

International Journal of Clinical and Health Psychology

International Journal of Clinical and Health Psychology
Asociación Española de Psicología Conductual (AEPC)
jcsierra@ugr.es
ISSN (Versión impresa): 1697-2600
ESPAÑA

2003

Jesús A. Salas-Auvert / Stephanie H. Felgoise

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International Journal of Clinical and Health Psychology, enero, año/vol. 3, número 001

Asociación Española de Psicología Conductual (AEPC)

Granada, España

pp. 123-140

The Rational-Experiential Information Processing Systems Model: Its Implications For Cognitive Therapy

Jesús A. Salas-Auvert¹ and Stephanie H. Felgoise
(*Philadelphia College of Osteopathic Medicine, USA*)

(Recibido 4 junio 2002 / Received June 4, 2002)
(Aceptado 10 septiembre 2002 / Accepted September 10, 2002)

ABSTRACT. Recent models of the cognitive system include the notion of different levels of information processing. According to these models, cognitive organization and capacity for parallel processing allows a multilayered system of appraisals in which different levels of evaluation are simultaneously available. Thus, the interpretations of a single stimulus may comprise several forms of representation coupled together. A general argument advanced in this paper is that, given the capacity to represent reality and process information in qualitatively different ways, the strategies for intervention must accommodate to such differences in order to increase their effectiveness. The present paper –theoretical study- discusses relevant problems in the standard cognitive therapy model regarding representation of reality and information processing. It presents an alternative information-processing model, the rational-experiential model. Finally, the paper discusses some implications for cognitive therapy practice resulting from the alternative formulation about information processing.

KEYWORDS. Information processing. cognitive therapy. Theoretical study.

RESUMEN. Los modelos recientes sobre el sistema cognitivo incluyen la noción de un procesamiento de la información a diferentes niveles. Según estos modelos, una

1 Correspondece: 1251 South Cedar Crest Blvd. Suite 211D. Allentown, PA, 18103 (USA). E-Mail: jsalasauvert@aol.com

organización cognitiva jerarquizada y la capacidad de procesar la información en paralelo permite el funcionamiento de un sistema multinivel de evaluación simultánea. Así, las interpretaciones de un mismo estímulo podrían comprender el acoplo de distintas formas de representación. Un argumento general de este estudio teórico es que para mejorar su eficacia, las estrategias de intervención deben ser adaptadas a la capacidad que tenemos de representar realidad y de procesar la información de manera cualitativamente distinta. El presente trabajo discute los problemas pertinentes a la terapia cognitiva estándar con respecto a sus modelos de representación de realidad y procesamiento de la información. Se presenta un modelo de procesamiento de la información alternativo denominado racional-experiencial. Finalmente, se discuten las implicaciones para la práctica de la terapia cognitiva que resulta de la aplicación de esta formulación alternativa sobre el procesamiento de la información.

PALABRAS CLAVE. Procesamiento de información. Terapia cognitiva. Estudio teórico.

RESUMO. Os modelos recentes sobre o sistema cognitivo incluem a noção de um processamento da informação a diferentes níveis. De acordo com estes modelos, uma organização cognitiva e a capacidade para processar a informação em paralelo permite o funcionamento de um sistema multinível de avaliação simultânea. Assim, as interpretações de um único estímulo poderiam compreender a associação de diversas formas de representação. Um argumento geral deste estudo teórico é que para melhorar a sua eficácia, as estratégias de intervenção devem ser adaptadas à capacidade que temos de representar a realidade e de processar a informação de maneira qualitativamente distinta. Este trabalho discute os problemas pertinentes para a terapia cognitiva padronizada em relação aos seus modelos de representação da realidade e processamento da informação. Apresenta-se um modelo de processamento da informação alternativo denominado racional-experiencial. Finalmente, discute-se as implicações para a prática da terapia cognitiva que resulta da aplicação desta formulação alternativa sobre o processamento da informação.

PALAVRAS CHAVE. Processamento de informação. Terapia cognitiva. Estudo teórico.

