

# COGNITIVE EVOLUTIONARY THERAPY FOR DEPRESSION

## Therapy Manual

Cezar Giosan, PhD<sup>1,2</sup>

Vlad Mureșan, PhD<sup>1</sup>

<sup>1</sup> Babes-Bolyai University

<sup>2</sup> University of Bucharest

**NOTE: WORK IN PROGRESS**

**- Unfinished and unpublished manuscript. Do not cite or distribute without written permission -**

[www.DarwinianPsychotherapy.com](http://www.DarwinianPsychotherapy.com)

## Acknowledgments

The authors would like to thank Oana Cobeanu, Cristina Mogoșe, Alina Rusu, and Aurora Szentagotai for their inputs and comments on the various iterations of this manuscript.

Also, special thanks to David Buss, Todd Shackelford, and Aurelio Jose Figueredo for their valuable help and early feedback on this work.

Note: This work was supported by a UEFISCDI grant awarded to Cezar Giosan through the Department of Clinical Psychology and Psychotherapy, Babeș-Bolyai University.

## 1. WHAT IS EVOLUTIONARY PSYCHOLOGY?

---

*In the distant future I see open fields for far more important researches. Psychology will be based on a new foundation, that of the necessary acquirement of each mental power and capacity by gradation.*

*Charles Darwin, The Origin of Species, 1859*

---

Little did Charles Darwin know a century and a half ago that his prophetic words would constitute the foundation of a modern discipline within the broad field of psychology, namely “evolutionary psychology.” Evolutionary psychology examines psychological traits and processes – such as memory, perception, or language – from a modern evolutionary perspective (Buss, 2005). It seeks to identify which (typically human) psychological traits and mechanisms are adaptations, that is, the functional products of natural selection. The approach is similar to that in medicine, wherein organs (e.g., heart, liver) are understood in the context of the survival and reproductive functions they serve. Although a relatively new development in psychology, significant progress has been made in the field in the past two decades. Behaviors that could not be explained well before, such as the causes of gender differences in sexual preferences, or altruistic behavior towards kin, have received ultimate-cause explanations deriving from the insights of evolutionary psychology (Buss, 2005).

Evolutionary psychology uses an adaptationist approach to understand and explain cognitive structures and argues that different “pieces” of our cognitive system serve different adaptive functions, which are related to recurrent adaptive problems that humans had to confront in the ancestral environments (Buss, 2005; Confer et al., 2010). Evolutionary psychology is not just a sub-discipline of psychology, but a foundational framework that integrates and reinterprets the entire field of psychology, in a similar way that Darwinism has done for biology (Cosmides, 1997; Ploeger, van der Maas, & Raijmakers, 2008).

While the classical approach in psychology, known as the “standard social science model” (Cosmides, 1997), has historically considered the human cognitive system to include abstract processes and general-problem solving domains such as reasoning and decision making, evolutionary psychologists describe evolved psychological mechanisms as narrowly focused to deal with specific problems, such as cheaters detection, mate selection, incest avoidance, or parental investment (Kurzban, 2011). Evolutionary psychology views the human brain as being comprised of many such functional mechanisms, called psychological adaptations, which are the result of natural selection (Barkow, Cosmides, & Tooby, 1995; Kurzban, 2011).

As with adaptations in general, psychological adaptations are intrinsically related to the specific environment in which they evolved, termed *the Environment of Evolutionary Adaptedness, or the EEA* (Tooby & Cosmides, 1990). The EEA is not a specific point/place in time, but rather a collection of historically recurring selection pressures that formed an adaptation through natural selection.

Humans, comprising the genus *Homo*, appeared between 1.5 and 2.5 million years ago, a time that coincides with the start of the Pleistocene 1.8 million years ago. Because the Pleistocene ended a mere 12,000 years ago, most human adaptations evolved before or during that period. Evolutionary psychologists therefore argue that the majority of human cognitive modules are adapted to reproductive and survival problems frequently encountered in *Pleistocene environments* (Barkow et al., 1995). In broad terms, these problems include those of growth, development, differentiation, maintenance, mating, parenting, and social relationships.

Since an organism's adaptations are suited to its ancestral environments, a novel and different environment can create a mismatch (Irons, 1998). This explains the relative ease with which humans develop phobias for ancestral threats (e.g., predators, insects, or heights) but rarely for modern, more dangerous inventions that were not present in ancestral environments (e.g., pollution, cigarettes, guns, traffic, or driving) (Pinker, 2009).

## 2. THE CONCEPT OF FITNESS IN EVOLUTIONARY PSYCHOLOGY

Fitness, a fundamental concept in evolutionary biology, is defined through *reproductive success* (number of offspring, (Fagerstrom, 1992; R. A. Fisher, 1958; Rosenberg, 1983; Sober, 1993), or through *adaptedness*, that is, *properties and capacities that make an organism more* (Burns, 1992; Dennett, 1995; Dobzhansky, 1969; Lennox, 1991; Michod, 1999; Pianka, 1978).

For a significant period after Darwin's monumental work, it was generally believed that an organism could achieve fitness solely through the maximum number of viable offspring. This narrow approach made it difficult to explain phenomena such as altruistic behavior, or particularly extreme altruism such as self-sacrifice, which Darwin himself saw as a threat to his theory of evolution. In 1964, however, William D. Hamilton noted that an organism can achieve success not only through direct reproduction, but also through indirect reproduction, by investing in organisms that carry copies of his or her genes – such as when a woman invests in her nephews. Hamilton proposed the concept of *inclusive fitness*, emphasizing a "gene's-eye" view of evolution (Hamilton, 1964). Thus, an organism's *inclusive fitness* is the sum of its classical fitness (how many of its own offspring it produces) and the number of equivalents of its own offspring it can add by supporting others. Other authors, such as Robert Trivers (1971) expanded on Hamilton's work by arguing that altruism towards non-kin evolved because it can be beneficial to an organisms' fitness, much in the same way like a tit-for-tat strategy.

## 3. EVOLUTIONARY PSYCHOPATHOLOGY

Evolutionary psychopathology is the evolutionary discipline that tries to understand mental disorders from an evolutionary perspective. Evolutionary psychology and evolutionary psychopathology start from the foundation of a universal human nature (Buss, 2000a; Tooby & Cosmides, 1990) and converge on two principles: (1) that there is a universal human nature that has evolved through natural selection, and (2) that some modern environments are toxic and damaging given our evolved nature. For instance, just as junk food damages our physical health, so do deviations

from ancestral patterns of kinship and group cohesion (e.g., band and tribal patterns) damage our mental health (Gilbert & Bailey, 2000).

