

# Belief Modification in Cognitive Therapy

## Modificación de las Creencias Disfuncionales en la Terapia Cognitiva

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**Abstract.** One of the central assumptions of cognitive therapy is that psychological disorders are caused, at least in part, by dysfunctional beliefs. One of the goals of therapy is therefore to modify these beliefs or to replace them by more adaptive ones. Among other treatments, this cognitive strategy has proved clinically successful in a number of cases. The efficacy of belief modification in cognitive therapy raises a number of theoretical and conceptual issues for behavior analysis. I discuss some of the attending difficulties and suggest a possible way out.

*Keywords:* belief, cognitive therapy, environment, molar, operant, philosophy.

**Resumen.** Uno de los supuestos en que se basa la terapia cognitiva es que los trastornos psicológicos son provocados, por lo menos en parte, por creencias disfuncionales. Por lo tanto, uno de los objetivos de la terapia es modificar estas creencias o sustituirlas por otras, más adaptativas. Entre otros tratamientos, esta estrategia cognitiva se ha mostrado efectiva en numerosos casos. La eficacia de la modificación de las creencias plantea varias cuestiones teóricas y conceptuales para el análisis de las conductas. En este artículo se abordan algunas de las dificultades que presenta y se avanzan algunas posibles soluciones.

*Palabras clave:* entorno, operante, filosofía, molar, terapia cognitiva.

Cognitive-behavioral therapy includes a variety of approaches, theories, and treatments. Some of them have been conceived as a relatively direct application of Pavlovian and operant techniques, whereas other stem from cognitive approaches to psychological functioning (Butler, Chapman, Forman, & Beck, 2006). Still others attempt to integrate cognitive and behavioral perspectives under the label of a new, third wave of therapy (Hayes, 2004). Certainly cognitive approaches to clinical psychology seem different, at least on surface, from behavioral orientations that focus on the use of operant reinforcement principles (Brewin, 1988). Regardless of the eventual success of competing clinical approaches, the issue arises of the relation between cognitive treatments and behavioral ones. Do they involve different processes of clinical

change (and if so, which ones?), or do they rely on common principles?

In this commentary I raise a number of theoretical questions with respect to the behavioral analysis of belief modification in cognitive therapy. (My perspective is not that of a practicing clinician but that of a behavior analyst interested in philosophical issues.) In particular, I address the possible role of operant reinforcement in the clinical changes that are brought about during cognitive therapy (e.g., Beck, Rush, Shaw, & Emery, 1979). Can the operant approach deal with belief modification during cognitive therapy? What kind of behavioral concepts, if any, are most adequate to deal with the clinical changes that result from therapeutic techniques such as cognitive questioning or logical challenges to a patient's beliefs (Beck, 1995)?

I will argue that a strictly behavioral analysis of cognitive modification is unlikely to succeed as long

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as this analysis is formulated in operant terms. To a large extent, the failure of operant concepts with respect to belief modification in cognitive therapy reflects similar limitations with respect to behavior analysis as a whole (Kantor, 1970). The concept of reinforcement, while legitimate when dealing with a restricted set of behavioral phenomena, fails to apply to others and therefore cannot fulfill a basic, integrative role in behavior theory (Malone, 1978). By criticizing overextensions of the notion of reinforcement, however, I do not wish to imply that operant concepts have no use in therapy or that clinical psychologists should stop examining the consequences of their patient's symptoms. The in-session reinforcement linked to natural social dynamics can certainly be put to good use in promoting the therapeutic process (see Valero, Ferro, Kohlenberg, & Tsai, this issue). Nevertheless, not all of the clinical interactions that lead to significant clinical change involve reinforcement. Those that promote therapeutic change through non-operant means raise special difficulties for behavior analysis. I do not claim to resolve any of them, but theoretical difficulties are better examined than ignored, and they can be informative with respect to future developments.

