo modeling (e.g. [34], [35]).

LANGUAGE AS OPERANT BEHAVIOR

There is no doubt that language plays an important role in all psychological interventions in many ways. It is

both an instrument and a target of intervention. There are many theories of language, mostly derived from the cognitive tradition. In the following section, we will outline how behavior analysis defines language, and how such definitions could be used in clinical practice.

Language, like any other behavior, may be analyzed topographically and functionally. The topography or form of language is composed of descriptive terms (phonemes, words, sentences, or grammar), while the functional analysis of language focuses on the context and consequences of the behavior for both the speaker and the listener [23]. The first behaviorist attempt to conceptualize language was conducted by Skinner [36]. He described language as generalized operant behavior (i.e., shaped and maintained by its history of consequences, see: [29]).

SKINNER’S VERBAL BEHAVIOR (VERBAL OPERANTS)

Skinner [36] viewed language as learned behavior. He described the verbal operants that serve as the basic analytic units of language within ABA (applied behavior analysis) and related intervention programs [29]. Examples of four elementary verbal operants are described in table 1. The example shows how one topography (saying the word ‘cookie’) can have multiple functions depending on the contextual variables (discriminative stimuli, motivational variables and consequences provided by the listener).

The functional analysis of language proposed by Skinner was often misunderstood and criticized. For example, Noam Chomsky’s famous critique of Skinner’s Verbal Behavior [37] stated that the theory explained language acquisition too simply as the repeated reinforcement of certain linguistic behaviors. Chomsky argued that humans have innate linguistic abilities, and that these abilities allow us to acquire language. Chomsky also argued that Skinner’s theory did not take into account the gene-

rative and creative nature of language use. He pointed out that because humans can use language in novel and creative ways that go beyond simple stimulus-response associations, they must have innate linguistic rules that allow them to generate an infinite number of sentences. It should be admitted that the accusation of Skinner’s theory’s poor handling of the generativity of language was partially justified.

Despite Chomsky’s critique and its wide reverberation, Skinner’s verbal behavior analysis had a significant impact on developing remedial programs for populations with developmental disabilities, and it is still successfully used in teaching language to individuals with autism [38] and in second language acquisition [39].

Since the 1960s, cognitive psychology has been perceived as dominant in language research. Many researchers and practitioners are unaware of what modern functional behavior analysis has to offer in terms of understanding complex behavior like language and thinking [40]. In the next section, we will introduce a functional analysis of language and thinking that goes beyond direct contingencies.

RFT’S ACCOUNT OF VERBAL BEHAVIOR (ARBITRARY APPLICABLE RELATIONAL RESPONDING)

The first functional analytic explanation of symbolic relations that allowed some aspects of the generativity of language to be captured within behavioral analysis was proposed by Murray Sidman. In his experiments, Sidman trained an individual with an intellectual disability to match spoken words to pictures and printed words. As a result, the individual was able to match printed words to pictures and vice versa without direct training and reinforcement. Sidman claimed that stimuli can become equivalent (acquire the same functions) without direct reinforcement and called the phenomenon stimulus

Table 1. Verbal operants (with controlling variables) based on Skinner’s analysis of verbal behavior

A (example of antecedent and motivating variables)	B (example of topography of behavior)	C (example of maintaining consequences)	Name of the verbal operant
SD: Wanting cookies (in the presence of another person)	Child says “cookie”	Receiving cookie (tangible reinforcement)	Mand (derived from <i>demand</i>) – requesting
SD: Seeing a cookie (e.g. wanting to show it to another person)		Someone’s reaction “yes, that’s a cookie” (social reinforcement)	Tact (derived from <i>contact</i>) – labeling
SD: Someone’s question: “What does a Cookie Monster like to eat?”		“Yes, you’re right” (social reinforcement)	Intraverbal (derived from a combination of <i>intra</i> and <i>verbal</i>) – responding to someone’s verbal behavior (e.g. question, comment)
SD: “Say cookie” (e.g. in speech therapy)		“Well done!” (social reinforcement)	Echoic (derived from <i>echo</i>) – vocal imitation

equivalence [41]. This phenomenon inspired a line of research on complex verbal relations including language acquisition, reading and mathematics [29].

Stimulus equivalence itself turned out to be limited in its ability to capture the complexity of relating behavior. What distinguished RFT from Sidman’s analysis was the claim that humans can relate stimuli in multiple ways (e.g. in terms of relations of distinction, opposition, or comparison, or deictically, from the perspective of the I) [23]; by doing so the functions of the stimuli are being modified (the so-called transformation of stimulus function) in a way that goes beyond their relational properties [22].