The high and persistent incidence of mental disorder in the general population of the developed world has triggered attempts to explain it from an evolutionary perspective. Such attempts generally center on a taxonomy or definition of mental disorder (Wakefield, 1997; Wakefield & First, 2003) or on the possible functions of distinct mental conditions (Crow, 1991, 1995, 1997; Fiske & Haslam, 1997; Mealey, 2000). To this end, a mental disorder is seen either as evolutionary dysfunction / failure of natural design (e.g., phobias), or as naturally selected conditions (e.g., mild depression) having present or past fitness advantages (Nesse, 2005). Phobias, in this view, are the result of evolved mechanisms designed to yield false positives, rather than false negatives. Indeed, one false negative (e.g., *not* avoiding a poisonous snake, believing it is harmless) could have resulted in death in ancestral environments (Nesse, 2005). Evolutionary psychologists argue that many phobias are exaggerations of fears of situations and objects that constituted threats in our evolutionary past (e.g., spiders, heights, storms, snakes, blood). Indeed, studies show that few people develop phobias of modern threats to survival, such as pollution or cigarettes (Marks, 1987; Marks & Nesse, 1994).

## 4. FITNESS IN EVOLUTIONARY PSYCHOPATHOLOGY

### 4.1. Evaluating Fitness

There are multiple ways by which an organism achieves fitness. According to Life History Theory (Bogaert & Rushton, 1989; Figueredo et al., 2006; MacArthur & Wilson, 1967; Pianka, 1970), an organism's available resources are finite, which translates into trade-offs in resource allocation for solving various fitness-relevant tasks. For instance, an individual can allocate resources for somatic effort (e.g., growing a larger body), or reproductive effort (pursuing mates or investing in offspring).

The extremes of these fundamental dimensions of reproduction are captured by the r/K theory. A “K-selection” strategy produces a smaller number of “fitter” offspring with higher chances of survival, whereas an “r-selected” strategy produces a larger number of offspring, of whom only a minority may survive (Bogaert & Rushton, 1989; Figueredo et al., 2006).

When applied to humans, Life History Strategy is referred to as “differential K” (Rushton, 1985). A high-K strategy in humans is theorized as a cohesive fitness strategy, in which the individual invests in somatic and parental effort to produce a fewer number of “fitter” and more competitive offspring. Traits associated with a high-K strategy are long-term thinking and planning, commitment to long-term relationships, extensive parental investment, existence of social support structures, adherence to social rules (e.g., altruism and cooperation) and careful consideration of risks (Figueredo et al., 2006; Figueredo, Vásquez, Brumbach, & Schneider, 2005; Giosan, 2006). Figueredo et al., (2005) showed that a high-K strategy is associated with personality traits associated with social success (high conscientiousness, extroversion, and agreeableness, and low neuroticism) while other authors showed that a slow life

history strategy (high-K) is negatively correlated with a cluster of socially undesirable behaviors and positively correlated with impulse control (Wenner, Figueredo, & Jacobs, 2005).

Some Life History measures include (1) the Mini-K (Figueredo et al., 2006) and (2) the High-K Strategy Scale (HKSS) (Giosan, 2006). Scores on the HKSS and the Mini-K are highly correlated with one another and with a general personality factor, thereby representing better measures of Life History Strategy than alternative proxy variables (Dunkel & Decker, 2010).

Some researchers have pointed out however that the differential K distinction in humans may be questionable (B. J. Ellis, Figueredo, Brumbach, & Schlomer, 2009; Rowe, Vazsonyi, & Figueredo, 1997; Woodley et al., 2017), with some proposing a measure of overall fitness conceptualized as a deep level construct upon which various reproductive strategies can be used (Giosan, Wyka, Mogoșe, Cobeanu, & Szentagotai, 2018). This measure, named *the Evolutionary Fitness Scale* (EFS) (Giosan et al., 2018) is an important element in the therapy protocol proposed in this manual.

#### *4.2. Fitness and Depression*

When a behavior (or symptom) has universality, a legitimate question about its possible biological/evolutionary function arises and, in many cases, the answers center on the potential fitness advantages of that behavior.

Depression, because of its high prevalence (5-10% in the US, (Kessler et al., 2003), cross-cultural universality (Nesse & Williams, 1996) upward course in symptom severity (NIMS, 1994), and puzzling potential fitness consequences, including suicide (APA, 1994; H. E. Fisher & Thomson, 2007), has been tackled in the evolutionary psychology literature.

Although no single cause for depression has been unequivocally identified, factors such as demographics and prior major depression (Lewinsohn, Hoberman, & Rosenbaum, 1988), early traumatic experiences (e.g., physical or sexual abuse) (Heim, Owens, Plotsky, & Nemeroff, 1997; Maercker, Michael, Fehm, Becker, & Margraf, 2004), or negative life experiences (e.g., job loss, loss of a close one) (Shrout et al., 1989), are believed to be involved.

While low mood is seen by evolutionary psychologists as functional (more on this below), major depression is viewed as an example of modern pathology, whereby an adaptive response has gone awry. This view is supported by the evidence that it is more prevalent in modern, Western cultures with loosely structured and dense populations that have little resemblance to the ancestral communities (Gilbert, 1992; McGuire, Troisi, & Raleigh, 1997) and by the observation that it can have serious negative consequences on fitness, such as suicide (H. E. Fisher & Thomson, 2007; McGuire et al., 1997).

In stark contrast to the prevalent view that depression is a brain disorder (Andreasen, 1985; Valenstein, 1998; Wolpert, 1999), evolutionary psychologists attempt to explain depression (mild and moderate) in reference to the functions it may serve. For instance, Leith and Baumeister (1996) showed that low mood is associated with lesser likelihood of engaging in risk taking behaviors, and other researchers have argued that low levels of depression appear to be 'normal' or functional states (Hagen, 2003; McGuire et al., 1997; Nesse, 1998).

Some scholars view depression as a mechanism that blocks unfavorable investments, which will motivate changes in behavioral strategies and goal pursuit (Watson & Andrews, 2002). In the same view, some researchers

have reported positive associations between depression and occupational functioning, associations that might develop as a result of depression-related reassessment and attempts to change the strategy (Buist-Bouwman, Ormel, de Graaf, & Vollebergh, 2004; Williams, 1966).

Other studies showed links between certain types of fitness strategies (e.g., Life History) and depression. For instance, Giosan (2013) showed that a high-K strategy is an important negative predictor of depressive symptomatology, accounting for 15% of the variance in Beck Depression Inventory scores (A. T. Beck, Steer, & Brown, 1996) after controlling for risk factors for depression.

Others scholars view depression as a result of unsuccessful attempts to reach a critical goal, and clinicians note that depression sometimes subsides when the individual gives up the pursuit of an unattainable goal (Nesse, 2000; Price, Sloman, Gardner, Gilbert, & Rohde, 1994; Wrosch, Scheier, & Carver, 2003). A specific type of depression – postpartum – is seen by other evolutionary scholars as a mechanism that signals fitness costs, which motivates the mother to reduce the investment in her child (Hagen, 2002), and this is supported by evidence that the correlates of postpartum depression include lack of social support, especially from the father (Campbell, Cohn, Flanagan, Popper, & Meyers, 1992; Paykel, Emms, Fletcher, & Rassaby, 1980; Richman, Raskin, & Gaines, 1991), and/or infant problems (Atkinson & Rickel, 1984; Campbell & Cohn, 1991; Campbell et al., 1992; Kumar & Robson, 1984).