### **Efficacy of Cognitive Therapy**

The very distinction between behavioral and cognitive forms of therapy may be challenged on pragmatic grounds. Therapies that are commonly classified as cognitive, such as Beck's (1991, 1993) or Ellis' (1969, 1991), have always involved explicitly behavioral components (e.g., Ellis, 1980, p. 336). Conversely, a treatment known otherwise as behavioral may include components that are arguably cognitive. In Dimidjian et al.'s (2006) version of behavioral activation, for example, "patients are encouraged to notice when they are ruminating and to move their attention away from the content of ruminative thoughts" (p. 668).

The distinction between the behavioral and cognitive components of cognitive behavior therapy can be further challenged on theoretical grounds. The cognitive therapists that use behavioral components as part of a cognitive treatment package often

assume that the behavioral procedures are effective because they modify cognitive processes (e.g., Clark, 2005). Conversely, some behavior analysts assume that cognitive treatments achieve their effects through behavioral processes such as reinforcement or extinction. Finally, one may even reject any conceivable distinction between cognition and behavior, arguing that the difference is not one of nature but merely of accessibility to third parties (e.g., Wilson, Hayes, & Gifford, 1997), so that cognition is just behavior of a private or covert kind.

The distinction I will make in this commentary concerns cognitive and behavioral *procedures* and is purely conventional. Some therapeutic procedures are commonly described as "behavioral," whereas others are commonly described as "cognitive" (e.g., Chambless & Ollendick, 2001). Exposure with response prevention might be a typical example of the former, and Socratic questioning a typical example of the latter. The distinction, then, is made for convenience and should not be taken to imply that "cognitive" and "behavioral" techniques necessary involve different operative principles. (In fact I will argue that the processes responsible for the success of cognitive treatment strategies are behavioral, although non operant.)

Evaluating the clinical benefits of any therapeutic strategy, cognitive or otherwise, is fraught with difficulties. The efficacy of a treatment package determined through randomized controlled trials, for example, may differ from the effectiveness of this treatment in the clinical population at large (Seligman, 1995). Focusing on dichotomous decisions (is a treatment empirically validated or not?) or win-lose comparisons among treatment packages may also mask the theoretical complexity of therapy evaluation (Westen & Bradley, 2005). Controlled comparisons among treatments administered to different groups of patients, for example, may lead to an overemphasis on statistical significance over clinical significance (Jacobson, Roberts, Berns, & McGlinchey, 1999).

With these qualifications in mind, cognitive behavioral treatments have documented their efficacy in addressing a wide range of disorders or problems (e.g., Butler et al., 2006; DeRubeis & Crits-Christoph, 1998). In the case of depression, for

example, cognitive behavior therapy produces enduring effects over those of psychoactive medication (Hollon, Stewart, & Strunk, 2006).

Establishing the efficacy of the more specifically cognitive components of a cognitive-behavioral treatment package has often proved more difficult, however. The very fact that most cognitive behavioral treatments involve components of both kinds (Beck, Rush, Shaw, & Emery, 1979) implies that ordinary clinical practice cannot disentangle their differential effects (if any). The few studies aimed at separating the effects of cognitive components from behavioral ones have not proved any notable advantage of the former. Thus, in a well-known component analysis of therapy for depression (Jacobson et al., 1996), a full treatment package that included both behavioral activation and cognitive modification of the patients' core beliefs (e.g., Beck, 2005) did not perform any better than behavioral activation alone.

Negative results like those of Jacobson et al. (1996) have lead some clinicians to question whether adding cognitive components to behavioral ones is ever necessary in therapy (Clark, 2005; Longmore & Worrell, 2007). That the addition of cognitive components to behavioral ones may prove superfluous, however, does not imply that cognitive strategies have no efficacy in and of themselves. In Jacobson et al.'s study, their efficacy may have been preempted by the previous implementation of behavioral components. As Longmore and Worrell (2007) suggest, "psychological states comprise interacting cognitive, affective, behavioral and physiological elements. Any treatment which effectively targets one of these systems may lead to a change in all of them" (p. 184).