Introduction

A common clinical observation about clients with emotional disorders is that they experience some degree of dissociation between their rational thinking and their emotional experiences. Two decades ago, Rachman (1983) and Wolpe (1978) had already noted that emotional problems usually persist even when clients know that their beliefs are irrational. Lazarus (1989) referred to the contradictions between response systems as disconnections. For example, flying phobics may rationally know that flying is a reasonably safe means of transportation, but still they feel very afraid of it. Likewise, an obsessive-compulsive client may feel urged to perform a ritual knowing that they are illogical. These examples raise questions about the sufficiency of cognitive models to explain

and alter such experiences. There are three aims in this paper: (1) to discuss relevant problems in the cognitive therapy model regarding representation of reality and information processing; (2) to outline possible ways of addressing such problems, including the proposition of a theoretical model called the “rational-experiential model”, that attempts to integrate relevant experimental and clinical findings; and (3) to discuss some implications for cognitive therapy resulting from alternative formulations about multiple forms of representation and information processing. The general argument advanced in this paper is that humans can represent reality and process information in qualitatively different ways, and the strategies for intervention must accommodate to such differences in order to increase their effectiveness. By qualitatively different representations and information processing, we refer to the capacity of embodying distinct encoding features of the stimulus being processed as well as different kind of associations.

Cognitive Experimental Models

The phenomenon of disconnection has led a number of cognitive theorists and cognitive researchers to formulate hierarchical models of the cognitive system (Leventhal, 1984; Williams, Watts, MacLeod, and Mathews, 1988). These cognitive experimental models include different levels of information processing, from low-level basic operations to higher-levels of functioning (e.g., Leventhal, 1984; Mathews and MacLeod, 1986; Williams *et al.*, 1988). The levels of information processing exert reciprocal influence on each other. Higher levels influence lower levels, which is known as top-down processing, and the reverse is referred to as bottom-up processing (e.g., Leventhal, 1984; Neisser, 1976). According to these cognitive models, cognitive activities may occur in serial order or in parallel form (Jonides and Gleitman, 1972; Posner and McLeod, 1982; Turvey, 1973). The possibility of parallel processing allows for multiple representations of the same stimulus. Thus, a single item of information might be stored and processed in any of several different ways (Carlston and Smith, 1996). Consequently, the memories and interpretations of a single stimulus may comprise several forms of representation coupled together, some of which may be incongruent (e.g., simultaneously feeling attraction and aversion). Also, cognitive operations may take place in two qualitatively different manners: automatically or strategically. Automatic processes are preconscious, unintentional and operate through associative connections. Strategic processes involve cognitive activity that occurs at a conscious level, and are deliberate, controlled and effortful (e.g., Lundh, 1988; Schneider, Dumais, and Siffrin, 1984; Schneider and Siffrin, 1977; Williams *et al.*, 1988). The complex cognitive architecture and cognitive functioning implicit in the information-processing paradigm provide a basis to understand such phenomena as rational-emotional incongruence, perceptual defense, and priming without awareness.

Recently, cognitive therapy theorists have adopted the information-processing paradigm derived from experimental cognitive psychology to improve the understanding of the cognitive basis of emotions, particularly anxiety (e.g., Alford and Beck, 1997; Beck, 1991a; Beck and Clark, 1997). Moreover, Alford and Beck (1997) proposed a hierarchical information-processing model involving three levels of cognitive operations: (a) the preconscious, unintentional, automatic level; (b) the conscious which involve a

passive monitoring of conscious experience; and (c) the metacognitive level which is a higher-order thought process involving active and deliberate memory-analytic abilities and conscious awareness. According to this model, cognitions at all levels are verbal propositions accessible to awareness with the proper training (Alford and Beck, 1997; Beck, 1967, 1976).

A number of important questions can be raised about the information processing model used in cognitive therapy. For example, (1) Are verbal propositions the main informational code at all levels of processing?, (2) What is the role of emotions at the different levels of cognitive operation?, (3) How is knowledge about emotions organized?, (4) Can emotions arise when there have been no preceding thoughts?, (5) Must successful treatment of emotional disorders include changes at all cognitive levels of operation?, (6) Is cognitive restructuring the most effective intervention for all levels of information processing?

Alternative Formulations in Information Processing

A psychodynamic perspective

Epstein and his colleagues (e.g., Epstein, 1990, 1993a, 1998; Epstein, Lipson, Holstein, and Hugh, 1992) have propounded a conceptualization called the Cognitive-Experiential Self-System Theory (CEST) which is rooted in psychodynamic theory. According to CEST there are two levels of information processing through which individuals construe their models of the self and the world: the cognitive system and the experiential system. The two levels operate relatively independently, and are guided by different rules of influence. The cognitive system is characterized by being logical, abstract, slow, deliberated and conscious. The experiential system allows us to construct meanings in an automatic, intuitive, nonconscious and holistic fashion. However, it is inadequate to analyze complex information. Epstein (1998) referred to representations in the cognitive system as beliefs, and those in the experiential system as implicit beliefs or schemas. According to Epstein (1990, 1998), schemas are primarily generalizations inductively derived from emotionally significant experiences. Epstein's (1984) conceptualization of schema is similar to Leventhal's (1979, 1984) concept of emotion schema, and Lang's (e.g., Lang, Lewin, Miller, and Kozak, 1983) concept of emotion prototypes, in the sense of being emotionally laden cognitive structures coded in memory at a preattentive level. The combined operations of the two information-processing systems are believed to influence behavior.

