

Cognitions in cognitive-behavioral psychotherapies; toward an integrative model

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Abstract

There seems to be a lack of a coherent and integrative theory and theoretically informed manuals in cognitive behavioral therapies that could negatively impact both the program of CBT as a platform for psychotherapy integration, as well as its efficacy and effectiveness. Although CBT is the golden psychological treatment for various disorders, overall, about 30–40% of the patients are still non-responsive to these interventions and various schools debate their status as promoters of the best theoretical view. The objective of the present paper is to use cognitive psychology/science as a tool to clarify several theoretical confusions in CBT, with impact on a coherent science and practice of CBT. As a general conclusion, we believe that CBT has reached preeminence in the clinical field betting on cold cognitions. Despite obvious advantages and accomplishments, this approach seems to lose its heuristic value. We believe that the next phase of CBT development lies in the construct of hot cognitions (which would increase its effectiveness) and in cognitive psychology (which would contribute to a coherent science of CBT beyond various schools). These developments could offer CBT the chance to be a platform for the integration of psychotherapy.

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1. The problem and the objectives

Cognitive-behavioral therapies (CBT) are based on Albert Ellis' ABCDE model (Ellis, 1962). According to the ABCDE model, people experience undesirable activating events (A), about which they have rational (i.e., adaptive, healthy, or functional) and irrational (i.e., maladaptive, unhealthy, or dysfunctional) beliefs/cognitions (B). These beliefs lead to emotional, behavioral, and cognitive consequences (C). Rational beliefs (RBs) lead to functional consequences, while irrational beliefs (IBs) lead to dysfunctional consequences. Clients who engage in CBT are encouraged to actively dispute (i.e., restructure) (D) their IBs and to assimilate more efficient (E) RBs, with a positive impact on their emotional, cognitive, and behavioral responses (Ellis, 1994). Based on the above description, we exclude from the CBT family approaches that employ cognitions to control behavior, without acknowledging their

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importance in the generation of feelings and behaviors. CBT also assumes that most complex human responses (e.g., emotional, cognitive, behavioral and some physiological response) are cognitively penetrable. Cognitive penetrability means two things: (a) that a response (e.g., behavior) is an outcome of cognitive processing (i.e., computation), be it conscious or unconscious, and (b) that a change in cognition by various procedures (e.g., cognitive, behavioral techniques) will induce a change in the expressed response (e.g., behavior). It is important to note that the limits of cognitive penetrability are the limitations of CBT. In other words, because some basic human responses are not cognitively penetrable, (e.g., some basic behaviors are genetically determined), they are not typically considered within the realm of CBT.

Since its creation (Beck, 1963; Ellis, 1958), hundreds of papers have been published focusing on the theory and practice of CBT. Some studies (e.g., Dryden, Ferguson, & Clark, 1989; Hollon & Beck, 1979) have confirmed the main aspects of the original CBT theories (e.g., Beck, 1963; Ellis, 1962), while other studies (e.g., Jacobson et al., 1996; Solomon, Haaga, Brody, Kirk, & Friedman, 1998; Szentagotai et al., 2005) have made critical contributions to their evolution. Furthermore, meta-analytic studies have supported the conclusion that CBT is an empirically supported form of psychotherapy (e.g., Butler & Beck, 2000; Engles, Garnefsky, & Diekstra, 1993). Indeed, CBT is well-represented as a standard treatment for many disorders in the American Psychological Association's (APA) list of empirically validated treatments (e.g., Chambless & Ollendick, 2001). It appears that CBT is the golden standard for a psychological technology since it seems to have both a well-defined theory and a well-supported effectiveness. However, within certain limits, both these aspects can be challenged.

From a theoretical point of view, various CBT professionals have ascribed greater importance to one type of cognitions without necessarily excluding the others. Some differences therefore exist in the theory of disturbance each has proposed, and in the identification of the crucial cognitions that are the target of intervention. Consequently, various schools of CBT have been created around these crucial cognitions. For example, while rational-emotive behavior therapy (REBT) is organized around the concept of rational and irrational beliefs (Ellis, 1994), cognitive therapy (CT) is organized around the concepts of automatic thoughts and schemas (Beck, 1995). Kuehlwein and Rosen (1993) have identified more than 10 types of CBT schools (e.g., cognitive therapy, cognitive-behavioral modifications, dialectic and behavioral therapy, meta-cognitive therapy, rational-emotive behavior therapy, schema-focused therapy), each school insisting that the level of cognition it focuses on is the most important. This “Babel Tower” within CBT does not favor a coherent scientific development. Rather, it sometimes stimulates repetitions, conflicts, confusions, and re-inventions. For example, proponents of meta-cognitive therapy (Wells, 2000) promote concepts such as meta-emotions and meta-cognitions as new, significant advancements, although oftentimes they only re-label the older concepts of secondary emotions and (re)appraisal from REBT. Similarly, schema focused therapy uses the concept of schema, but ascribes its new meaning (Young, 1994), leading to confusions between the schema construct in cognitive therapy and the schema construct in schema-focused therapy. Because it is not itself well-integrated yet, we doubt that in this phase CBT can accomplish its ambitious goal of being the platform of psychotherapy integration. Moreover, some professionals who define themselves as cognitive-behavioral therapists sometimes neglect to attend to the hypothesized theory of change, and instead practice what we have called “a cocktail school of cognitive-behavioral therapy” (David, Miclea, & Opre, 2003). More precisely, they simply combine different cognitive and behavioral techniques in a cocktail-like process while ignoring the hypothesized theory of change; this is particularly true in the health/behavioral medicine field while it is less obvious in the clinical/psychiatric field (see for example Barlow, 2002). Although such a cocktail might prove effective, and even be manualized, it is still not informative enough for the science of cognitive-behavioral therapy (CBT). Without a clearly hypothesized theory of change (e.g., precisely which cognitions we want to restructure by using which specific techniques) accompanying each manualized treatment, CBT can hardly be considered a reference scientific therapeutic system (David, 2004).