Yet other scholars view depression as an adaptation that serves the purpose of inhibiting aggressive behaviors toward others of superior rank (Evans, 1999; Price et al., 1994). This view of “involuntary yielding” draws on observations of individuals from various animal species that have lost their status in the hierarchy (Gilbert, 1992; Sloman, Price, Gilbert, & Gardner, 1994).

Although different, many of the above-mentioned evolutionary explanations of depression consider it a mechanism that can contribute to fitness (for a synthesis of the major adaptationist perspectives of depression, see (Durisko, Mulsant, & Andrews, 2015). Evolutionary psychologists note that when humans are successful at meeting fitness-enhancing goals, they generally experience well-being and happiness (Gilbert & Bailey, 2000). On the other hand, failure (perceived or real) to meet these challenges results in dissatisfaction, depression, tension, or frustration (Gilbert & Bailey, 2000).

#### *4.3. Fitness and the Mismatch Hypothesis*

Different groups are affected differentially by depression. The Amish, for instance, are the only one known group of Americans not affected by depression (Ilardi, 2009). Similarly, hunter-gatherer tribes, such as the Kaluli people, have virtually no rates of clinical depression (Ilardi, 2009). In contrast, developed countries, such as the UK, Germany or US, have witnessed alarming increases in depression rates. Indeed, in the United States, depression rates have historically increased despite a parallel increase in antidepressant use. Paralleling this trend, in third-world countries the prevalence of depression, once very low, has increased as people have shifted from traditional to modern lifestyles (Ilardi, 2009).

These findings cannot be explained by cross-cultural or historical confounds, as they have also been yielded by cross-sectional studies within the same cultures as well, which documented significant differences in the prevalence of depression (and anxiety disorders) between rural and urban populations (Kennedy & Adolphs, 2011).

The observation that depression is more prevalent in the modern societies has led some authors to make the argument that this condition is the result of a misfit between our evolved adaptations and the present environments (Nesse & Williams, 1996). This argument stems from the broader “Mismatch Hypothesis”, which is a theory in evolutionary biology describing how some traits that conferred benefits in the past are now maladaptive due to environmental changes (Lloyd, Wilson, & Sober, 2011). Example of outcomes of such mismatches include obesity and diabetes (Knight, 2011), osteoporosis (Lieberman, 2013), the effects of hygiene on inflammation (Garn & Renz, 2007), gambling (Spinella, 2003), drug use (Durrant, Adamson, Todd, & Sellman, 2009), or compulsive overeating (Davis & Carter, 2009).

In other words, from this angle depression is seen as the result of a mismatch between our evolved adaptations and the environments we currently live in. This made some authors address depression in therapy by outlining some practical steps to reduce such misfits. For instance, Ilardi (2009) proposed 6 steps, including: (1) omega-3 fatty acids, (2) engaging activity (“don’t think, do!”), (3) physical exercise, (4) sunlight exposure, (5) social connection, and (6) enhanced sleep.

See Appendix 3 and Appendix 4 for more information about some of these realities.

## 5. THE CURRENT PSYCHOLOGICAL STANDARD OF CARE IN DEPRESSION

Currently there are many treatment approaches to depression, among which the most widely used are: (1) Cognitive Behavioral therapy, (2) Mindfulness-based Cognitive Therapy, (3) Behavioral Activation, and (4) Interpersonal Psychotherapy.

### 5.1. Cognitive-Behavioral Therapy

Cognitive-Behavioral Therapy (CBT) is an umbrella term used to describe both standard Cognitive Therapy (CT) and the atheoretical combination of CT and behavioral strategies (A. T. Beck, 2005). Cognitive Therapy, the prototype of CBT, was developed for the treatment of depression (A. T. Beck, 1976, 1979). It is a structured, goal-oriented, short-term intervention organized around the concepts of automatic thoughts and schema/core beliefs (J. S. Beck, 1995; David & Szentagotai, 2006). Cognitive Therapy focuses on specific current problems, using techniques designed to modify dysfunctional thinking and targeting problematic behaviors (J. S. Beck, 1995).

Regardless of the specific approach, all CBT-based treatments generally have some common features. First, most involve two fundamental intervention avenues: (1) *cognitive restructuring*, designed to change faulty thinking patterns, and (2) *behavioral techniques*, designed to increase or decrease the occurrence, frequency or intensity of target behaviors. Second, all the CBT-based therapies focus on the immediate present and on specific problems. Moreover, they all are goal-oriented (goals are defined collaboratively for every session) and time-limited. Finally, the approach is educational (i.e., patients are provided structured learning experiences and are taught coping skills) and patients have an active role in the therapeutic process, during the sessions and between sessions. The patients are given homework assignments for every session and are encouraged to identify specific ways to practice newly acquired skills.

CBT is one of the treatments of choice for depression, recommended by leading mental health agencies such as the National Institute for Clinical Excellence ([www.nice.org.uk](http://www.nice.org.uk)) or the National Institute for Mental Health ([www.nimh.nih.gov](http://www.nimh.nih.gov)). Numerous studies attest the efficacy of this well-established approach in the treatment of depression (Watts, Turnell, Kladnitski, Newby, & Andrews, 2015).

### *5.2. Mindfulness-Based Cognitive Therapy*

Mindfulness-based Cognitive Therapy (MBCT), an eight-week manualized group intervention, was originally developed to prevent relapse among those in remission from depression and/or for those who suffer from chronic depression (Segal, Williams, & Teasdale, 2002). It recognizes the role of negative mental processes (e.g., cognitive biases such as the preferential processing of negative information) and contents (e.g., negative automatic thoughts) in the onset and maintenance of depression, as well as the fact that these internal experiences are rather mental events than actual realities. Unlike CBT, this approach does not employ an effort to change dysfunctional cognitions but teaches patients to be mindful and non-judgmental about their internal experiences. The goal of this approach is to help patients to distance emotionally from automatic and self-perpetuating cognitions characteristic of depression.

MBCT was found to be as effective as CBT in the treatment of depression (Manicavasgar, Parker, & Perich, 2011), and significantly better than standard of care alone in preventing relapses in patients with three or more prior depressive episodes (Chiesa & Serretti, 2011; Keng, Smoski, & Robins, 2011).

### *5.3. Behavioral Activation Approaches*

Behavioral activation builds on Lewinsohn's (1974) emphasis of the role of response-contingent positive reinforcements as proximal causes of depressive symptoms. In this view, depression results from desirable behaviors reinforced increasingly less, due to losses or reduction of response-contingent reinforcers. At the same time, counterproductive behaviors, such as social isolation or excessive sadness may be unintentionally reinforced by the (social) environment, resulting in the maintenance of the depressive symptoms.

Two treatment approaches based on behavioral strategies are: (1) *Behavioral Activation* (Martell, Addis, & Jacobson, 2001) and (2) *Behavioral Activation Treatment for Depression* (Lejuez, Hopko, LePage, Hopko, & McNeil, 2001).