A cognitive-behavioral perspective

Barnard, Teasdale and their colleagues (e.g., Barnard, 1985; Barnard and Teasdale, 1991; Teasdale, 1996, 1999; Teasdale and Barnard, 1993; Teasdale, Segal, and Williams, 1995) recently formulated a complex information processing model involving different representational formats and information codes called the Interacting Cognitive Subsystems (ICS). This conceptual framework, based on a cognitive-behavioral framework, proposes a cognitive system comprising nine interactive cognitive subsystems. Each of these is

specialized for encoding and processing different types of information. According to the ICS model, cognitive-affective interaction and change is mainly based upon two levels of semantic interpretation: Propositional and implicational (Barnard and Teasdale, 1991). The distinction of two qualitatively different levels of meaning is similar to the one already suggested by Epstein and his colleagues. Specifically, Teasdale and his colleagues' concept of propositional system is close to Epstein's concept of cognitive system; both are based on verbal language and involve rational analysis. Furthermore, the concept of implicational system is similar to Epstein's experiential system in that it corresponds to emotions, moods and vibes rather than to thoughts or images (Barnard and Teasdale, 1991). The implicational system integrates sensorial and propositional meanings into a holistic sense about something (i.e., a thought, an image or a bodily sensation).

Attributes of the Cognitive-Propositional System

Representational Attributes

The cognitive system is closely linked with language and logic. Within this system, information is encoded in terms of symbols, words and numbers (Epstein, 1998). Thus, the content of these types of representations is verbal and numerical. According to Epstein (1991, 1998) the cognitive or rational system can function at higher levels of abstraction than the experiential system. Change within the cognitive system involves, a process of objectivation of individuals' perceptions of reality. It also includes a process of logical and structural differentiation of previous cognitive representations toward new ones, more complex in terms of units of representation, organization and integration. For example, as children educate and grow into adults, their primitive representations of the self and the world become more complex. Greater representational complexity entails organizing knowledge using a larger number of aspects (e.g., traits, core beliefs), and a greater distinction among such aspects (Linville, 1987).

Information-Processing Attributes

The cognitive-propositional system operates primarily through language (Epstein, 1993a, 1998). It is typically conscious, controlled, logical, deliberated, and designed for problem solving of complex demands, but of limited attentional capacity (Epstein, 1990, 1993a; Brewin, 1988). It operates according to logic rules, and the meaning resulting from this system can be assessed by their validity (i.e., they can be empirically verified or demonstrated logically; Teasdale, 1996). For example, reevaluation of information may produce a cognitive change. This system is associated with long-term consequences, and responsible for conscious intentions, long-term goals and complex problem solving. The cognitive subsystem changes according to the strength of the arguments and the clarity of the new evidences (Epstein, 1991).