From a practical point of view, the efficacy of CBT for most of the disorders is far from being satisfactory (but see anxiety and panic disorders, Barlow, 2002). For example, although CBT is often considered the golden psychological standard for the treatment of depression, about 30–40% of patients are still non-responsive. Some have even questioned the golden standard position based upon the results of the Treatment of Depression Collaborative Research Program (TDCRP, Elkin et al., 1989), and have criticized the theory of change as proposed by Beck, Rush, Shaw, and Emery (1979) to explain the efficacy of CBT in the treatment of depression (Jacobson et al., 1996). It is our feeling that research on this line has reached a dead-end because, (a) although effective, the efficacy/effectiveness of CBT has not yet reached “the desired standard” and (b) the efficacy and effectiveness in the newer trials is comparable with that

of older trials. Moreover, some authors have even challenged the efficacy of CBT compared to other therapies, suggesting that there are no clinically significant differences between various therapies (e.g., Wampold et al. 1997).

We believe that the lack of a coherent theory and theoretically informed manuals is the major cause for CBT being somewhat “stuck.” Cognitive psychology is the basic science that could help clarify many of the confusions within CBT, thus stimulating both theoretical and practical developments. Simply said, cognitive psychology is concerned with the human mind, with how it creates meaning, how it processes the information it receives (input) in order to develop responses (output), and how these responses (output) can in turn influence subsequent input (Anderson, 2000). However, cognitive psychology is not only the science of human information processing per se, but also an information processing perspective, which can be used in our attempts to understand all of the workings of the human mind, including cognitive processes, behaviors, and emotions that are cognitively penetrable (Anderson, 2000; Eysenck & Keane, 2000). Cognitive psychology attempts to understand the basic mechanisms of the human mind. Thus, cognitive psychology studies may be the foundation on which the other social sciences, including clinical psychology, could be based. It is certainly true that CBT has developed without grounding on cognitive psychology. Researchers and practitioners in clinical psychology have managed to find higher order principles unrelated to cognitive mechanisms to explain the phenomena that they are interested in. However, much is unknown and poorly understood in the clinical domain. If clinicians and clinical researchers could come to better understand these higher order principles in terms of cognitive mechanisms, and how to apply cognitive mechanisms directly to higher order phenomena, they would have a firmer grasp on the phenomena in question (Anderson, 1990).

The objective of this paper is to use a cognitive psychology approach as a tool to clarify several theoretical confusions in the field of CBT, with impact on a coherent science and practice of CBT.

2. Fundamentals of cognitive psychology relevant to CBT

In the Western civilization, interest in human cognition can be traced back to the ancient Greeks. Socrates, Plato, and Aristotle speculated on the nature of memory and thinking. This discussion about the nature of cognition developed into a centuries-long debate between empiricists and rationalists. Interestingly enough, although during this philosophical debate sciences such as astronomy, physics, chemistry, and biology developed, no concomitant attempts were made to apply the scientific method to the understanding of cognition (Anderson, 1990). Things began to change, however, with the work of Gustav Theodor Fechner (1801–1887). In his work we find the formal beginnings of experimental psychology, and of the systematic study of cognition. Before Fechner, there had only been physiological psychology and philosophical psychology. It was Fechner who performed the first scientifically rigorous experiments, which laid the foundations for modern psychology. By the end of the 19th century, psychology became even more scientifically respectable with Wilhelm Wundt's first laboratory of psychology. Despite this progress in the study of cognition (including the contributions of Gestalt psychology), modern cognitive psychology as understood today has only been a serious area of research for approximately the last five decades. In the 1950s, a number of pioneers (e.g., Noam Chomsky, George Miller, Alan Newell, Herbert Simon) broke with the behaviorist tradition, initiating the “cognitive revolution” in psychology, and thus laid the foundation for the field of cognitive psychology. In 1967, Ulrich Neisser wrote his seminal book “Cognitive Psychology” (Neisser, 1967), and by doing so, labeled and defined the field. At the same time, in the clinical arena, Albert Ellis (1958) broke with the behavioral tradition and laid the foundation upon which cognitive therapies are based. Since those beginnings, other famous pioneers (e.g., Albert Bandura, Aaron Beck, Arnold Lazarus, Donald Meichenbaum) have made invaluable contributions to the development of cognitive therapies. Although other professionals have emphasized the importance of cognitions in clinical work (e.g., Alfred Adler, Karen Horney, George Kelly), they did not promote the cognitive approach as an entity in and of itself (i.e., an independent status). The publication of Ellis' (1958) article “Rational Psychotherapy” and his seminal book “Reason and Emotion in Psychotherapy” (Ellis, 1962) added a good deal of legitimacy to the cognitive approach in clinical practice. However, despite some striking similarities (e.g., focus on cognitions as potential “causes” of human behavior), the cognitive revolution in academic psychology (related to cognitive psychology) and that in the clinical field (related to cognitive/rational therapies) had scarce relations with each other. Only recently, as a result of the efforts of a few professionals (see David, 2003), the two have begun to converge under the umbrella of evidence-based psychology.

In essence, cognitive psychology assumes that the human mind is a general-purpose system, and that two important functions of the human mind are: representation and computation. *Representation* can either refer to

“something” that stands for something else (e.g., the word “cat” stands for the animal “cat”), or it can refer to the relationship between a representation in the sense described above, and what it represents (e.g., the relationship between the word “cat” and the actual “cat”). *Computation*, both conscious and unconscious, refers to the transformation of representations into other representations in a rule-governed manner. The answer of cognitive psychology to the question: “How do we gain knowledge regarding the functioning of the mind and what takes place between the observable input and output?” is: “By computational models supported by experimental evidence” (Eysenck & Keane, 2000). In cognitive psychology, a set of inputs (stimuli) is associated with a set of outputs (human responses: subjective, cognitive, behavioral, and biological) through cognitive constructs (i.e., a computational model). These cognitive constructs refer to both conscious information processing (e.g., explicit perception, explicit learning, and explicit memory) and unconscious information processing (e.g., implicit perception, implicit learning, and implicit memory) (David, 2000; Eysenck & Keane, 2000). Cognitive constructs have several functions: (1) they explain why a certain input is associated with a certain output; (2) given a certain input, they predict the output; (3) they describe the input–output relations; and (4) they organize and summarize various input–output relations. In order to understand cognitive constructs, one elaborates computational models based upon both the classic-symbolic paradigm (e.g., schema, script, semantic and propositional networks) and the non-symbolic paradigm (e.g., connectionist networks).