(1) *Behavioral Activation* includes techniques commonly used in cognitive therapy, such as activity scheduling, daily activity monitoring, stimulus control procedures, skills training (when needed), mental rehearsal of assigned behavior, contingency management, whose purpose is to facilitate access to reinforcements. Behavioral Activation does not focus on pleasurable activities, but rather on the functional analysis of behavior and the client's goal, embracing an idiographic functional approach (Manos, Kanter, & Busch, 2010). Customized interventions are designed and implemented by the careful examination of antecedents and consequences of target behaviors. Behavioral Activation also highlights the role of aversive stimuli (punishers and negative reinforcers) in relation to depression and targets avoidance patterns in treatment, replacing them with more adaptive coping behaviors.

(2) *Behavioral Activation Treatment for Depression*, expands Lewinsohn's (1974) original approach by emphasizing positive and negative reinforcements in relation to both depressive and non-depressive behaviors and by

taking into account the client's values (Lejuez et al., 2001). It aims to differentially reinforce depressive and non-depressive behaviors, increasing the value and availability of reinforcers for non-depressed behaviors while decreasing the value and availability of reinforcers for depressive behavior. Another distinctive note of this intervention is the direct targeting of the person's environment, by involving family and friends who sign behavioral contracts designed to decrease the patient's access to positive reinforcement (i.e., attention) and negative reinforcement (i.e., avoidance of unpleasant tasks) for depressed behaviors, and increase reinforcement for non-depressed behaviors (Manos et al., 2010).

Systematic reviews and meta-analyses (Dimidjian, Barrera, Martell, Muñoz, & Lewinsohn, 2011; Mazzucchelli, Kane, & Rees, 2009) show that Behavioral Activation is well-established, empirically-validated treatment for depression.

#### *5.4. Interpersonal Psychotherapy (IPT)*

Interpersonal psychotherapy (IPT) for depression focuses on improving interpersonal difficulties and emphasizes the role of *social support* to the onset and maintenance of depression. Interpersonal difficulties are thought to trigger or exacerbate depressive symptoms. In fact, depression and interpersonal difficulties are assumed to reciprocally influence each another. Thus, the rationale behind IPT is that improvement in interpersonal relationships leads to improvement in depressive symptoms, which loops back to cause better interpersonal functioning (Kelly, Cyranowski, & Frank, 2007).

IPT has been shown to be an efficacious treatment for depression in numerous clinical trials (Cuijpers, 2011; Jakobsen, 2011; Mufson, 2008; Mufson et al., 2004; Mufson, Weissman, Moreau, & Garfinkel, 1999). It is one of the recommended treatments of choice by the National Institute for Clinical Excellence (NICE; see [www.nice.org.uk](http://www.nice.org.uk)) and the National Institute of Mental Health (<https://www.nimh.nih.gov>)

## **6. COGNITIVE EVOLUTIONARY THERAPY FOR DEPRESSION**

### *6.1. Conceptualization in Psychotherapy*

Clinical conceptualization is an explanation of problems and their causes provided by the therapist to the patient. To be efficient, this explanation should provide an accurate description of the: (1) mental problem; (2) probable causes of the mental problem; (3) etiopathogenetic processes involved; (4) positive/adverse effects of the treatment. When the therapist successfully addresses these areas, she creates sense of prediction and control in the patient, raising the hope of getting better and leading to positive expectancies of the treatment's outcome (John & Segal, 2014; Kuyken, Padesky, & Dudley, 2008a, 2008b).

The first record of clinical conceptualization was Freud's interpretation of neurotic symptoms and latent content of the dreams. This interpretation, Freud argued, could unravel parts of the unconsciousness, thus leading to catharsis and healing (Freud & Brill, 1915).

Miller, Duncan and Hubble, (1997) argued that there are four common factors to all psychotherapies that determine its success: client factors, therapist factors, placebo and specific techniques. Asay and Lambert (1999)

evaluated these factors and showed that the therapeutic success is 40% due to client factors, 30% to therapist factors, 15% due to placebo, expectancy and hope, and 15% due to specific psychotherapeutic techniques. The third factor (placebo, expectancy and hope) refers to the client' and therapist's belief in the rationale and efficiency of the treatment, i.e, conceptualization. A good understanding of the problem and the link between the problem and the treatment suggested by the therapist can make the treatment more credible and the patient more involved, leading to better treatment outcomes (e.g., reduced dropout rate, increased treatment adherence).

## 6.2. Cognitive Evolutionary Therapy for Depression as Clinical Conceptualization

### 6.2.1. The ABC / ABCDE model

Some authors have suggested that an integrative understanding of behavior must include *a proximate* and *an ultimate (functional)* analysis of behavior, as well as an understanding of both phylogenetic/developmental history and the operation of current mechanisms (Tinbergen, 1963). For instance, some scholars argue that Beck's cognitive distortions (A. T. Beck, 1979) are a *consequence* of depression, not a *cause* of it (Dobson & Shaw, 1987), pointing to the necessity of additional explicative layers.

The typical conceptualization in classical CBT only contains information about the first two questions (ontogeny and mechanisms of causation), that is, the proximal causes of psychopathology. In other words, the conceptualization in classical CBT answers the "how" questions, as illustrated by the ABC model (A. Ellis, 1994; A. Ellis, Dryden, & DiGiuseppe, 2007a) presented in Figure 1.

A	B	C
<b>Activating life events</b> (trigger learned irrational beliefs)	<b>Irrational Beliefs</b> 1. Demandingness: "Things MUST be as I wish them to be." 2. Awfulizing: "I refuse to accept being shown up as foolish, as I must not be, and it is awful when I am." 3. Low Frustration Tolerance: "I refuse to accept that things in my life are hard and uncomfortable, as they must not be, and I can't stand it when they are." 4. Damnation / Global Evaluation: "I refuse to accept your treating me this way, as you must not, and you are no damned good for doing so."	<b>Behavioral and emotional consequences</b> (symptoms)

Figure 1: The ABC model (A. Ellis, 1994; A. Ellis et al., 2007a)

The original ABC theoretic conceptualization framework described above was later expanded into the ABCDE model (A. Ellis, 1994; A. Ellis, Dryden, & DiGiuseppe, 2007b) in recognition of the importance of disputation and replacing irrational beliefs with rational ones. In the ABCDE framework, (A) stands for undesirable life events ("activating events") that can be (1) internal or external, (2) past, present or future, or (3) real or imagined. People hold (B) rational or irrational beliefs about the activating events, which result in (C) affective, psychophysiological and behavioral consequences. Rational beliefs (RBs) lead to functional consequences, while irrational beliefs (IBs) lead to dysfunctional consequences (A. Ellis et al., 2007b). Once generated, the Cs can later convert to

an A, triggering other rational/irrational beliefs (RBs/IBs), which will lead to other adaptive or maladaptive consequences. In order to change the dysfunctional consequences of their irrational thoughts, the patients are encouraged to actively (D) dispute these beliefs and replace them with more (E) efficient beliefs (Walen, DiGiuseppe, & Dryden, 1992).