RELATIONAL FRAME AS A BASIC UNIT OF ANALYSIS

RFT proposes that relating or relational framing can be considered a class of generalized operant behavior as it involves deriving new functions from previously learned relations and can be applied to a wide range of stimuli and contexts [23]. This specific class of generalized operant behavior is called Arbitrarily Applicable Relational Responding (AARR). One example of how AARR are established could be teaching a young child to respond to the questions “where is the cat?” and “where is Rex?” by pointing to the same animal, following instances of the child’s carers labeling their family pet as “cat” and “Rex” on various occasions. In early language training children learn (through imitation and direct reinforcement) to coordinate names (as strings of sounds) to their referents (either real objects or pictures). Over time, through repeated examples involving different stimuli and situations, the operant class (relational frame) of coordinating stimuli is established. As a result, the necessity of direct reinforcement for every single component of naming is no longer needed when the child is faced with new stimuli. Contextual cues acquire discriminative functions for particular instances of relating, and phrases like “this is”, “this is not”, “better than”, or “later” would be

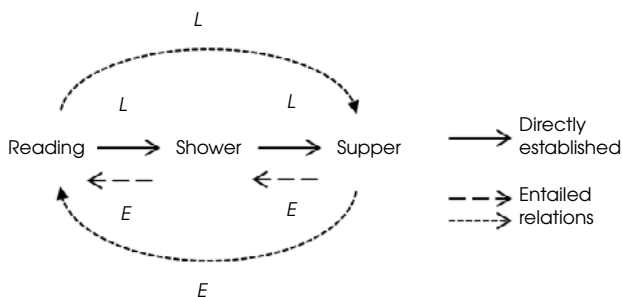
established across exemplars to derive relations of coordination, distinction, comparison and temporal respectively. Once the function of a contextual cue is established in the behavioral repertoire of a young child, the number of stimuli that they may relate (relationally frame) in each class becomes almost infinite [22]. The example of a temporal relational frame presented in Figure I illustrates how, based on the information provided about the order of three events – reading, a shower and supper – one can derive additional pieces of information, e.g. what is the earliest and latest of all three. Data suggest that such relational skills develop in typically and atypically developing children in non-uniform ways [42].

RFT brings in possibilities and functional analytic tools that allow therapists to go beyond both direct-acting contingencies and equivalence relations to better predict and influence a patient’s behavior. For example, if a patient arbitrarily derives that A is greater (more important or better) than B, and B will be established as a conditioned reinforcer, A will have a higher motivational value (i.e., the patient may work harder to achieve it) [43].

There are two broad classes of contextual cues involved in any instance of relational framing. One type of cue influences how stimuli are related to one another (e.g., “less than” – comparison, “this tastes like” – coordination), while the second type of cue affects the behavioral functions of the stimuli that occur during the relational process; these two types of cues are called Crel and Cfunc, respectively.

A specific and important area of RFT research considers the development of the concept of self. According to RFT, the concept of self is formed by three deictic relations: I-You for interpersonal relations, Here-There for spatial relations and Now-Then for temporal relations. The main idea is that as children learn to respond to these relational cues they are essentially learning how to connect themselves to others within specific temporal and spatial contexts [44].

Relational frames were found to be insufficient when it came to predicting and influencing the increasingly complex AARRing that is observed in normal language development. In response, RFT researchers recently proposed a multidimensional, multilevel (MDML) framework as a tool for the more precise analysis of AARRing. According to the framework, AARRing develops from mutual entailment, to simple relational frames, to more complex networking involved in rules and instructions, to the relating of the relations involved in analogical reasoning, and finally to relating relational networks, which is typically involved in advanced problem solving [22]. The framework views each of these levels as consisting of various properties: coherence, complexity, derivation, and flexibility. These properties of relating are technical terms allowing for the identification of the strength of a relational pattern. *Coherence* is the degree to which certain AARRing patterns are, overall,



E – earlier, L – later

Figure I. Example of a rational (temporal) frame and its entailment (relational properties)

consistent with other patterns, e.g., stating that an elephant is smaller than a mouse is inconsistent (incoherent) with the relational network of most people. *Complexity* refers to how much information is packed into the relational pattern (its density). Many details involved in an instance of a particular relational responding indicate high complexity, e.g., when an individual is providing numerous examples of feeling inadequate in various contexts. *Derivation* refers to how well-practiced a particular instance of AARRing has become. Initially, when a particular AARRing pattern is derived for the first time, it is considered highly derived (newly formed), e.g., when a child learns simple mathematics, adding two numbers is highly derived. As the pattern is repeated and practiced, the level of derivation decreases. *Flexibility* is the degree to which a specific instance of AARRing can be modified on the basis of current contextual variables. The easier one can change AARRing, the more flexible is the repertoire; e.g., when a person says “hot” as an answer to the question “what is the temperature of an ice cream?” when instructed to state the opposite of the right answer. The MDML framework specifies the levels and dimensions of AARRing, allowing the precise analysis and assessment of verbal behavior.