More importantly, a number of studies have documented the clinical efficacy of cognitive techniques in the absence of behavioral components. Consider, for example, cognitive therapy for delusions, a therapeutic strategy which relies mainly on Socratic questioning and the empirical testing of delusional beliefs (Turkington & Siddle, 1998). Cognitive questioning has been shown to reduce belief conviction (Chadwick, Lowe, Horne, & Higson, 1994), strength of delusion and distress (Chadwick & Birchwood, 1994), and compliance with hallucinatory commands (Trower et al., 2004)

in patients diagnosed with symptoms of schizophrenia. In each case, cognitive treatment of delusion was implemented with concurrent medication but without accompanying behavioral procedures (such as reinforcement for non-compliance). By contrast with the mixed cognitive and behavioral components in the treatment of depression (Jacobson et al., 1996), the positive results on delusions strongly suggest that cognitive procedures have a clinical efficacy of their own.

The processes responsible for the efficacy of cognitive procedures may differ entirely from those trained through strictly behavioral treatments. Alternatively, both sets of processes may coincide or even fully overlap. The common-factor school of psychotherapy (e.g., Wampold, 2007) emphasizes the latter possibility, with the efficacy of all treatments (cognitive or otherwise) attributed to shared basic processes theorized in terms of therapeutic alliance, catharsis, the acquisition of new behaviors, or positive expectancies (Grencavage & Norcross, 1990). In favor of their approach, proponents of the common-factor interpretation of therapeutic success often point out that demonstrating the superiority of a psychological treatment over another has proved difficult (Wampold et al., 1997).

The hypothesis that all *bona fide* psychotherapies are empirically equivalent has been debated, however (Crits-Christoph, 1997), especially with regard to the fit between particular disorders and particular treatments (Chambless, 2002), as opposed to a meta-analytic evaluation averaged across all outcomes. For the present argument, the demonstration that cognitive procedures are efficacious with respect to at least some disorders (e.g., Trower et al., 2004) is enough to proceed. The extent of the overlap between the processes engaged through behavioral and cognitive procedures should be a matter of further discussion; there is no theory-free resolution of this issue, since it depends on theoretical choices about the nature of therapeutic change.

### **Belief Modification: Practice and Theory**

The cognitive components of a successful therapeutic package vary across situations and from clini-

cian to clinician. Beck (1995) provides both a set of guidelines for the implementation of cognitive therapy and an overview of the theoretical concepts through which the results and procedures are to be interpreted. Cognitive therapy typically assumes complex causal relations among a variety of mental, emotional, physiological, and behavioral components (e.g., Alford & Beck, 1997). Within the cognitive domain, Beck (1995, p. 16) distinguishes core beliefs, intermediate beliefs, and automatic thoughts. Core beliefs are the most abstract, pervasive ones and are acquired during early development and education. They organize a person's cognitive life at its most central level. Intermediate beliefs consist of mid-level rules, attitudes, and assumptions that guide perception and a person's interpretation of the current situation. Automatic thoughts are situation-specific and result in current behavioral, emotional, and physiological reactions (pp. 15-22).

In the case of a depressed patient, for example, automatic thoughts often trigger negative mood changes. The therapist trained to detect these changes can probe them in session, at the very moment they occur, so as to uncover the underlying cognition. Patients can also be encouraged to monitor their own automatic thoughts outside of the clinical session (Beck, 1995, pp. 125-136). From then on, therapy moves progressively from the most superficial or accessible cognitions (automatic thoughts) to the more central or deeper ones (core beliefs). The "downward arrow technique," for example, starts from an automatic thought in order to identify its underlying meaning and eventually uncover a more abstract belief (p. 145).

Having identified a dysfunctional belief, "the therapist mentally devises a new, more realistic and functional belief and guides the patient toward it" (Beck, 1995, p. 175). Intermediate as well as core beliefs are modified through techniques such as Socratic questioning, examining pros and cons, rational-emotional role playing, and behavioral experiments designed to test whether a belief is actually valid or not. Cognitive disputing can take on a variety of styles, especially in rational-emotive therapy (DiGiuseppe, 1991). Aside from rational arguments, the therapist may attempt to modify beliefs through metaphor or humor. In all cases, the

therapeutic aim is to uncover incongruities in the patient's current belief system and thereby to replace dysfunctional cognitions by more adaptive ones.