Of course, there are also non-cognitive mechanisms that could account for the relationship between an observable input and output. Some people might argue that a neurophysiological description is desirable (Churchland, 1989). Others might argue for a behavioral description, where cognitive processes are conceptualized as covert behaviors (Skinner, 1984a,b). However, both neurophysiological and radical behavioral descriptions are too complex and too detailed to describe the human mind efficiently (Anderson, 2000). For example, in order to describe a simple psychological phenomenon—memory biases induced by schema type processing (i.e., remembering schema-consistent information better than schema-inconsistent information) (for details, see Brewer & Treyns, 1981)—we would have to either describe the behavior of millions of neural cells, or to examine the particular history of contingencies associated with the items on a memory test. This would be similar to using a formula of relativistic mechanics to predict the movement of a large object at low speed or to listing all domain–co-domain relations (e.g., 0–0, 1–2, 2–4, etc.) to describe a single mathematical function. In principle, this is possible, but it is too complicated, and adds nothing to the prediction offered by a more simple formula of Newtonian mechanics or by a mathematical formula [e.g., $F(x)=2x$]. Similarly, in psychology, we need a level of analysis that is more abstract and yet simpler than a neurophysiological and/or a radical behavioral approach, yet one that still leads to accurate explanations and predictions. The cognitive approach fulfills these criteria, and has thus far proved to be the most productive paradigm in studying the human mind. An empirical analysis of trends in psychology (Robins, Gosling, & Craik, 1999) has shown that cognitive psychology has become the most popular model in use today, whereas the popularity of behaviorism has declined, and neuroscience has only shown a modest increase in prominence in mainstream psychology. It is important to note that cognitive, neurophysiological, and behavioral approaches are not always simply different languages used to describe the same phenomenon; sometimes they may refer to different phenomena. In other words, we should be very much aware that although some cognitive models can be translated into neural or behavioral models and vice versa, this is sometimes merely an artifact of the formalisms involved, not necessarily reflective of the inner structure of the phenomenon under study.

The analysis of cognitions can be made upon various criteria. Strictly speaking, the term cognition refers to the mental activity of knowing, involving mental representations and computations.

2.1. Cold versus hot cognitions

Some 40 years ago, Abelson and Rosenberg (1958) used the terms “hot and cold” cognitions to make the distinction between appraisals (hot) and knowledge (cold) of presumed facts. Any classification of cognitions should take into account the fundamental distinction between knowing and appraising. According to Lazarus and Smith (1988), cold cognitions refer to the way people develop representations of relevant circumstances (i.e., about activating events). Such circumstances are often analyzed in terms of surface cognitions (easy to access consciously) and deep cognitions (more difficult to access consciously; however, consciously accessible). *Surface cognitions* refer for example to descriptions, inferences and attributions, while *deep cognitions* refer to schemas and other meaning-based representations (for details, see Eysenck & Keane, 2000). *Hot cognitions* refer to the way people further process cold cognitions. The terms appraisal or evaluative (hot) cognitions are used to define how cold cognitions are

processed in terms of their relevance for personal well-being (for details, see Ellis, 1994; Lazarus, 1991). For example, the statement “Romania is a sovereign nation” is a cognition, a statement of knowledge. But knowledge can also be incorrect, e.g., “Romania is a part of the continent of Asia.” The mental act of appraising adds evaluative valence to what one assumes to be true. The statement, “Romania is beautiful,” is not a statement of a fact; it is an appraisal. The statement really means, “I like the scenery of Romania”, since people often express appraisals in statements that attribute beauty or goodness to a thing or event, rather than using personal pronouns, as in “I judge this thing to be beautiful” or “This scene fits my idea of beautiful”. Confusions may arise when a speaker combines knowledge and appraisal into one statement: “Romania is a beautiful country.” Zajonc (1980) reviewed these issues in an article that produced some adverse reactions because he used the term affect to refer to appraisal, a common practice in social psychology. Unfortunately, often many hot cognitions are not explicitly stated, but are contained within what appears to be a cold cognition, e.g., “I think I will fail if I attempt a new task.” In this example, the speaker might (or might not) appraise failing as negative or mixed (some negative and some positive appraisals of failing at a certain task). If one attends only to the accuracy of the cold cognitions, one misses the component of the statement that makes it active in an emotional process. It seems likely that one does not appraise a cold cognition one believes to be untrue. While humans can imagine all sorts of things, only those that seem possible—no matter how slight the possibility—stir emotions. If hot cognitions about it are strong enough, even the most remote possibility may stir emotions. This may be one reason why merely convincing someone of the low probability of an event occurring is insufficient to reduce fear about the event; phobias do not result from cold cognitions alone. Consequently, during a specific activating event, there seem to be four different possibilities for the relationship between cold and hot cognitions regarding the activating event: (1) distorted representation of the event/negatively appraised; (2) non-distorted representation/negatively appraised; (3) distorted representation/non-negatively appraised; (4) non-distorted representation/non-negatively appraised. According to Lazarus (1991) and to the appraisal theory of emotions, although cold cognitions contribute to appraisal, only appraisal results directly in emotions. While previous research programs have shown that cold cognitions are strongly related to emotions (e.g., Schachter & Singer, 1962; Weiner, 1985), it is now generally accepted that as long as cold cognitions remain unevaluated, they are not sufficient to produce emotions (Lazarus, 1991; Lazarus & Smith, 1988; Smith, Haynes, Lazarus, & Pope, 1993). Thus, the effect of cold cognitions on emotions seems to be mediated by hot cognitions.