As was previously mentioned, RFT defines AARRing in terms of both entailing (on different levels and with different dimensions) as well as function-transformation. Combining the MDML framework with another recent development that comes from RFT research, the DAARRE (differential arbitrarily applicable relational responding) model, allowed the creation of a new conceptual unit of analysis that facilitates the even more precise functional analysis of AARRing.

The DAARRE model proposes two Cfunc properties of the stimuli: orienting and evoking. *Orienting* (attending to, noticing) allows certain events or elements of the environment to become a stimulus. In order to respond to certain event, it needs to be noticed. *Evoking* refers to functional properties of the stimuli: appetitive (approach behavior), neutral (notice i.e., orient without approach, or avoidant behavior), or aversive (avoidant/escape behavior). Both properties of a stimulus seem to play a role in responses produced in basic experimental research: dangerous or threatening stimuli may possess relatively strong orienting and aversive evoking functions, while other non-threatening, pleasant stimuli may have relatively lower orienting functions over approach functions (see: [17] for a review).

The most recent conceptual development within RFT that comes from laboratory research is integrating the MDML framework with the DAARRE model and proposing Relating, Orienting, and Evoking (ROEing) as a conceptual unit of analysis [17], just like the previously mentioned ABC unit of analysis in applied behavior analysis. ROE as a unit of analysis summarizes psychological events of verbally able humans as involving a constant

behavioral stream of relating (R), orienting (O), and evoking (E) illustrated in Figure II.

Relating refers to the complex ways in which stimuli or events may be related verbally, orienting refers to attending toward specific stimuli or events, and evoking refers to whether stimuli that a person is orienting towards is relatively appetitive, aversive or neutral. The authors of the model summarize the operations and utility of ROE in psychological research and practice in the following way:

“Elements of the ROE are not seen as interacting in a linear or unidirectional manner but are dynamical. Thus, for example, an orienting response may produce relating, which then leads to an evoked response” ([17], p. 615).

“The concept of the ROE is thus designed to provide a general conceptual unit of analysis, based on RFT, that aims to capture the distinct way in which most humans navigate their psychological worlds. As such, the ROE is based on the RFT view that human “knowing,” as a behavior, is only made possible through the evolution of human language and our learning of a specific language through our ongoing interactions with the verbal communities in which we reside from birth through to death” ([17], p. 616).

RFT’s account of verbal behavior was considered controversial for decades, even within the behavior analytic community ([43]; [17]). However, the growing body of evidence from laboratory and clinical trials (see [45] for a review) shows its utility and effectiveness in establishing new relations, conducting detailed assessments of language abilities, and changing the existing patterns of AARRing [46].

WHAT RFT BRINGS TO TRADITIONAL BEHAVIORAL THERAPIES

Knowing behavioral processes and the mechanisms through which they operate allows practitioners to apply and modify techniques to meet the varying needs of their clients.

For decades behavioral therapy was associated with contingency management or antecedent-based interventions dedicated mainly to individuals with disorders of intellectual development, developmental disabilities

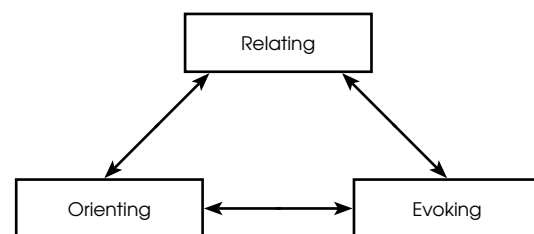


Figure II. Conceptual model of ROE as a unit of analysis of AARR

(e.g., autism spectrum disorder) or facing anxiety- or fear-related disorders (e.g. the use of systematic desensitization). Thanks to the discoveries of RFT, behavior analysts can expand their language-based clinical interventions to target complex skills that were previously unavailable to functional analysis, e.g., perspective taking [47], rule following [48] or problem solving [49]. AARR is thus an additional process rooted in operant conditioning, providing tools like ROE for analyzing and changing problematic patterns of verbal behavior, as presented in Figure III.

RFT proposes that individuals not only learn through direct contingencies or classical conditioning but also through AARR. Verbally able humans can relate anything to just about anything else. Once AARR operates, stimulus functions may change in a moment: reinforcing functions may change to punishing functions and vice versa, or previously neutral stimuli can acquire discriminative properties (functions) with no direct training [25].