### 6.2.2. Cognitive Evolutionary Therapy as Clinical Conceptualization

An evolutionary-enhanced psychotherapy for depression enhances the ABCDE model by including information about the hypothesized *adaptive functions* (the “why” questions) of depressive symptoms, along with direct interventions on fitness enhancing factors. Thus, an evolutionary-inspired psychotherapy for depression enhances the conceptualization of the therapy and the therapy protocol by addressing the *distal* causes of depression (i.e., the evolutionary mechanisms involved) and explaining why depression is thought to be an expectable response to a post-EEA environment (see Figure 2).

Standard ABCDE model (CBT)	A Activating life events	B Beliefs	C Emotional and behavioral consequences	D Disputing (Cognitive restructuring)	E New, effective emotions and behaviors
<b>Evolutionary Enhancements (CET)</b>	Focus on fitness related activating events; select potential A's based on mismatch theory ( <b>using EFS</b> )	Conceptualize irrational beliefs and dysfunctional emotions as adaptive mental structures left over from EEA		Normalize expectations (mismatch theory)	Prediction, control, self-acceptance

Figure 2: the ABCDE model coupled with CET

### 6.3. Why such an intervention?

According to the World Health Organization, depression is the *leading* cause of disability worldwide (“WHO | “Depression,” n.d.). Meta-analyses indicate that all bona fide (non-placebo) psychological treatments for depression (CBT included) are equally efficacious (Wampold, Minami, Baskin, & Tierney, 2002), with effect sizes ranging from small to moderate (Cuijpers, Smit, Bohlmeijer, Hollon, & Andersson, 2010). Given the exorbitant costs of this condition, the need to develop new approaches that add therapeutic value is vital. Even a 1% increase in treatment efficacy can translate into substantial cost savings.

Psychotherapists normally focus on events within the lifespan of a patient and examine proximal (mechanistic) causes of maladaptive behaviors, such as irrational or automatic thoughts (A. T. Beck, Rush, Shaw, & Emery, 1979). Modifying these thoughts has proven effective in ameliorating depressive symptoms. However, what is lacking in all the current psychological treatments for depression, including CBT, is a unifying paradigm providing explanations about the *ultimate* causes of depression. In other words, the underlying evolutionary factors that can lead to depression and biased thinking are not addressed directly in the current therapeutic approaches, unless specifically identified as problems by the patient. Even in the cases when the patient does identify such factors, the therapy is

empirically centered, lacking a unifying theory. Cognitive Evolutionary Therapy addresses both the proximate causes of depression (via Cognitive Therapy) and the distal causes (via an Evolutionary Intervention).

#### *6.4. Biosocial/Fitness Goals and Mental Health*

Generally, in their evaluations, evolutionary psychotherapists turn their attention to unhealthy deviations from the human species norm and devise interventions aimed at normalizing such deviations (Gilbert & Bailey, 2000). Human behavior generally revolves around a finite set of fitness-relevant themes (e.g., shelter/security, status and resource acquisition, nutrition, sexual consummation within mateships, mating, parenting, in-group and between-group interaction, Buss, 2005). Therefore, the main aim of an evolutionary therapist treating depression is to guide the patient towards solutions to the obstacles s/he is encountering in pursuing such biosocial goals. The role of the evolutionary therapist sometimes includes encouraging the patient to admit defeat in some of their pursuits for fitness-related goals and to seek fitness-related alternatives; compromising on morals when appropriate; recalibrating elevated expectations; making the patient give up unrealistic goal(s), as evolutionary research has shown that giving up pursuing unattainable goals can alleviate depression (Sloman et al., 1994).

Some of these dimensions are sometimes also addressed in CBT, but *only in the cases where the patient specifically identifies problems related to them*. In many cases, however, people are not aware of the entire spectrum of (fitness) problems that might be linked to their depressive symptoms or might not consider them important enough to bring to the clinician's attention. As described in detail in the next sections of this manual, CET's first step is to identify fitness-related problems at the beginning of the treatment, and then devise appropriate interventions to address these problems.

The solutions advocated in evolutionary therapy can sometimes be extreme. The patient may be encouraged to buy a house or give one up (if it is judged that house ownership acts against the patient's fitness interests). The patient may be encouraged to begin preparations to move to a different area if there is a mismatch between her cultural background and the community in which she is residing. The patient may be encouraged to switch jobs or retrain for new jobs. The patient might even be encouraged, in some cases, to leave a partner, or find a new one (Keedwell, 2008).

Of course, the evolutionary therapist will not force such solutions to the patient. On the contrary, their implementation will only be attempted if they are generated by the patient, as a result of their understanding of the fitness-related factors that might contribute to their depression.

## **7. MORAL AND ETHICAL ASPECTS IN CET**

### *7.1. Preliminary Considerations*

Oftentimes, there is a divergence between behaviors that serve biosocial goals (i.e., behaviors that can enhance fitness), and the morality (or even the legality) of those behaviors.

Let's begin with two extreme examples: Male fitness can be achieved in multiple ways, one of which is rape, which some authors view as an evolved reproductive strategy (Thornhill & Palmer, 2000, 2004). In a similar vein,

reproductive success can also be achieved by mating with underage opposite-sex partners. Both scenarios are examples of illegal acts in many societies, and widely (although not universally) regarded as immoral and repugnant.

Therefore, although evolutionary therapists must be mindful of the species' norms, they must also be mindful of legal and ethical concerns (both cultural and personal) and exclude any undesirable solutions. The above-mentioned examples are obvious and extreme, given to illustrate the point, but an evolutionary therapist might face situations in which the boundary between what is legal and what is not is not so clear. For example, let us imagine that during therapy with a young, married male patient, one possible fitness-enhancing solution that the patient suggested (which would presumably decrease depression) was that the patient seek an extra-marital relationship. Let us also stretch our imagination and suppose that the moral aspects of this have been settled, in that the patient's wife has agreed to a one-way open marriage. In this scenario, should the therapist encourage the patient in this direction? The answer depends, among other concerns, on whether adulterous relationships (even with spousal consent) are legal in the respective society, and, if not, if the laws are enforced.

Furthermore, while evolutionary therapists must take into consideration the species norms, it must be added that these norms are high level and that there is considerable individual variation in pursuing biosocial goals. The evolutionary therapist must incorporate this individual variation in the interventions. In other words, the aim of the therapist is to help the person become a biologically well-functioning member of the species, but not at the expense of that person's aspirations and needs. Ultimately, the role of the evolutionary therapist is to help the person to reasonably seek and meet biosocial goals, *as reflected in their personal aspirations and needs*.

The evolutionary therapist must also be cautious to label certain forms of thinking as pathological, because they may well be adaptive mechanisms at work (Gilbert & Bailey, 2000). Anxious thoughts, for instance ("distorted cognitions" in cognitive therapy), could be the activation of previously adaptive defensive information-processing whereby overestimating danger was more adaptive than under-estimating it (Gilbert & Bailey, 2000). More often than not, biases and distortions, rather than logic, were the norm in our thinking and the role of these biases was to enhance fitness (Buss, 2000b). Normalizing expectations can be therapeutic in such contexts.