Whereas the belief modification procedures used in cognitive therapy were first formulated independently from basic research, efforts at theorizing clinical change in cognitive terms have been continuing (Alford & Beck, 1997), and progress has been made in integrating basic and applied cognitive psychology (Brewin, 1988). Cognitive therapists assume that a person's beliefs are acquired through experience (early experience in the case of core beliefs) and then sensitized and activated by life events. Accordingly, a cognitive theory of belief acquisition is necessary a theory of memory, and memory theory has proved increasingly relevant to modern cognitive therapy (e.g., Ehlers & Clark, 2000). What happens in cognitive therapy should be consistent with cognitive theories about the acquisition of memory structures and the modification of schematic knowledge through novel experience (Brewin, 1988, pp. 171-175).

As in traditional network models of memory (e.g., Anderson and Bower, 1973), the theory underlying cognitive therapy assumes knowledge structures arranged in a hierarchy of different levels of accessibility and abstraction (e.g., Teasdale, 1996). Postulating different levels of knowledge abstraction and remoteness from behavioral responses has an important implication with respect to language: expressing a thought or belief during therapy is not simply a case of "turning up the auditory stereo channel so that the therapist can hear what the client is thinking" (Bernard, 1981, p. 131). Although some of the patient's cognitions may be identified with covert verbal responses, others may not (Teasdale, 1996). An important portion of the patient's thinking involves mental imagery (Beck, 1995, pp. 229-247). Mental imagery is not verbal.

Finally, a memory structure qualifies as a "belief" to the extent that is integrated with the cognitive mechanisms of response production. Thus, cognitive therapy may target not only the content of a dysfunctional belief (or memory structure), but also its believability (e.g., Turkington & Siddle, 1998). A "belief" that is not believed anymore stops being a belief and becomes a mere "thought" – a cognitive

content that may still be present in memory but does not engage behavior anymore. In sum, a coherent theory of cognitive therapy must include not only a theory of memory acquisition and modification, but also a theory of how and when memory structures affect the guidance of behavior (Brewin, 1988).

### Cognition for Behavior Analysts

What kind of concepts could a behavior analyst use so as to make sense of the empirical track record of cognitive therapy procedures (e.g. Trower et al., 2004)? I see profound difficulties with the operant reinforcement framework in this respect. A main difficulty concerns the behavior analyst's reliance on hypothetical, covert activities. An operant account of belief modification may start with the assumption that the "beliefs" modified through cognitive therapy consist in private verbal responses. This assumption may seem plausible in some cases. But can beliefs, even those we can easily "translate" in public language, be identified with covert verbal responses?

The answer is no, for reasons that are well known (Erwin, 1978) and have been recently brought to the attention of behavior analysts by Foxall (2007). A given belief X cannot be identified with a verbal response (covert or otherwise) because the same belief or meaning can be expressed by *different* verbal responses. This is especially obvious in the case of paraphrasing or translating an expression from one language to another (Skinner, 1957). In cognitive therapy it is the meaning common to different utterances, not the utterances themselves, that count (Alford & Beck, 1997). Trying to salvage a behavioral analysis of meaning by appealing to a response class instead of a single utterance (e.g., Moore, 2000) has proved unsuccessful, because specifying the criteria for membership in this "class" seems impossible unless one again appeals to shared meanings (Anderson & Bower, 1973).