Experiential System's Attributes

Representational Attributes

The experiential system is emotionally driven, and closely tied to experience, that is, feeling, sensing, and behaving. The experiential system encodes information in sensorial, affective or motor ways which are rich in implicit meaning (Epstein, 1998; Teasdale, 1996). According to Epstein (1993a, 1998), the experiential system represents inputs primarily in concrete or imaginary forms. However, this system is also capable of abstraction in the form of generalization gradients, metaphors, and narratives (Epstein, 1998). Similarly, Teasdale (1996, 1999) suggested that patterns of implicational code represent higher order implicit meanings extracted from experience. The experiential system allows us to construct meanings in an instantaneous, holistic, intuitive and effortless fashion. An example of this holistic representation is the instantaneous laugh one may have upon immediately hearing a funny joke. In this example, the emotional response seems to be triggered by a holistic and quick appreciation of the stimuli which does not appear to be mediated by cognitive propositions. Thus, the meaning is constructed without direct participation of the propositional system. Experiential information tends to be encoded and processed outside of awareness at the preattentive level. Two reasons have been suggested to account for the preconscious nature of most of the implicational system functioning: (1) automatized tasks require little attentional resources (Schneider *et al.*, 1984); (2) holistic encoding of inputs make them independent of focused attention and conscious processing (LaBerge, 1973). The holistic representation of an event occurs when sufficient features of the schema are present and the individual is able to categorize his/her perception (McCloskey and Glucksberg, 1978; Rosch, 1978). For example, phobic clients may construct an interpretation of an event as threatening if according to their past experience, it contains sufficient relevant information that matches a previously threatening experience. Similarly to Epstein's (1998) description of the experiential system functioning, Teasdale (1996, 1999) suggested that implicational representations are difficult to convey since meaning is not based on language, but on images, feelings or kinesthetic sensations. Hence, in order to be reported, implicational representations have to be translated into language. For example, it is common that clients have expressions such: "I don't know how to describe how I feel"; "I never felt like this before. I don't know what to make of this." And, certainly pre-verbal children cannot verbally describe their emotional or physical experiences. Thus, even though they have affective experiences, infants do not have the means to translate their experiences into words. Leahy (1991) suggested that clients may have experiential representations resulting from learning processes that took place in pre-verbal stages of development; consequently, it is difficult for them to describe the experience. Also, later in life, after language is available, representations may also result from a conditioning process outside of the individual awareness (Skinner, 1957). Well rehearsed mental representations have a high probability of being directly retrieved by the relevant evoking stimulus, bypassing any rules or decision process operations (Logan, 1988). Some of these representations may reach awareness, and oftentimes they may be influenced by consciously controlled processes.

Information Processing Attributes

The experiential system is adaptive in nature and has a longer evolutionary history than the cognitive system (Epstein, 1993b). The experiential system operates in a similar manner in both humans and nonhuman animals, that is, by associations and conditioning. The experiential system is intended to deal with certain features of the environment that have adaptational meaning (Epstein, 1998). Thus, behavior is reinforced and shaped by positive and negative affect (Epstein, 1998). Depending on past emotionally similar experiences, the experiential representation occurs when a learned representation is activated by the relevant stimulus. This system is associated with short-term consequences. For example, when clients are confronted with a situation that triggers an emotion, their affective response involves an implicit action tendency to seek to further the state if the affect is pleasant, or to reduce the state if it is unpleasant (Epstein, 1990, 1998). A complementary perceptual process may also be involved in this type of representation in which a gestalt is either created or activated. For example, in Kohler's (1970) experiment with chickens, he found that the chicken's response became conditioned to a relationship between the stimuli rather than a specific stimulus. In other words, chickens' learning seems to have involved the construction of a principle or relationship among variables, and not merely a specific stimulus-response association in which contextual cues helped to provide meaning. Changes in the system seem to occur by establishing new connections between the stimulus (overt or covert) and the response. Hence, experiential changes seem to be mainly due to conditioning (classical or operant) process. Extended practice of stimulus perception that initially requires focused attention and serial processing eventually lead to integrated holistic representations (LaBerge, 1973). Also, a sudden exposure to highly emotional stimuli may create strong and new associations equivalent to what would result from extensive practice (e.g., a traumatic reaction).

Interaction Between the Cognitive and Experiential Systems

The complexity in human behavior seems to be in part due to the possibility of being influenced simultaneously by experiential and cognitive representations and processing (Epstein, 1998). For example, when an expert driver travels from one place to another, the behavior includes the ability to timeshare between the automatized tasks and attention-demanding tasks. Moreover, the experiential and cognitive systems can communicate and influence each other. The balance of influences between the cognitive and the experiential systems is flexible and varies according to different factors, such as the nature of the stimuli, individual's preferred coping style and emotional state. Epstein (1998) suggested that emotional arousal tend to shift the balance of influence favor the experiential system.

Relative independence of the systems

The two information processing systems operate simultaneously and can influence each other, but they may also operate in a relatively independent manner (Epstein, 1993a, 1998; Barnard and Teasdale, 1991; Teasdale, 1999). This last property may

explain the frequent reports from clients about the dissociation between what they think and what they feel regarding a particular situation. An example is the typical obsessive-compulsive experience: "I know that to behave in this way is totally irrational, but I feel an irresistible urge to do it." Another example is observed in the treatment of phobic reactions. Typically, after cognitive restructuring has occurred and clients rate their irrational threatening beliefs with very low credibility, clients still report anxiety when confronting a phobic object. How is that possible? Perhaps, the exposure to the phobic stimulus still triggers a perception of a threat (experientially encoded), which in turn triggers the fear response. The relative independence between the two systems is also involved when the experiential representation of a stimulus occurs outside the person's awareness. Consequently, despite the fact that some individuals consciously report a monolithic construction of a particular stimulus, in reality their construction may be contradictory. For example, it has been found that homophobic individuals consciously reject homosexuality, but experientially and unconsciously feel sexually aroused by homosexual stimuli. This arousal has not been observed in heterosexual non-homophobic individuals when they are exposed to the same homosexual stimuli (Adams and Wright, 1996). Parallel processing of multiple inputs, and the reciprocal influence between information processing subsystems is central to understand complex human behavior, including the maintenance and modification of emotional states.