2.2. *Conscious (explicit/declarative) versus unconscious (implicit/procedural) cognitions*

Declarative or explicit memory refers to intentional and/or conscious retrieval of previously learned information (Schacter, 1987). Non-declarative or implicit memory refers to the unconscious and involuntary influence of prior experience on our responses, without the past being represented in terms of any consciously accessible content (Schacter, 1987). The distinction between implicit and explicit memory is highly complex and is a fundamental one in cognitive psychology. This distinction may refer to memory systems/representations (Schacter & Tulving, 1994), memory processes (Richardson-Klavehn & Gardiner, 1996), memory tasks (Schacter, 1987), strategies at retrieval (Jacoby, 1991), or memorial awareness (Richardson-Klavehn & Gardiner, 1996). Unconscious information processing (cognitive unconscious) in the form of implicit perception, implicit learning, and implicit memory is one of the most explored topics in current cognitive psychology research (Kihlstrom, 1999; Schacter, 1987; Seger, 1994a,b). As concerning the relationship between conscious and unconscious cognitions, a distinction needs to be made between functional dissociation and structural dissociation. Functional dissociation between conscious and unconscious processes is determined by the automatization of some conscious processes and/or by coping and defense mechanisms (e.g., suppression, Wegner & Smart, 1997). However, modern work in cognitive psychology (e.g., Reber, 1993; Schacter, 1987; Seger, 1992) argues for a structural dissociation between conscious and unconscious processes. This concept has nothing to do with the Freudian concept of the dynamic unconscious (which is functionally separated from consciousness); in the best case, the dynamic unconscious could be reinterpreted in the light of modern research on the cognitive unconscious (for details, see Kihlstrom, 1994). Some aspects of information processing (including both perceptual and semantic processing), by their characteristics, cannot be made conscious. They are represented in our memory in a format (e.g., non-verbal associations) that is not consciously accessible (Schacter & Tulving, 1994). These non-declarative/implicit memory processes (structurally separated from consciousness and not consciously accessible) exert a major impact on interpersonal experience, emotions, cognitions, and behavior, independent of beliefs, and they need to be analyzed on their own terms. They should not be mistakenly viewed as a form of

repressed memory or only as an automatization (functionally separated from consciousness and consciously accessible) of explicit memory processes (e.g., beliefs) (Tobias, Kihlstrom, & Schacter, 1992). Some “Cs” (e.g., feelings) are not mediated by beliefs at all, but instead, by unconscious information processing, which is structurally separated from consciousness (e.g., nonverbal associations) (LeDoux, 2000).

2.3. *Autobiographical versus semantic cognitions*

According to Tulving (1983), episodic memory is necessary for the context-specific recollection of events from one's personal past (e.g., “Yesterday I walked on Broadway”), whereas semantic memory subserves the acquisition and retrieval of general knowledge (e.g., “New York is located in the USA”). Some IBs are contextually loaded and seem to be a part of the autobiographical memory system (e.g., “Today at the birthday party my wife MUST obey me”), while other IBs are a part of the semantic memory system (e.g., “The others MUST obey me”). Since autobiographical memories are more emotionally loaded and easier to distort (e.g., Tsai, Loftus, & Polage, 2000) they could create some special problems during cognitive restructuring (e.g., disputation). Thus, cognitions can range from broad and pervasive to situation-specific, and specific thoughts about particular situations are derived from assumptions about self, people in general, and the world. General cold cognitions include correct information, e.g., “most people are right-handed” as well as incorrect information: “All people are right handed”. To have impact on the person, a statement does not need to be correct; rather, the person must believe it to be correct. Several general cold cognitions may be combined as, for instance, “Hard work brings desirable results, but I am not capable of hard work, therefore any good results I get are due to luck or other people's (rare) generosity.” When faced with a certain task, a person who holds this set of general ideas will most likely conclude: “I can't work hard enough to perform this task, so I'll put it off or not try it at all.” Generalized hot cognitions are simple values. They are acquired by learning, and become personal guidelines for conduct and for making specific evaluations of things and events. To emphasize their regulatory function in a person's life, we call them “personal rules of living”. Hot cognitions may also be called evaluative premises, and specific appraisals derived from them, evaluative conclusions (Wessler & Wessler, 1980).

2.4. *Available versus accessible cognitions*

Working memory is considered to be the activated part of long-term memory (for details, see Anderson, 1983). To have an impact on our responses (“C”), IBs would have to be active in working memory during the activating event (“A”). In order for this, IBs should not only be available (i.e., exist in the knowledge base of the person's long-term memory), but also accessible (i.e., activated at that time—working memory). If during an “A”, irrational beliefs are de-activated and/or not relevant to people's goals, they may have no identifiable effect although they exist in the cognitive architecture of our mind. Therefore, despite their availability, the lack of impact of IBs on various dependent variables may be caused by the lack of their accessibility. Just as stress in the form of strenuous exercises is sometimes necessary for the accurate interpretation of electrocardiogram results, relevant stressful situations may be necessary in order to identify the effect of various cognitions existing in our long-term memory (i.e., cognitive vulnerability; Solomon et al., 1998).

2.5. *Decision versus automatic*

The last category of cognitions is labeled decisions. The full title of the category is decisions regarding behavior, meaning the selection of courses of action to take, and instructing oneself to do one thing rather than another (Wessler, 1982 but see Wegner, 1994). Without this type of cognition, behavior would seem to derive automatically from other cognitive activities. This somewhat existential dimension is, in fact, what makes therapeutic change possible in a cognitive framework, as one makes decisions to behave differently despite anxiety generated by long-standing interpretations and evaluations, and to act against one's feelings rather than go along with them (and maintain a self-defeating pattern of anxiety-reduction). Adoption of this category of cognitions makes it possible to eliminate a seeming paradox that arises when we cognitively analyze therapeutic change. Cognitively oriented psychotherapies agree that cognitions must change in order for enduring behavioral change to occur. However, Bandura (1969), Jacobson et al. (1996), etc., have shown that performing new behaviors is one of the most, if not the most, effective means of changing cognitions. Behaviors must change in order for cognitions to change, but cognitions must also

change in order for behaviors to change, and so on. Decisions to behave differently result in the performing of new behaviors which result in changes in one's hot and cold cognitions, which in turn result in sustained behavioral change, and so on. For example, Meichenbaum (1977) has shown that self-instructional statements can make the difference between behaviorally coping with otherwise disruptive emotions and allowing emotional arousal to result in feeling better, but less productive actions.

3. Implications of cognitive psychology and multilevel cognitions for CBT

Any statement referring to one's cognitions—and we work with statements about cognitions and not cognitions themselves—can be classified according to the taxonomy presented above. Thus, any statement can be categorized according to whether it is evaluative (hot) or non-evaluative (cold), general (semantic) or specific (autobiographic), conscious or non-conscious, available or accessible, and decision to act or automatic response. These categories can be used as continua as well as dichotomies. As follows, based on the constructs presented before, we discuss the potential impact of cognitive psychology on CBT at three different levels: (a) theoretical level; (b) models construction level; and (c) practical level.