Eventually, an analysis of meaning in terms of verbal activity must fail because it neglects the central role in behavioral guidance of the *referents* from which the "meaning" of verbal behavior derives (for a more detailed discussion of this issue

see Tonneau, 2001). Thus, as Segal (1977) pointed out, in his treatment of paraphrase Skinner eventually invoked *nonverbal* private events so as to avoid appealing to a form of "knowledge" (p. 650) with "more abstract status than covert verbal responses" (p. 651). The fact remains that in order to account for linguistic meaning the "more abstract," nonverbal events are needed anyway, whether described as "knowledge" (Segal, 1977), "images" (Wolpe, 1978) or just "cognition" (Wilson, Hayes, & Gifford, 1997). To this extent, the traditional operant approach to meaning ends up looking like a cognitive account in terms of internal symbolic processes (Segal, 1977).

It is important to understand why the cognitive and operant models of human behavior converge on this issue. As their proponents traditionally conceive them, both are temporally molecular (Rachlin, 1977b, 1988): they consider that psychological phenomena are defined only over an arbitrarily short temporal interval (typically called, "the present" or "now"). In the case of a patient who expresses a dysfunctional belief, the therapist finds no obvious external stimulus that could explain the content of the patient's verbal report and be present in the therapeutic session. Accordingly, the therapist infers that the proximal cause of the verbal report must be some sort of private event (belief, cognition) inside the patient.

This shared agreement does not extend to the mechanisms through which internal beliefs or cognitions are modified. Overreliance on reinforcement and punishment as processes of behavioral change means that the empirical properties of belief modification procedures are misrepresented in the operant framework. Two interrelated properties stand out.

First, belief modification procedures are to some extent holistic instead of elementarist. When successful, belief modification entails changes in a wide class of interrelated activities. These activities are not random, but bear organized relations to each other (Delprato, 1986). This does not fit well with the traditional operant focus on a single response submitted to reinforcement contingencies (e.g., Skinner, 1938). Here is how Rachlin (1983) characterizes the importance of the matching law in operant research:

Application of simplistic behavioral theory to complicated human situations has been the bane of behavior therapy ... [a] great advantage of Herrnstein's matching law over previous expressions of the law of effect is that it is less simplistic than those expressions—it takes context into account. (p. 377).

The matching law (Herrnstein, 1970) is clearly a step in the right direction in that it incorporates alternative responses or context. Nevertheless, the formal relation between the responses included in the matching equation is just one of physical incompatibility (for example, stepping on the left or on the right side of the operant chamber). This still is a far cry from the complex structural and semantic relations between the utterances that could express the same underlying "belief."

A second, related property of cognitive modification is that is structure-dependent (Fodor & Pylyshyn, 1988). In Socratic questioning, for example, the environmental events through which cognitive therapists try to modify their patients' beliefs consist typically of organized sentences or arguments. These sentences have a semantic and logical structure that bears some specific relation to the structure of the beliefs to be modified (Fodor, 1976). This does not fit well with the concept of operant reinforcement, in which the respective structural properties of the response and of the reinforcer are assumed to be irrelevant (Tonneau, in press).

For these two reasons, the environmental operations through which cognitive therapists modify their patients' beliefs do not bear a close similarity to the operant relations that hold between responses and consequences. Cognitive therapists typically assume that a belief must be activated in order to be modified (Brewin, 1988, p. 65), but modification takes place through the structural and semantic relations between the activated belief and the therapist's arguments. The replacement of a dysfunctional belief by a more adaptive one may thus superficially look like punishment, in the sense that the frequency with which the former belief affects behavior diminishes during therapy. However, this "punishment" is a consequence of the structural modification of a belief into another. The closest analog with respect to instrumental

behavior would be "punishment" in the sense of Guthrie (1952).

### What to Do?

"Belief" is a term from ordinary language. Nothing in the world may answer to all of the properties that beliefs are traditionally supposed to have. Nevertheless, belief phenomena are an important part of psychological functioning and deserve to be explained—if not as beliefs, then as "quasi-beliefs," scientifically acceptable surrogates for the full-fledged beliefs of common sense. Currently we have no fully developed explanation of belief phenomena, but remedial steps can be taken.