Finally, the clients are not alone in therapy. Therapists themselves have biosocial goals, some of which are unconscious, which can interfere with the client's. Thus, the client-therapist relationship is considerably more nuanced as a result (Bailey, 2000; Kriegman, 2000). The therapists must be aware of their own biosocial goals and not allow them to interfere with the therapeutic process. For example, let's imagine that a male therapist finds a female patient very attractive. Let's further say that this patient is in a turbulent relationship with her partner. To serve his own biosocial goals, the therapist may (unintentionally or deliberately) guide her towards breaking up with her partner, thus making her available in the mating pool. Such a solution might serve the therapist's fitness goals (perhaps unconsciously) and not necessarily the patient's.

## *7.2. Religiosity and Faith*

It is customary for a treatment rationale (conceptualization) to be presented to patients in the first sessions, after the initial assessments. The backbone idea of an evolutionary-driven intervention is the fact that humans are the product of evolution, and that this simple fact has enormous consequences on our behavior. How should a therapist approach a client who holds deep religious beliefs, and who might consider Darwin's theory of evolution blasphemy?

It is important that in such a situation the therapist do not challenge deeply-held religious beliefs, as this will significantly affect the treatment outcomes by decreasing the therapeutic alliance. For religious clients, the therapist should explain how humans are believed to have achieved reproductive success, citing relevant research on inclusive fitness and leaving aside the sensitive issue of whether humans are a product of evolution or not – which, in any case, would not be relevant for the actual treatment. For more inquisitive religious clients, the therapist can cite the theory of “intelligent design”, which posits the role of a Creator, while not denying humans’ relatedness to animals. Or s/he may cite Pope Francis, who stated that the theory of evolution is not incompatible with the existence of a Creator, but requires it (“Pope Francis declares evolution and Big Bang theory are real and God is not ‘a magician with a magic wand’ | The Independent,” n.d.)

In short, the patient’s religious beliefs should stay unchallenged. Generally, a safe approach is to present the framework of the interventions in a neutral way, insisting on empirical findings, not theoretical or philosophical abstractions. For instance, let’s suppose we have a childless 55-year-old woman who is a devout Christian. As we will see shortly, in cases of postmenopausal women, one evolutionary-driven intervention is to encourage her to maximize her inclusive fitness (Hamilton, 1964) by increasing her investment in relatives who carry copies of her genes (e.g., nephews, nieces, etcetera). The therapist, after describing the treatment rationale as explained above, could tell her that *“research has shown that women who are past a certain age – especially those who are post menopause – are less likely to become depressed if they maintain close and rich relationships with second- and third-degree younger relatives, such as nephews and nieces”* and devise an appropriate action plan in this direction.

In short, while the central assumption of an evolutionary-driven intervention is the fact that humans are the product of evolution, the main two ideas that can be inserted in the actual CET protocol need not challenge creationistic convictions. Firstly, patients of various denominations can easily accept the idea that the human cognitive system is adapted to an environment we lived in for almost our entire history. Secondly, patients will easily accept the truism that our ancestral environments were markedly different from the modern ones, and that this can have significant consequences on human psychology. Neither of these two assumptions challenges religious beliefs directly.

### *7.3. Patient’s Sexual Orientation*

Humans have evolved mechanisms designed to increase fitness, and these mechanisms’ functions are those of survival and reproduction (i.e., finding suitable opposite-sex mates). An evolutionary therapist, however, might have a young homosexual client whose chances at direct reproductive success may be nil, so there cannot be interventions on this dimension.

The sensible therapeutic approach in such cases is to prescribe interventions along the dimensions of inclusive fitness (investing in genetic relatives), as well as interventions that increase mate value irrespective of the sexual orientation of the client. If one factor that makes this patient depressed is the patient’s sexual orientation, the therapist can attempt to normalize it by citing evolutionary research showing that some gay men, for instance, are more likely to invest in blood relatives or that, in the past, homosexuals occupied high status in the society (e.g., nuns and monks), thus benefitting the family indirectly (Barash, 2012), therefore, from a genes’ transmission point of view, they are actually no different from heterosexual men.

## 8. SPECIFIC ASPECTS RELATED TO CET

### 8.1. Therapist's Background

Evolutionary psychotherapies stem directly from the tenets of evolutionary psychology. As such, a therapist who is providing this kind of interventions must be well versed in the theoretical aspects of evolutionary psychology. While formal advanced background in evolutionary psychology is not required, a good mastery of the fundamental concepts in this discipline is mandatory. The therapist can obtain this knowledge from handbooks such as David Buss's (2005) or introductory texts such as "Evolutionary Psychology: The New Science of the Mind" (Buss, 2015).

Also, the main methods in CET for depression are those also used in CBT (e.g. cognitive restructuring, behavioral activation), and, as such, a therapist with experience in CBT might find it easier to adapt than one specialized in other therapeutic approaches.

### 8.2. Psychotherapeutic Alliance

Close kinship relations – in their ideal manifestations – are warm, close, emphatic, giving, loving, and secure. During the time of our evolutionary history, we lived in tribal bands consisting of about 150 members (Dunbar, 1992), in which we knew each other well, and in which we were involved in complex group dynamics, such as mutual support and shared affection and resources, but also conflict and rivalry. In ancestral societies, biological and *psychological kinship* relations included warmth and love, as well as obligations and entitlements (Bailey, 2000). A "psychological kin" is a minimally related or unrelated individual who is integrated into the family circle, thus receiving rights and obligations which, although secondary to official biological kin, were true kin nevertheless – in other words, this person received family status (Bailey, 2000; Bailey, Wood, & Nava, 1992). Some authors have argued that balanced and strong psychological and biological kinship relationships are linked to psychological health (Bailey, 2000).

Drawing on the above, the evolutionary therapist and the client should work in a warm, kin-like context, as opposed to the detached professionalism, or friendly neutrality, that characterizes other forms of therapy, such as psychoanalysis. The therapist should become the patient's "psychological kin" – a "buddy", a good friend – *while maintaining a set of safe boundaries* (Bailey, 2000).

In order to do this, the evolutionary therapist should go beyond the insights from REBT, where the therapeutic alliance centers on empathy, unconditional acceptance, genuineness, and humor (Bernard, 1991; David, Lynn, & Ellis, 2009; A. Ellis et al., 2007b; Walen et al., 1992). On top of these very desirable therapist characteristics, the ability and willingness to make the extra-step of establishing a more personal relationship with the patient can be critical.

A note of caution: When building this relationship, the therapist should be mindful that different patients may perceive a therapist's attempt to establish rapport differently, so the therapist must navigate through this with great care. For example, abuse victims may perceive caring/closeness signals as a threat. Depressed patients might see a therapist's disclosure of his or her own personal problems as a signal that the therapist is too "weak to be of help." All these can greatly impact the establishment of rapport. Thus, to achieve optimal results with a depressed patient, the therapist must balance overt friendship versus reservation wisely.