Experiential system influencing cognitive processing

The emotional reactions accompanying an experiential activation may influence the operation of the propositional system. For example, a stimulus may trigger a particular emotion (i.e., a depressive reaction) which tends to color the nature of the propositional system spontaneously activated (Epstein, 1990; Teasdale, 1997). Another phenomenon that also reveals this type of interaction is observed when patients receive pharmacotherapy. The biochemical changes resulting from the drugs change patients' experiential system, which in turn influence spontaneous cognitive activity. However, these changes do not reduce individuals' vulnerability to a particular disorder because it does not seem to have an impact on their core cognitive structure (Riskind, 1995).

Cognitive influence on experiential processing

A different type of interaction occurs when the cognitive system influences the operation of the experiential system. Thus, the cognitive system may be associated to emotional reactions, specially those that involve more cognitive elaboration, such as remorse, guilt, or pride. Consider for example, a woman who feels depressed because of the abortion she had ten years ago. For the nine years she did not feel any distress about it, but a conversation with a friend changed her view about abortion and now she feels guilty. She frequently thinks that she should have not done it, and that it was morally wrong. That example shows how propositions may act as a direct antecedent to an emotional reaction. This kind of influence -the cognitive system's influence on the experiential system- is crucial for the design of cognitive-behavioral interventions. For example, anxiety disordered clients can give themselves instructions to remain in aversive situations despite their fear (Meichenbaum, 1977). Hence, through rational

self-instruction individuals can help themselves to realize that nothing dangerous will happen as they are exposed to phobic situations. This awareness will facilitate the creation of a new emotional connection. An interesting research question stemming from exploring the interaction between the two systems is, Under which circumstances does one of the systems, cognitive or experiential, have more control over the mind than the other?

The Dual System Model and Cognitive Therapy

Alford and Beck (1997) have attempted to integrate Epstein's (1994) dual processing model into cognitive therapy's conceptual information-processing model. According to Alford and Beck, the automatic level corresponds to the experiential system, and the metacognitive level to the cognitive system. The metacognitive level of information processing has evolved to override the experiential system, that is, "primal thinking, affect and motivation" (Alford and Beck, 1997, p. 68); consequently, it is activated when the experiential system is dysfunctional. Alford and Beck (1997) comparative analysis overlooked the particular properties of the experiential system, and subordinate its functioning to the rational or metacognitive system. However, if the Epstein's model is valid, the presence of an experiential system, in addition to the rational system, has important implications for theory and practice of cognitive therapy.

The Mediation Model

A basic tenant in cognitive therapy is that cognition mediates emotion and behavior (Beck and Clark, 1997). The mediational model and the cognitive primacy principle have been justified by adopting a very broad definition of cognition (Lazarus, 1984; Alford and Beck, 1997). According to Alford and Beck (1997), "cognition includes the entire range of variables implicated in the processing of information and meaning" (Alford and Beck, 1997, p. 65). Thus, all psychological processes, including perception, are explained by means of cognitive concepts. From a neuropsychological perspective, LeDoux (1989) also supported a broad definition of cognition. Specifically, LeDoux (1989) suggested that before one responds emotionally to stimuli, one must perform some computation of stimulus significance in order to assign an affective valence to the stimuli. According to LeDoux (1989) computation is the benchmark of the cognitive operation; consequently, appraisals are considered a cognitive process. If one accepts the preceding formulation as tenable, the Lazarus-Zajonc controversy of whether the affect is a post-cognitive or a pre-cognitive phenomenon is no longer valid (e.g., Lazarus, 1982, 1984; Zajonc, 1980, 1984). Then, the important question is whether or not humans represent reality exclusively in terms of thoughts and images. If the answer to that question is affirmative, then it is assumed that all emotional experiences are preceded by a thought or an image, automatic or not. Moreover, therapists must try to persuade their clients that there are unidentified and preconscious irrational thoughts that account for their distress, and that they need to become aware of them. According to the cognitive-experiential model, one can also engage in an instantaneous, holistic and preconscious appraisal of physical or semantic stimuli without a prior stage of concep-