4. Implications for the theoretical level

4.1. Cold versus hot cognitions

Models and etiopathogenetic theories of psychological problems should take into account each component of the above-described model. Most cognitive theories of various disorders are focused on cold cognitions while ignoring hot cognitions. The proximal causes of our feelings, however, are hot rather than cold cognitions. For example, the influential cognitive therapy models (Clark, 1999) of panic insist on the fact that the basic cognition is catastrophizing expressed by “I will die!”, but this is a cold cognition which might generate no negative feelings in a hypothetical society where dying was desirable because you would come in contact with your Gods. According to the new developments in cognitive psychology (even if there is still a lack of empirical investigation on this topic in the case of clinical disorders), hot cognitions like “I must not die; It is awful to die”, should be the ones generating panic. Similarly, in the case of depression, the cold cognition “I am incompetent” generates a sad mood if, and only if, it is evaluated as “I must not be incompetent; It is bad to be incompetent” (David et al., 2003; Ellis, 2003). Following a clear distinction between hot and cold cognitions a whole research program could be initiated in CBT (for details, see David & McMahon, 2001). Let us briefly detail some directions. According to the appraisal theory of emotions (Lazarus, 1991), emotional problems will only emerge in case of (1) distorted representation/negatively appraised and (2) non-distorted representation/negatively appraised. In *case 1*, if one changes this distorted representation (e.g., “He hates me”) into an accurate one (e.g., “He does not hate me”) one may change the negative emotion (e.g., anxiety) into a positive one (e.g., happiness). However, the individual may still be prone to emotional problems because the tendency to make negative appraisals (e.g., “It is awful that he hates me”) is still present. If one changes a negative appraisal (e.g., “It is awful that he hates me”) into a less irrational and personally relevant one (e.g., “It is bad that he hates me but it is not awful”) one will likely change dysfunctional emotions (e.g., anxiety) into more functional but still negative ones (e.g., concern). Some people may argue that by changing the negative appraisal, one indirectly changes the distorted representations as well (Ellis, 1994). This is possible, but experimental evidence for this hypothesis is mixed (Bond & Dryden, 2000; Dryden et al., 1989). Supposing that distorted cognitions are initially influenced by negative appraisal, they may get functional autonomy from appraisal by practice (for details about the construct of functional autonomy, see Allport, 1958). A strategy that would change both distorted representations and negative appraisals seems to be a better one. In *case 2*, it is likely that if one changes the negative appraisal, one will generate a positive (e.g., happiness) or a negative (e.g., concern) functional emotion. Another possibility, however, would be to change the non-distorted representation into a positively distorted one (e.g., “His negative comments about me are a way of communicating that he considers me strong enough to withstand his criticism”). Positive psychology may offer ways to help people make this kind of change (Seligman & Csikszentmihaly, 2000). To conclude, although some CBT theorists make the distinction between cold and hot cognitions (Ellis & Dryden, 1997) this distinction is insufficiently explored clinically and experimentally. By incorporating a more clear distinction between hot and cold cognitions in their research, CBT researchers could significantly enrich their fund of knowledge.

For example, one could study how different CBT strategies impact on cold versus hot cognitions, generating functional versus dysfunctional emotions, cognitions, and behaviors. We believe this could be a very influential and productive research program. Hot cognitions are emphasized in Ellis' approach to psychotherapy, but receive less attention in other cognitively oriented psychotherapies. There are a number of cold cognitions that are discussed in cognitively oriented psychotherapies. Among these are anticipation of events (Kelly, 1955), expectancies (Rotter, 1954), anticipated outcomes (Bandura, 1969), attributions (Seligman, 1994), core beliefs and automatic thoughts (Beck, 1995). Other cold cognitions include attributions or hypotheses people create to explain their own and others' behavior (Försterling, 1980), and conclusions based on logical operations (Beck, 1976). Beck has shown that failure to process information logically may lead a person to far different conclusions than the correct processing of the same information. Faulty generalizations and other misuses of evidence result in negatively experienced emotions, provided Ellis (2003) is correct, if they are negatively appraised. Faulty conclusions (cold cognitions) do not automatically result in emotional responses unless appraised (hot cognitions). Research in cognitive science seems to support this idea (e.g., Smith et al., 1993).

4.2. *Conscious versus unconscious cognition*

Unfortunately, the psychotherapeutic community seems to have received this distinction in a distorted fashion. For example, Mahoney (1993) wrongly argues that the construct of cognitive unconscious has already penetrated the field of psychotherapy, and uses Beck's (1976) concepts of automatic thoughts and schema (core beliefs) as an example. Mahoney (1993) seems to refer to the segment of information processing which functions unconsciously, but which can potentially be made conscious. This is a kind of functional dissociation between conscious and unconscious processes, determined by the automatization of some conscious processes and/or by coping and defense mechanisms (e.g., suppression, Wegner & Smart, 1997). In this respect CBT has made serious efforts to develop techniques for increasing awareness on these automatic thoughts so that they can become less automatic and more conscious (Beck, 1995). However, modern work in cognitive psychology (e.g., Reber, 1993; Schacter, 1987; Seger, 1992) argues for a structural dissociation between conscious and unconscious processes. As we mentioned before, this concept has nothing to do with the Freudian concept of the dynamic unconscious (which is functionally separated from consciousness); in the best case, the dynamic unconscious could be reinterpreted in the light of modern research on the cognitive unconscious (for details, see Kihlstrom, 1999). Some types of information processing (including both perceptual and semantic processing), by their characteristics, cannot be made conscious. They are represented in our memory in a format (e.g., non-verbal associations) that is not consciously accessible (Schacter & Tulving, 1994). Few works have assimilated this line of research in psychotherapy, yet one notable exception is the work of Dowd and Courchaine (1996). Contrary to Mahoney (1993) and others, we argue that the "unconscious revolution in cognitive behavior therapy" has not yet taken place, and that in fact, it has to start by being based on a clear understanding of the construct of cognitive unconscious. We further suggest that incorporating a conceptualization of non-declarative/implicit memory processing into psychotherapy and into CBT theory is essential. Non-declarative/implicit memory processes (structurally separated from consciousness and not consciously accessible) exert a major impact on interpersonal experiences, emotions, cognitions, and behaviors independent of beliefs, and they need to be analyzed on their own terms. They should not be mistakenly viewed as forms of repressed memories or as mere automatizations (functionally separated from consciousness and consciously accessible) of explicit memory processes (e.g., beliefs) (Tobias et al., 1992). Some "Cs" are not mediated by beliefs at all, but instead, by unconscious information processing, structurally separated from consciousness (e.g., nonverbal associations). The concepts of implicit memory and cognitive unconscious could relate CBT theory to recent research in the neurobiology of memory and emotion (e.g., LeDoux, 2000; Schacter & Tulving, 1994), which would bring CBT further into the mainstream of current psychological research. In addition, they could contribute to a better assimilation of some behaviorist constructs (e.g., associations) into CBT theory. So far, behaviorism is assimilated into CBT at the level of technique rather than at the level of clinical conceptualization. The concept of implicit memory (e.g., Schacter, 1987) combined with Rescorla's (1990) work on classical conditioning (Rescorla has proved that classical conditioning can be described in terms of information processing and computation) might contribute to a better assimilation of behaviorist principles by CBT into an expanded ABCDE model (see David, 2003). It might also stimulate the elaboration of new techniques to deal with unconscious information processing which is structurally separated from consciousness.