Also, there may be the case that some patients might benefit more from an authoritative therapist (which would, evolutionarily speaking, tap ‘hierarchical’ relationships), in which case more formality in the relationship might be beneficial. The therapist should use his or her clinical judgement to make such determinations on a case by case basis.

### *8.3. Decorum*

The mismatch between our ancestral environments and the modern culture produces frustration and tension (Bailey, 1997; Crawford & Krebs, 1998). The overarching goal of an evolutionary-driven therapy is to reduce the gap between the traditional culture and the technology-based culture, and this can (and should) start with therapeutic setting itself.

For much of our pre-agricultural history, our ancestors were tribal groups of migrators. Therefore, the therapeutic setting should fit with this tendency of humans to search and explore. The therapeutic setting must be flexible, not rigid like the office settings that characterize many forms of modern therapy. Our ancestors did not stay in the same location with a friend for an hour every week for three months. On the contrary, they interacted in different settings and circumstances, and the evolutionary therapist must be creative and try to mimic those realities, to the extent that is possible. If local regulations permit (i.e., when liability is not an issue), the sessions can be conducted while walking in a park, sitting on a bench, or over a healthy meal in a quiet, green place. If the local regulations forbid this, then an occasional change in decorum (e.g., using another office in the same building for a couple of sessions) is recommended.

### *8.4. Behavioral Activation versus CET for Depression*

Because the dimensions of fitness differ as a function of gender/age of a person, an evolutionary-driven intervention is partially standardized (and customized) *a priori* for each patient. Unlike a standard behavioral approach, which draws heavily from Skinner’s applied behavior analysis, evolutionary-based interventions stem from a paradigm that informs *beforehand* what specific behaviors should be encouraged or discouraged.

In behavioral activation, the intervention is generally directed at helping the patients to increase activation in such a way that they can experience greater contact with the sources of reward. To this end, behavioral activation includes analyses of behavior that help in the identification of the sources of reward.

In contrast, in an evolutionary-based intervention the identification of the sources of reward is guided by the evolutionary theory, so the therapist comes pre-equipped with a list of potential sources of fitness problems and opportunities for intervention. This general list is operationalized comprehensively by a measure called *The Evolutionary Fitness Scale* (Giosan et al., 2018) (EFS, see Appendix 1), which the patient completes *at the beginning* of treatment. The patient’s answers to the EFS guide the therapeutic interventions (more on the EFS in the next sections).

In short, CET enhances the classic approach in cognitive-behavioral therapy by (1) focusing on specific, fitness-related problems, some of which might have never been freely recognized by the patient, and by (2) using a specialized evolutionary-aware conceptualization that enhances the effectiveness of CBT by normalizing expectations.

Like in classical CBT, at the beginning of the treatment the psychotherapist and the patient select and define the list of problems that will be addressed during therapy. However, unlike the standard CBT, these problems are primarily identified from the patient's answers to the Evolutionary Fitness Scale at intake (see Appendix 1).

Furthermore, in line with the evolutionary framing of the intervention, the therapist should note that fitness-related problems can have a high impact on quality of life and depressive symptomatology reduction, and will cite relevant research, some of which detailed in earlier in this manual. The therapist will use an evolutionary rationale to suggest that these fitness-related problems be prioritized. The therapist will also have an input on prioritizing the resolution of certain fitness-related problems over others, while giving the patient the latitude to make the final decision.

After the settlement of the fitness-problem list as captured by the Evolutionary Fitness Scale, the therapist will elaborate the specific evolutionary conceptualizations of the patient's particular set of problems. In other words, besides the general CBT conceptualization, the therapist will include explanations about the distal causes of depression as applicable to that patient. This will help put the disorder in context, create a feeling of prediction and control regarding the treatment outcome, and reduce secondary problems related to the depressive symptoms (e.g., anxiety about depression, anger about depression or depression about feeling depressed).

Besides standard cognitive, behavioral and emotive techniques, discussions about human nature from an evolutionary standpoint (where appropriate, see the section on ethical aspects), will encourage the patient to experience acceptance (a key therapeutic ingredient) by acknowledging basic human limitations as well as strengths in oneself (self-acceptance), partner, family members or friends (other-acceptance) and the world in general (world-acceptance).

Furthermore, the evolutionary roots of our cognitive systems can be used as arguments for why people do not act or think as they "should". Such evolutionary arguments can become powerful tools in the disputing process, commonly used in standard cognitive therapies. Evolutionary-inspired concepts such as cognitive modularity, parental investment theory, conspicuous consumption and costly signaling theory, deference modules, moralistic judgment modules and hypocrisy (explained in layman's terms) can offer useful explanations for seemingly "aberrant" behaviors of self or others.

Besides addressing existing problems, towards the end of therapy the therapist may choose to address the patient's potential future fitness problems. The Mismatch Hypothesis (Lloyd et al., 2011) can inform and explain difficulties such as sticking with long-term plans, procrastination, difficulties with long-term relationships, etcetera, and the therapist should raise these potential problems (and offer possible solutions solutions) on a case-by-case basis as a relapse prevention and personal optimization measure.

#### *8.5. Demographic-Related Interventions*

As mentioned in the previous sections, and detailed further later, Cognitive Evolutionary Therapy for depression relies heavily on a *fitness evaluation* that takes place at intake, using the Evolutionary Fitness Scale (EFS) (Giosan et al., 2018), which guides the subsequent interventions. However, the answers to this evaluation of a patient's fitness should be used in conjunction with the patient's *demographic* characteristics, because these characteristics can have a differential bearing on fitness.

For example, let's suppose we have two patients: a woman in her 50's (she can only increase her fitness indirectly, through investment in family members), and a man in his 50's (he can potentially achieve both direct and indirect fitness). Let's also suppose that both score low on EFS items tapping into personal attractiveness (i.e., direct fitness) and on investments in relatives (i.e., indirect fitness). The theoretical arguments presented in this manual suggest that interventions on dimensions that have effects on direct fitness in the case of the female patient will be less impactful than those that can increase this patient's indirect fitness, while in the case of the male patient both types of interventions might be equally effective and should be considered equally in treatment.

In short, demographic characteristics are very important because they provide a general framework that should be used in conjunction with the patient's answers to the EFS. Generally, a therapist should place emphasis on direct fitness (e.g., attractiveness, resource acquisition, mating) in patients of reproductive age and on indirect fitness in patients past their reproductive ages. Given the fact, however, that men's reproductive period is much longer than women's – a man can potentially reproduce throughout his entire lifetime – a therapist should use her clinical judgement for the most appropriate fitness interventions in such cases.