tual appraisal (Arnold, 1960; Epstein, 1998; Lazarus, 1984). The information is automatically encoded and linked through associations that do not necessarily give rise to a kind of propositional or declarative knowledge (Lovibond, 1993). For example, LeDoux (1996) and Öhman, Flykt, and Lundqvist (2000) suggested that aversive emotional learning can occur without a conscious representation of the learning process. The practical implication of this automatic process is that therapists do not have to insist that for every emotional reaction there is at least one automatic thought or image that has to be uncovered. From a research point of view, it is interesting to explore how verbal-symbolic stimuli acquire emotion-evoking properties without resorting to cognitive propositions as explanations. For example, in the case of fear, Bouton, Mineka, and Barlow (2001) hypothesized that implicit emotional memories can activate the fear system without an awareness of why that happens. The cognitive-experiential perspective is compatible with the notion that, even though humans can mediate their perception through the use of verbal language, perception is not dependent upon verbal, declarative knowledge. For example, infants construct sensory motor schemata before they have verbal language and abstract representations of the world (Piaget, 1954; Gibson, 1966, 1979). Izard (1994) argued that emotional responses can be learned and activated without the participation of neocortex and thought processes. Bechara *et al.* (1995) findings support Izard's hypothesis. Bechara *et al.* (1995) found that a patient with a damaged hippocampus was able to acquire classically conditioned autonomic responding, but was unable to report what conditioned stimulus predicted the unconditional stimulus. Conversely, a patient with a damaged amygdala was not able to develop an autonomic conditioned response, but was capable of reporting what conditioned stimulus predicted the unconditioned stimulus. Gibson (1966) referred to the nonverbally mediated perceptions of events as "direct perceptions". An implication of the cognitive-experiential perspective is that just because we are able to verbally describe our experience does not mean that all experiences are created or controlled by prior thoughts. Thus, if therapy focuses only on the propositional level representations, it may fail to access and modify emotions acquired through subcortical pathways or associate with emotion networks, which are basically not language based (Izard, 1994; Lang, Cuthbert and Bradley, 1998).

Case Conceptualization

Although cognitive therapy is framed within a biopsychosocial model, and the reciprocal determinism principle (Bandura, 1977), the focus of case conceptualizations is primarily on cognitive factors, particularly on clients' beliefs (e.g., Alford and Beck, 1997; Kuehlwein, 1998; Layden, 1998; Persons, 1989). For cognitive therapy, cognitive content (e.g. automatic thoughts), cognitive processes (e.g., cognitive distortions), and cognitive structure (e.g. schemas) are formulated in propositional terms (Beck, 1991a,b; Freeman, 1993; Hollon, DeRubeis, and Evans, 1987). Alford and Beck (1997) stated, "The cognitive conceptualization of psychotherapy provides strategies for correcting such concepts. Thus, the theoretical framework of cognitive therapy constitutes a 'theory of theories'" (p. 11). Alternatively, a case conceptualization that uses the cognitive-experiential model would better balance the importance of stimulus-response connec-

tions, information processing styles, and operant schedules of reinforcement in understanding the client's disorder.

Therapy Focus

According to cognitive therapy principles, maladaptive beliefs are the central characteristic of psychological disturbances (Rush, Beck, Kovacs, and Hollon, 1977). Consequently, the correction of such beliefs should alleviate symptomatology (Beck, 1991b; Hollon *et al.*, 1987). Hence, the primary targets in cognitive therapy are maladaptive cognitive content, processes and structures (J.S. Beck, 1995). Thus, despite the acknowledgment of an unconscious or habitual level of cognitive functioning, the main focus of cognitive therapy interventions has been the conscious and metacognitive levels (Alford and Beck, 1997; J. S. Beck, 1995). For example, J. S. Beck (1995) stated: "The cognitive therapist is particularly interested in the level of thinking that operates simultaneously with more obvious, surface level of thinking" (p. 14). Thus, when practicing, cognitive therapists tend to equate cognition with logical conceptual activity, to underemphasize the role of automatic processing, and to neglect the use of conditioning and experiential techniques. From a cognitive-experiential framework, therapy would place more emphasis on balancing upper and lower levels of cognitive functioning and to facilitate clients' learning of new stimulus-response connections.