4.3. *Autobiographical versus semantic cognitions*

Cognitions can range from broad and pervasive to situation-specific. Ellis (1962) distinguishes between elegant and inelegant solutions to emotional problems. Elegant solutions involve pervasive philosophical change, (i.e., change in one's general evaluative thinking of values). Inelegant solutions involve either a change in a situation-specific evaluation or in a cold cognition, but not pervasive philosophical change. Also, Beck (1995) has tied automatic thoughts to specific situations while core beliefs are broad and pervasive. Some authors (Beck, 1995) have noted the difficulty in changing the broad and pervasive cognitions compared to restructuring situation-specific cognitions (e.g., core beliefs versus automatic thoughts) while others (e.g., Ellis, 1994) have insisted that situation-specific cognitions are sometimes more difficult to change than broad cognitions (e.g., it is easier to change the cognition "I must be loved by the others" than the cognition "I must be loved by my wife"). Future research should try to explore the best strategy of changing cognitions by taking into account the autobiographical versus semantic memory distinction. For example, it is possible that for cold cognitions a change of autobiographical cognitions (e.g., "I will not be able to please her") might be easier than a change of semantic cognitions (e.g., "I am incompetent") while for hot cognitions a change of autobiographical cognitions (e.g., "My wife must be loving today") might prove more difficult than a change of semantic cognitions (e.g., "The others must love me") (e.g., David, 2003). The analysis of beliefs in terms of memory theories may impact not only on the elaboration of various disputation strategies, but also on the implementational level theory (i.e., neurobiological) and on the relationship of CBT with biological psychiatry. Different types of memories have been shown to have different neural substrates (for details, see Schacter & Tulving, 1994; Squire, 1987). If one proves that IBs are related to different types of memories, this line of research could be a first step towards joining CBT research with biological research in psychopathology and cognitive neuroscience.

4.4. *Available versus accessible cognitions*

Most prior research in CBT has not investigated or controlled for this factor. For example, researchers often used scales to evaluate IBs (at time T_n) and later assessed how IBs (measured at time T_n) impacted on various dependent variables measured at time $T_n + 1$. In our opinion, such research is relatively meaningless because of the confusion between available and accessible IBs. IBs measured by various scales might be both accessible and available at time T_n . However, at time $T_n + 1$ they might be available but not accessible. Therefore the lack of impact of IBs on various dependent variables may be caused by the lack of their accessibility, despite their availability. Ellis (1994) argues that irrational beliefs are often latent and inaccessible during non-stressful or low stressful periods. Most of the prior studies did not use relevant stressful situations and consequently, it is debatable that they adequately tested CBT theory regarding the impact of IBs on various dependent variables. Just as stress in the form of strenuous exercises is sometimes necessary for the accurate interpretation of electrocardiogram results, relevant stressful situations may be necessary in order to identify the effect of cognitive vulnerability (Solomon et al., 1998). In future studies of CBT theory, relevant events should not be generic events as in most of the previous studies, but rather specific events, namely events representing a thwarting of one's fundamental goals that access available IBs (Ellis, 1994).

5. **Implications for the models construction level**

Model construction is an important intermediate phase between theories and their practical implications (David, 2003). As follows, we present a cognitive framework/model of human feelings and behaviors based on reviews of the cognitive psychology literature (e.g., David, 2003) and Lazarus' model of emotions (e.g., Lazarus, 1991); it is an updated extension of Wessler's model (Wessler, 1982). Three points should be emphasized regarding this proposed cognitive framework/model. First, it is a general model that can be adapted for specific clinical problems. Second, it is based on current knowledge in the field, and future developments could alter it. Third, it incorporates the constructs presented above and mediates between the theoretical and practical impact of cognitive psychology on CBT.

5.1. *Step 1: stimulus*

A stimulus is anything that can influence the activity of our sensorial systems. It can be simple (e.g., a spot of light) or complex (e.g., a classroom) depending on the level of investigation the researcher chooses. The process starts with

a stimulus complex that may come from either the external environment or the internal environment. An overt stimulus (from the external environment) might be other people's actions, a phobic object, or the loss of something tangible. Covert stimuli (from the internal environment) can be bodily sensations, such as nausea or emotional arousal, or any of the following elements described in this model, (e.g., memories or anticipations). There are many potential stimuli in one's environment at any given time, some of them supraliminal and some of them subliminal.

5.2. Step 2: input and selection

Individuals selectively attend to supraliminal stimuli, ignoring many of the potential stimuli in the environment. Most of the time, selection is based on cognitive inhibition, which helps us focus our resources on task-relevant information while inhibiting task irrelevant information. Also, it is at this level that perceptual defense occurs, the defensive maneuver so important to the theories of Carl Rogers and Fritz Perls (e.g., [Rogers, 1961](#)), although failure to attend to a stimulus may sometimes simply be due to the lack of conceptual categories to pick up the information ([Neisser, 1976](#)).

5.3. Step 3: perception and symbolic representation of the stimulus

This step is cognitive in character and can be divided into definitions (the perception) and descriptions (symbolic representation of perceptions). Descriptions are most accurate when they take into account the perceiver/describer as well as the specification of time, place, and circumstances. Perception is temporally contiguous with the stimuli, but descriptions need not be; they can come well after the fact or refer to images that have no overt stimulus associated with them. Both the perception and symbolic representation of the stimulus can be conscious or unconscious ([Kihlstrom, 1994](#)) and they can generate (e.g., by classical conditioning) arousal, behaviors and/or cognitions, which can in turn initiate another step 1.