First and foremost, it is probably a mistake to look for beliefs or quasi-beliefs as covert activities inside the patient. To do so only pushes behavior analysts to endorse an inadequate version of cognitive psychology (Rachlin, 1985), one that is useless and likely to be false (see above). Remember that the rationale for looking inside the patient is temporal molecularism (Rachlin, 1977b): the notion that the significant causes of behavior must be located at an arbitrarily short temporal distance from the current response.

The alternative is to embrace a molar form of behavior analysis in which psychological phenomena are not tied to any particular temporal interval (Rachlin, 1974, 1977b). In particular, we should seriously consider the possibility that beliefs involve scattered portions of the environment that are separated in time from the current response (Tonneau, 2007):

One cannot seek the fountain of youth (...) if one knows nothing about fountains and nothing about youth, and one cannot believe anything about Hobbits unless told that Hobbits are small human-like creatures with hairy feet. No ordinary object has all the properties being described (small, human-like, with hairy feet), but we are certainly familiar with these properties. We have encountered them one by one while interacting with things past. (p. 145).

My suggestion here is that beliefs (or quasi-beliefs) include temporally distributed properties of

environmental stimuli as their constituents. This conceptual framework is a molar one, like Rachlin's (1988), but with a focus on the molar environment rather than molar behavior. Instead of identifying a thought with an extended behavioral pattern (Rachlin, 1977a), I identify thoughts with extended features of the environment, in the tradition of the philosophical approach to psychology known as neorealism (for a recent review of neorealism see Charles, 2011).

It is a challenge to show that all of our beliefs and concepts, veridical or otherwise, can be traced back to (and in fact, be constituted by) objective portions of the environment. Yet convergent evidence on this point has been provided in the context of "perceptual symbol systems" (Barsalou, 1999) and of the theory of "grounded cognition" (Barsalou, 2008). Here I propose to replace the "perceptual symbols" of Barsalou (1999) and the "proxytypes" of Prinz (2002) by the environmental constituents that these cognitive surrogates are said to represent.

Consider, for example, the case of patient CE reported by Chadwick, Lowe, Horne, and Higson (1994, p. 38). She believed that she was spied on and that her neighbors pumped poisonous gas through the wall of her house. What did CE's belief consist of? Among other parts, of her previous encounters with liquids, disease (hence the concept of "poison"), boilers, gas, walls, her house, and her neighbors. Of course her neighbors never pumped gas through the wall; her belief was nonveridical. Nevertheless, she encountered all of these components *at different times* in her life history. What distinguishes CE from a person without delusional beliefs is not CE's reacting to something that is not there, but rather her *failure* to react to the temporal gaps between the components of her belief (for further discussion see Tonneau, 2011).

Now a sequence of environmental features, whether temporally connected or not (corresponding to veridical and nonveridical beliefs, respectively), qualifies as a belief only if this sequence influences the patient's behavior by interacting with other sequences and other environmental patterns. How can a therapist modify a belief or decrease its behavioral impact? The first step is to activate the belief in question, and typically this is done through lan-

guage, be it the patient's language or the therapist's (Ellis, 1969). How language can "activate" a belief (that is, made it available for modification) and then modify it is not known in detail, but clearly depends on the correlations between semantic units of the therapist's utterances (typically words) and their environmental referents (Stemmer, 1973; Tonneau, 2001).

The belief is modified when behavioral control of the patient's repertoire shifts from one molar environmental sequence to another. At a fundamental level, none of this is accomplished through operant reinforcement (although of course reinforcement can also be useful in therapy). Rather, the process of belief modification seems to involve structural changes in controlling sequences through the presentation of stimuli (in this case, words) that have been correlated with previous environmental constituents.

The relevant behavioral principles have not been studied in the operant laboratory, and behavior analysts know little about them. This, however, should not be taken as a cause for despair but rather as a call for more basic and applied research, along with novel theoretical developments (Tonneau, 2007). Understanding belief modification in cognitive therapy will only be possible if the phenomena in question are not prematurely fitted in the straightjacket of familiar, but in many ways inadequate, theoretical concepts.

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