Strategies for intervention

The adoption of a cognitive-experiential information processing approach is compatible with Petty and Cacioppo's (1986) contention that there are two routes to persuasion, and that psychotherapy can be conceptualized and implemented in two ways: 1) The central route to behavioral change, which is based upon a reflective, critical and analytical exam of arguments and evidences. The result of such a rational discussion will persuade the individual to change. The amount of persuasion will depend on the strength of the arguments presented by the therapist (Riskind, 1995). For example, through critical thinking a worry prone individual questions her need to feel totally safe, and realizes that she has been taking reasonable risks all her life, and that nobody is perfectly safe or secure. Such awareness may help to reduce her initial need for total safety. 2) The peripheral route to behavior change is based on, and involves indirect and mindless methods of persuasion (Riskind, 1995). For example, a therapist may recommend an inhibited client to disclose a painful past experience to a close friend. The goal of such intervention is to provide the client with an outlet to his thoughts and feelings which has been found to be a buffer for distress and disease (e.g., Booth, Petrie, and Pennebaker, 1997; Borkovec, Roemer and Kinyon, 1995). Although any form of therapy includes some degree of both central and peripheral routes of persuasion, cognitive therapy focuses on the central route, targeting patients' rational system. Thus, the goal of the Socratic method in cognitive therapy is to facilitate clients' reformulation of conscious irrational beliefs through systematic questioning, empirical hypothesis-testing, and inductive reasoning (Hollon and Beck, 1986). Also, interventions based upon Ellis' rational-emotive therapy emphasize the role of rational disputations and rational appeal to promote clients' reconceptualization of irrational values and beliefs (Ellis,

1970; Ellis and Dryden, 1987). Thus, as clients become aware of their faulty logic or the lack of factual support for their beliefs allow clients to realign their thinking with reality (Ellis, 1970; Rush *et al.*, 1977). Alternatively, other therapeutic approaches such as behavior therapy, hypnosis, client-centered therapy, gestalt, and psychodrama emphasize the use of peripheral route interventions.

Behavioral interventions in cognitive therapy

Within a cognitive framework, cognitive therapy uses a variety of noncognitive techniques to change clients' behavior (J. S. Beck, 1995). Moreover, behavioral interventions and behavior change are considered as central components of cognitive therapy (Persons, 1995). In cognitive therapy, behavioral techniques are conceptualized as real-life hypothesis-testing experiments through which clients have the opportunity to collect unbiased data, to reevaluate their beliefs in terms of their validity or functionality, and to reach new conclusions (J.S. Beck, 1995). This view is consistent with the notion that the primary goal of all change procedures in cognitive therapy, including the ones that involve behavioral intervention, is a belief change. At present, it is widely accepted that behavioral interventions often induce conscious and metacognitive changes. However, there are limits to the extent that undesired emotions (e.g., a depressive mood or a phobic response) can be changed through modifying the individual's beliefs (Rachman, 1983). Thus, the usefulness of behavioral interventions is not limited to represent a method to facilitate the objectivation of a distorted belief. Its main value is to facilitate new habitual stimulus-response associations (i.e., habituation), as well as the acquisition of new skills (i.e., assertive behavior). Consequently, cognitive-behavior therapy typically uses homework assignments. The rationale is that repeated experiences lead to developing new coping skills or new affective connections to relevant stimuli which will become strongly synthesized and stored in memory.

The role of emotion

In cognitive therapy, emotions are an important source of information. And, emotions are induced in order to facilitate the identification of spontaneous cognitive activity, particularly, negative automatic thoughts (Alford and Beck, 1997; Beck and Clark, 1997). From a cognitive-experiential perspective, the emotional aspects of the client's problems have additional functions and applications. For example, therapists should strive to teach clients to identify and accept their emotional experience, and how to express and regulate their emotions. Epstein (1998) proposed that therapists can modify clients' rational system through guided imagery exercises which communicate directly with the experiential system. In addition to constitute a method that allows to uncover deep-seated schemas, fantasy can be used as a vicarious form of experience and exposure. Safran and Greenberg (1986) suggested that dysfunctional beliefs can be effectively challenged by confronting them with contrary emotional experiences. From a behavioral framework, an increasing number of anxiety disorders theorists agree that emotional engagement during exposure to phobic stimuli is a necessary condition for successful emotional reprocessing of the event and recovery (e.g., Borkovec and Sides, 1979; Foa and Kozak, 1986; Jaycox, Foa, and Morral, 1998; Kozak, Foa, and Steketee, 1988; Lang, Melamed, and Hart, 1970). Similarly, behavior analytic theorists suggest