5.4. Step 4: non-evaluative interpretation of the symbolic representation of the stimuli

Interpretation, as defined here, refers to inferences about unobserved aspects of the perceived stimulus or about one's mental images. Inferences go beyond immediately observable facts, and include such cognitive activities as logical operations, forecasts and expectations, attributions, and other types of cold cognitions. They are conclusions drawn by the person. For example, "My friend did not speak to me" (description) may be followed by inferences like: "He is not really my friend or he does not like me" (but he might not have seen me) (interpretation). These non-evaluative interpretations can be conscious or unconscious and they can generate arousal, behavior and/or other cognitions, which may initiate another step 1.

5.5. Step 5: evaluative interpretations of processed stimuli

This step consists of hot cognitions, and it refers to the process emphasized by [Lazarus \(1991\)](#) and [Ellis \(1994\)](#) in their view of emotions. If the appraisal is neutral, ambiguous, or indecisive, no affective response follows. The appraisal may be implicit rather than explicit; for example, when one reads a negative meaning "It is awful" into the description "My friend did not speak to me." New developments of the theory ([David, 2003](#); [Smith et al., 1993](#)) suggest that there are two types of appraisal: (1) primary (i.e., motivational incongruence; motivational relevance) and (2) secondary (emotional focused potential, coping focused potential, self-accountability, other-accountability, and negative expectations) and that irrational beliefs ([Ellis, 1962, 1994](#)) are appraisal components.

5.6. Step 6: emotional response to processed stimuli

Feelings are hypothesized to follow non-neutral appraisals of stimuli (or images). The arousal accompanying these feelings may become a stimulus at step 1, and initiate a second emotional episode in which arousal labeling occurs at step 4 and gets appraised at step 5. Recently [LeDoux \(2000\)](#) and others have argued for another theory of emotion formation that does not involve appraisal. They argue that some emotional problems are subcortically produced (e.g., involving the amygdala, thalamus, and other non-cerebral structures), and do not involve appraisal as defined by the

appraisal theory (Lazarus, 1991). Although people less familiar with basic cognitive psychological research could be tempted to say that these findings are incompatible with the cognitive approach of emotions (Glenn, 2001), this is certainly not the case. Some of the ways in which these two fields are linked are briefly described below (for details, see also Tobias et al., 1992). *First*, subcortical processes are related to the concept of unconscious information processing. Therefore, these processes preserve the cognitive (computational) component of emotions and connect the theory of emotions to the concept of cognitive unconscious, strongly investigated in current cognitive psychology (David, 2000; LeDoux, 2000); this covers the arousal generated at step 3 in this model. *Second*, these subcortical and automatic processes can be countered by activating higher order modes of thinking (Beck & Clark, 1997; Ellis, 1994), and their effects can be controlled by conscious strategies. *Third*, cognitive psychology and CBT do not assume that verbal mediation is the only modality of emotional control. Some very successful exposure methods work specifically on this type of unconscious information processing involved in emotion formation (Ellis, 1962, 1994). *Fourth*, an emotion generated by subcortical mechanisms may become a stimulus (at step 1) and may then be consciously appraised, thus generating a secondary emotional problem (e.g., meta-emotion) (Ellis, 1962, 1994).

5.7. Step 7: coping mechanisms to feelings experienced at step 6

Coping mechanisms (e.g., cognitive, behavioral, physiological, emotional) aim to deal with feelings generated at step 6. For example, there is an automatic tendency for coping to accompany feelings based upon appraisals at step 5. The tendency is to approach what we evaluate positively, and to eliminate what we evaluate negatively, either by avoidance, escape, or modifying the stimulus. This is related to the “flight or fight” response and to unconscious defense mechanisms (e.g., Cramer, 1998a,b). People tend to seek conditions that they believe will bring them relative comfort, particularly immediate relief, even if they are only slightly more pleasant than their alternatives. However, coping is also conceived (Lazarus, 1991) as controlled by decisions and self-directions, based on anticipated outcomes. Behavior is usually consistent with emotional states, but not always. If humans always acted in consonance with their emotional states, there could be no therapeutic progress. Humans can choose to refuse the immediate relief of anxiety in order to receive benefits of personal experiences. These coping mechanisms initiate another process covering steps 1–7.

6. Implications for the practical level

According to Ellis (1994), an important distinction should be made between feeling better, getting better, and staying better. A variety of techniques could help us feel better. However, in order to get and stay better we would have to change the fundamental etiopathogenetic mechanisms of our emotional problems, and these are related to the last element in the chain, namely appraisal. For instance, we have reviewed the work of therapists who claim they are practicing Ellis’s approach, but who are not doing so, even though they are doing a fine job of correcting misconceptions, teaching problem-solving skills, and generally promoting clear thinking. To further clarify these differences, we will present a clinical strategy using the cognitive psychology framework of human feelings and behaviors, described previously. This framework recognizes that any arbitrary division of human psychological processes is artificial: thoughts, emotions, and actions may occur simultaneously. They exist interdependently. There is a mutual influence rather than a one-way causation of thoughts producing emotions (Ellis, 1958). Let us now look at a specific example. Let us say that a person suffers from test anxiety. The crucial variables are not the test (step 1) or his/her knowledge that it will occur at a scheduled time (steps 2 and 3). The person probably predicts poor performance (step 4) and evaluates this anticipated outcome as highly negative (“I must pass the exam, otherwise it will be awful”; step 5). This results in anxiety (step 6), which he/she may reduce by choosing to procrastinate (step 7), a behavior that brings immediate anxiety reduction, but is a neurotic choice if he/she has the goal of passing the test. There are other ways of reducing anxiety. One such way is ignoring the stimulus (step 1) by getting absorbed in some other activity. Another one is reconstructing failure, by blaming the test or the examiner (step 4). One can also change the appraisal (step 5), “It is not good to fail, but neither extremely bad”, reduce the arousal at step 6 by taking drugs, or over-prepare and reduce the chance of failing (altering the probability at step 4). Among cognitively oriented psychotherapies, Ellis’ REBT focuses largely on step 5—appraisal—both specific appraisals, and the underlying (general and possibly non-conscious) personal philosophic principles. Step 4 interventions are typical for the work of Beck (1995) and others who emphasize the adopting of new attributions, new anticipated outcomes, new expectations, and more careful logical operations (e.g., avoiding overgeneralizations, dichotomous thinking, and

the like). Step 6 includes direct modifications of emotional responses through biofeedback, relaxation, and medication. Step 7 includes deciding to endure discomfort, as well as increasing skills through training and modifying one's behavior by self-instructional messages (e.g., [Meichenbaum, 1977](#)). All can be used with step 5 interventions. A competent therapist has skills to intervene at any point in the described framework and to offer help with many practical aspects of the client's problems as well as with psychological aspects. What is distinctive among the cognitively oriented psychotherapies is the relative emphasis each places on one or more of the steps in the cognitive psychology framework, as described above.