We wanted to stress that it is not our intention to suggest that RFT replaced Skinner’s functional analysis of verbal operants. What we suggest instead is that they are separate types of analysis rooted in the same learning process (operant conditioning), allowing for different types of explanations and interventions to problems related to human language. Despite their differences, the two approaches can be mutually supportive (e.g., using multiple exemplar training in establishing derived mands, see: [50]), just like any other processes and techniques within the behavioral sciences (e.g., combining reinforcement strategies and video-modeling, [51]).

Modern behavioral science proposes a variety of interventions based on well-established behavioral principles and often incorporated in multidisciplinary approaches, e.g., behavioral interventions within CBT (cognitive be-

havioral therapy). AARR is no exception and although cognitive and behavioral psychology operate on different yet related levels of explanation, there is a possibility for mutually beneficial interactions between the two approaches, for example under the functional framework [40, 52, 53].

CONCLUSIONS

A growing body of evidence now supports applications of behavioral therapies in various populations and problems. Behavioral processes (i.e., principles and mechanisms of shaping and changing behavior in the given context in a predictable way) guide the functional analysis of problem behaviors that clinicians target in their interventions. The more complex the behavior, the more difficult it is to analyze it in purely functional-analytical terms. There are various units of functional analysis available within the behavior analysis tradition that practitioners can select from: ABC (Antecedent-Behavior-Consequence), Skinner’s verbal operants (mands, tacts etc), or relational framing and ROE.

Contemporary psychotherapeutic schools shift from topographical interventions (so called manualized treatments or protocol-based interventions) to process-based interventions (e.g., functional analytic treatments) [18]. Introducing AARR and its functional analytic tools allows behavioral practitioners to conduct a functional analysis of complex behaviors like language and thinking and influence them with more precision. Unlike Skinner’s framework, RFT emphasizes the role of relating in generative and complex human behavior. Verbal functional analysis as proposed by RFT is based on the analysis of relational patterns and their functions (also referred to as meaning in mainstream psychology).

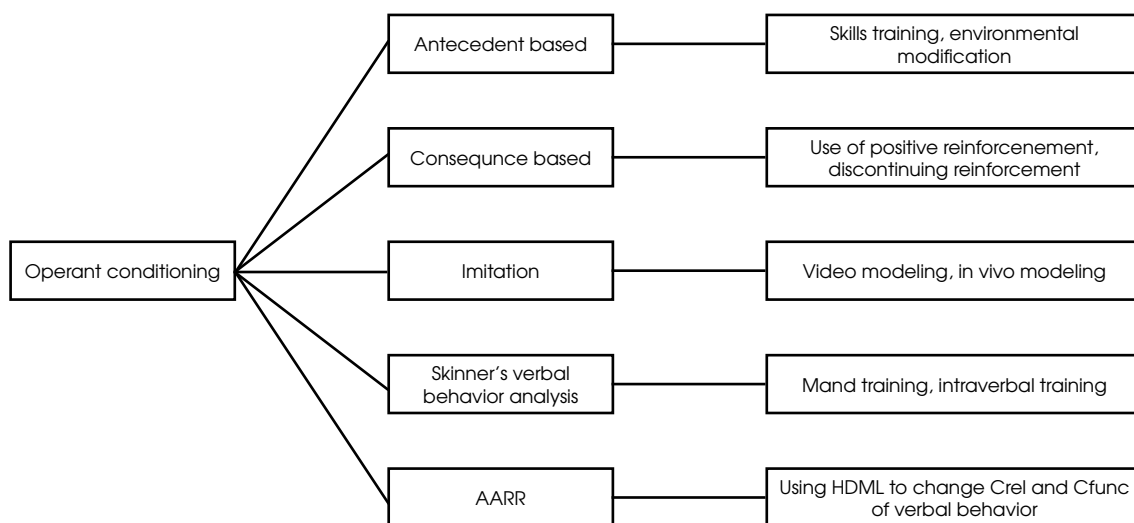


Figure III. Examples of behavioral procedures and principles derived from operant conditioning

One example of a clinical application of AARR, based on its most recent conceptual development (ROE), is called Process-based Behavior Therapy (PBBT[®]). This type of psychotherapy is based on the behavioral processes defined by relational frame theory and, even though the data supporting its application come mostly from basic research, it appears very promising in targeting language and related behaviors with precision, scope and depth [22, 54]. Time will tell whether applied research will provide further evidence of its effectiveness in treating human suffering.

It is heartening to note that researchers have already demonstrated the potential for future applied and clinical studies [55] and the usefulness of the application of behavioral analysis based on relating [45]. Considering the promising results of existing research, we strongly encourage practitioners, especially behavioral therapists and behavior analysts, to add AARR and its tools to their toolbox of therapeutic interventions, as suggested in recent publications [52, 53].

Conflict of interest

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