that psychological distress often results from experiential avoidance (Hayes, Strosahl, and Wilson, 1996). Moreover, according to their conceptualization, experiential avoidance is a defensive reaction, counterproductive for emotional problems resolution; therefore, interventions must emphasize facilitating clients' acceptance of their emotional experiences (Hayes, 1987; Wilson, Hayes, and Gifford, 1997). Hunt (1998) and Teasdale (1999) have suggested that in some cases cognitive restructuring of nonemotional cognitions may help to maintain a propositional buffer that prevents the activation of affect-related schemas, and interferes with effective emotional processing.

The Rational-Experiential Approach

Taking into account the essential features that differentiated the two information processing systems, a more appropriate name for the model would be rational-experiential rather than cognitive-experiential. Specifically, Epstein's concept of cognitive system and Teasdale's concept of propositional system are better referred to as a "rational system" since their most distinctive feature is the use of logical operations. Epstein (1990, 1998) has also used the terms cognitive system and rational system interchangeably. The term "rational" is not synonymous with "propositional" since there are instances in which the information is processed in a conscious, propositional and irrational manner (e.g., obsessive thoughts). Thus, in some cases propositions seem to operate in an experiential style rather than in a logical fashion, and to be more susceptible to change through experiential than rational interventions. In addition, the rational system operates frequently in a conscious and deliberate manner; however, it is not exclusively conscious since it can also operate at a preconscious level (e.g., an automatic thought that is not distorted, but rational). The experiential system, on the other hand, is typically associated with emotions and emotionally laden perceptions, thoughts, images, and bodily changes. This system frequently operates in a preconscious or unconscious manner, but it may also function in a conscious way. For example, a client may report: "I know that I am a valuable human being, but I don't feel valuable." The following concepts seem to be the most prototypical characteristics of experiential information processing: (a) its associationistic nature; thus, the experiential system changes according to some sort of conditioning process, by way of association, in contrast to the rational system, which changes according to deductive and inductive reasoning; (b) its affective nature; and (c) its spontaneity or unintended nature. An additional reason to prefer the rational-experiential term over cognitive-experiential is that, if one accepts the broad definition of cognition formulated by Beck and his colleagues (e.g., Alford and Beck, 1997), all forms of information processing are cognitive; consequently, the experiential information processing is also a cognitive process.

Conclusions

As Gardner (1987) suggested, to limit human information processing capabilities to a logical model is only justified to avoid complicating the scientific endeavor of studying human cognition. Humans' cognitive organization and capacity for parallel

processing allows humans to have a multilayered system of appraisals in which different levels of evaluation are simultaneously available (Leventhal and Scherer, 1987). The rational-experiential model distinguishes between two qualitatively different information processing systems: rational and experiential. According to this model, one can simultaneously produce automatic and controlled appraisals, conscious and unconscious cognitions, emotionally laden cognitions and nonemotional cognitions. In addition, there is interaction between the information processing subsystems: rational and experiential. Such capability produces a model of the human mind characterized as dynamic, flexible and self-organizing, and helps to understand complex phenomena such as rational-experiential incongruity. It also explains the need in cognitive therapy literature to distinguish between “cold” cognitions, typified by rationality and logic, and “hot” cognitions, characterized by irrational, emotionally-laden thoughts or images. The awareness of the differences in the way people represents reality and process information leads therapists to balance more verbal exchanges and logical analysis about the irrationality of the client’s beliefs with the use of behaviorally-based treatment and experiential interventions. Undesirable emotional responses are most effectively modified when clients are in the relevant emotional state; consequently, a crucial strategy is to design interventions that replicate the environmental contingencies that activate relevant schemas and evoke maladaptive emotions (Safran and Greenberg, 1998). The goal is to teach clients to reprocess the information in a different way, creating new constructive meanings for relevant stimuli, at a conscious and/or preconscious levels. Thus, even though a significant proportion of clients’ maladaptive emotions and behaviors result from dysfunctional beliefs and heuristics, not all behaviors are governed by thoughts. A complementary formulation of nonpropositional information processing is necessary for a more accurate understanding of human behavior and for more effective techniques to modify it. A more comprehensive model of information processing seems to be more descriptive of human functioning and more useful in terms of clinical applications. Thus, after all, the seventieth century French physicist Blaise Pascal was right: “The heart has reasons than the mind does not understand.”

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