7. Conclusions and discussions

There is no doubt that CBT is efficient and efficacious for a variety of conditions, from human optimization to the prevention and treatment of various mental disorders. Also, there is no doubt that among CBT schools, Beck's cognitive therapy is the most investigated and empirically supported. Therefore, most of the preeminence of CBT today is indebted to Beck's cognitive therapy rather than to the other CBT schools (e.g., REBT, cognitive-behavioral modifications), although the original and the oldest CBT school, from which the others have developed, is REBT. It is our feeling, however, that research in this line has reached a dead-end because, although effective, the efficacy/effectiveness of these therapies has not yet reached "the desired standard", as about 30–40% of the people are still non-responsive to these interventions. In our view, a more productive strategy than debating preeminence of CBT over other therapies would be to explore new treatments that are anchored in the cognitive approach and thus have already proved both theoretical and practical potential in theoretical papers, case analyses, and pilot studies. The analysis presented in this paper suggests that CBTs focused on appraisal could be more efficient. Indeed, REBT is hypothesized by its proponents ([Ellis, 1987, 1994](#)) to exceed the efficacy of other forms of CBT (e.g., CT), by virtue of promoting a deeper/philosophical change through: (1) unconditional self-acceptance (USA), (2) reducing secondary problems such as self-criticism about having problems and depression about depression, (3) focusing on demandingness (DEM), which seems to be the core belief involved in major depressive disorder (e.g., [Solomon, Arnow, Gotlib, & Wind, 2003](#)), and (4) dealing mainly with the proximal causes of negative feelings (e.g., hot cognitions: evaluation/appraisal) rather than the more distal ones (e.g., cold cognitions: inferences, attributions). What is distinctive about REBT is the explicit discrimination between non-evaluative and evaluative cognitions, and its methods for promoting change. There is an emphasis on changing extreme negative appraisals and the values on which they are based. REBT does not seek to impose values on clients. Instead, REBT seeks to help clients by showing them the advantages of changing their values. "Irrational" evaluative thoughts are good ideas turned bad by exaggeration. For example, a person may hold the cultural value that success on a certain task is better than failure, and yet know that success cannot always be obtained, or that it often involves personal sacrifices. The person can also exaggerate the importance of success and "irrationally" demand success, perhaps as a proof of his/her worth, and view failure as catastrophic. A major goal in REBT is to reduce dysfunctional behaviors and emotions by substituting exaggerated versions of personal values with realistic ones. The REBT therapist may also help clients examine some thoughts at steps 3 and 4, for example, by presenting evidence that the anticipated failure is unlikely to occur, or that they could cope if it did. However, when we say that someone is not practicing REBT, we mean that the therapist devotes no part of the session to the exploration and interventions directed at step 5 of the episode.

From a practical point of view, we believe that the future development of CBT lays in interventions focused on changing appraisal. Some authors have noted the difficulty in changing the appraisal as compared to restructuring cold cognitions ([Beck, 1995](#)). However, this is not an argument for preserving the pursuit of changing cold cognitions while ignoring hot cognitions; the change of hot cognitions involves the development of new techniques and interventions that can approach important aspects related to life philosophy.

From a theoretical point of view, based upon findings in cognitive psychology (e.g., [David, 2003](#); [Ellis, 2003](#); [Lazarus, 1991](#)), it is obvious that any model of mental/emotional disorders should include hot cognitions in order to be comprehensive. For example, in the case of the cognitive model of depression, Ellis has always argued that demandingness is a core element in this disorder (a sadly neglected one; [Ellis, 1987](#)). Upon analyzing the models of depression hypothesized by leading cognitive-behavioral theorists (e.g., Aaron Beck, Martin Seligman), [Ellis \(1987\)](#) has commented that they probably explain how people make themselves appropriately sad, regretful, disappointed, and annoyed when they suffer major losses and inconveniences. [Ellis \(1987\)](#) argues, however, that these models do not explain why people with similar losses and inconveniences may also make themselves inappropriately depressed

and self-hating. He hypothesizes that the CBT/REBT model of depression has a crucial and unique cognitive and philosophical element that differentiates people's appropriate feelings of sadness from their inappropriate feelings of depression, and that it appreciably adds to our understanding of the causative factors in depression. This element is the CBT/REBT concept of absolutistic and dogmatic shoulds, oughts, and musts (i.e., demandingness; see also Macavei, 2005). Ellis was seriously criticized for these ideas (Brown & Beck, 1989; Marzillier, 1987) and was even advised to be "more open minded and realize the values of all useful therapeutic approaches" (Marzillier, 1987). Because at that time CBT/REBT lacked a powerful tool to empirically investigate the CBT/REBT theory of depression, Ellis could not empirically prove his theoretical point. However, although he was criticized by many of his colleagues in the field of CBT, he kept pushing the idea that demandingness was a core factor in depression. Interestingly, recently, Solomon et al. (2003) using individualized cognitive measures of irrational beliefs have found that demandingness does indeed seem to be the core factor involved in depression.

To make a long story short, we believe that CBT has reached preeminence in the clinical field betting on cold cognitions. Despite its advantages and tremendous accomplishments, this approach seems to lose its heuristic values. We believe that the next phase of CBT development lies in the construct of hot cognitions, which could increase its efficacy and effectiveness, and in constructs promoted by cognitive psychology (e.g., unconscious versus conscious; autobiographical versus semantic, accessible versus available), which could contribute to a coherent science of CBT beyond the various schools. It is our belief that these developments could indeed offer CBT the chance of being a platform for integrating psychotherapy.

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