## 9. THE EVOLUTIONARY FITNESS SCALE

As mentioned earlier, Cognitive Evolutionary Therapy for Depression starts with the administration of a fitness evaluation at intake. This instrument is called “The Evolutionary Fitness Scale” (Giosan et al., 2018) and consists of 45 items (58 if the respondent has children) scored on a 1-5 Likert scale (see Appendix 1 for the items in English and Appendix 2 for a Romanian version of this instrument). The items tap into dimensions that are thought to be implicated in reproductive success, some of which are health, attractiveness, safety of, and fit with the environment, resourcefulness, upward social mobility, reciprocal altruism, mate value, offspring quality, extended family. The patient's answers to this instrument guide the subsequent evolutionary interventions, which can be behavioral activation or cognitive restructuring targeting the patient's fitness deficiencies.

Let's illustrate this through several examples of EFS items, assuming a hypothetical patient who has stated disagreement.

- EFS item: “*I am not afraid of intrusions or burglaries in the house I live*”. This item taps on safety of the environment. The therapist should initiate a conversation to address this problem, and, together with the patient, come up with some potential solutions (e.g., an alarm system, more secure locks, a guard dog, etcetera).
- EFS items: “*I often get the chance to spend time outside*” and “*I am an active outdoors person*”. These items tap into (mis)fits with the environment. People generally report higher levels of well-being when they spend time in nature. After ruling out potential health problems that might prevent a patient from spending time outdoors, the therapist should initiate a conversation for a concrete plan for the patient to do that (e.g., hiking, walking in parks, etc.). Like in standard cognitive approaches, the patient should be given “homework” to this effect. Unlike standard cognitive approaches, however, this behavioral

activation element was not generated by the patient in therapy but was captured a priori at intake by the EFS.

- EFS item: *“I frequently go out with my friends”*. This item taps into social capital and reciprocal altruism. Having many friends who can help a person in case of need (e.g., by babysitting a child) can have a positive impact on fitness. The therapist should work with the patient by making concrete plans for the patient to meet friends regularly/more often.
- EFS item: *“I am satisfied by my sex life with my partner”*. If the patient does not have a partner, the therapist will begin a conversation to pinpoint the root of the problem, then come up with potential strategies, on a case by case basis. If the patient does have a partner, the therapist should initiate a conversation to pinpoint the cause of the sexual inactivity (e.g., sexual incompatibility, boredom, etc.) and discuss possible solutions.

In most of the cases, the fitness problems captured by the EFS can be addressed in therapy. In some cases, however, some of the problems indicated by a patient’s answers to the EFS are not addressable. For instance, a patient might answer negatively at the EFS item *“I visit my relatives frequently”* because she might not have relatives, or because her relatives live on a different continent. In such a case, very little can be done along this dimension and the therapist should focus on the other fitness problems indicated by the EFS.

Furthermore, a patient’s answers at the EFS will typically reveal many fitness areas that need improvement. In some cases, it is not practical to work on all of them, because of logistical constraints or time. In such situations, the therapist should rank these fitness problems in terms of their likely impact on fitness (e.g., lack of a partner has a greater impact on fitness than not having the possibility to tend to pets and animals often) and work on the more fitness-relevant ones first.

For some therapeutic suggestions for each of the EFS items, please see Appendix 5 from this manual.

## **10. THE EFFICACY OF CET FOR DEPRESSION**

The efficacy of Cognitive Evolutionary Therapy for depression was examined in contrast to that of Cognitive Therapy in a Randomized Clinical Trial (Giosan, Cobeanu, et al., 2014) as well as in a case study (Giosan, Muresan, & Moldovan, 2014). The clinical trial included 86 depressive patients split in two active groups: (1) the Cognitive Evolutionary Therapy group, which received cognitive therapy + evolutionary interventions, and (2) the Cognitive Therapy group, which received standard cognitive therapy.

The results showed that the CET and CT protocols were equally efficacious, with the CET protocol showing a consistent pattern of larger gains during the treatment. In this study, fewer CET participants were classified as having moderate or severe depression over time, with between-group analyses showing significant differences at both post-treatment and follow-up. In addition, the CET group showed significantly more improvement in functioning (particularly social and leisure activities) compared to the CT group, although the effect somewhat subsided at follow up (Giosan et al., n.d.).

## 11. THE GENERAL STRUCTURE OF CET

What follows in the next pages is a structured therapy protocol of Cognitive Evolutionary Therapy. It is based on a protocol tested in a randomized clinical trial that compared CET to Cognitive Therapy (Giosan, Cobeanu, et al., 2014; Giosan, Muresan, et al., 2014), but expands on it by incorporating, besides specific CT techniques, elements specific to REBT. Therapists should use their clinical judgment in deciding whether to follow the REBT enriched protocol presented below, or the original one, or variations.

The standard CET intervention consists of 12 individual 60-minute therapy sessions, whose structure is presented below. However, the evolutionary therapist is free to adapt and adjust the number of sessions as she sees fit.

Like in classical CBT, the therapy sessions are highly structured. They generally start by setting an agenda listing the items to be dealt with during the session. The patient and the therapist agree on the contents of the agenda, which always includes a review of the previous week's homework, along with one or two specific problems that will be the main focus of the session.

The sessions should therefore follow this format:

- Brief update and mood check
- Bridge from previous session
- Set agenda
- Review homework
- Potential supporting exercises
- Summary
- Assign homework
- Feedback

### *11.1. Session 1*

The first session starts with a general discussion about depression – what it is, what consequences it can have, what treatments exist. It also focuses on educating the patient about psychotherapy, emphasizing the importance of 'homework' (personal practice of the therapy at home), taking responsibility for change, and adjusting the patient's expectations.

This first session will also consist of an explanation of the broad premises of the evolutionary-based intervention (being mindful of the ethical issues outlined earlier in this manual). The therapist will explain that the current approaches to depression view it as a brain disorder, but that recent research points to the fact that depression, at least mild to moderate, can be an adaptive mechanism signaling reproductive costs or problems, and that many of these problems are captured by the Evolutionary Fitness Scale, which the patient completed at intake. The goal of the therapy, the patient is further explained, is to find solutions to (some of) these problems and/or to correct irrational

beliefs linked to them. According to research, the patient is told, when adequate solutions to these problems are found, depression is likely to subside.

This session also focuses on presenting more detailed explanations about the evolutionary causes of depression, such as the mismatch theory (the theory that cognitive structures which were adaptive in a Pleistocene environment, but are now 'mismatched' to the current environment, lead to dysfunctional emotions and behaviors), and about some of the hypothesized evolutionary functions of depression (Nesse & Williams, 1994). The patient is informed in this session about the research linking depression and fitness-related behaviors, and why an evolutionary approach is suitable as a guiding add-on to a cognitive intervention. This is also the point where the therapist discusses the problems identified by the EFS at intake, and, with the help of the patient, sets realistic goals to address them in future sessions. The homework in this session usually consists of building specific goals, using the EFS as a guideline and as an example of specific target behaviors.

Structurally, session 1 includes:

- Setting the agenda (and providing a rationale for doing so);
- Doing a mood check, including objective scores;
- Beginning the development of the therapeutic relationship;
- Educating the patient about psychotherapy (emphasizing the importance of homework and taking responsibility for change) and specific CET insights (mismatch theory, depression as adaptation, etc.);
- Briefly reviewing the presenting problems and obtaining an update (since evaluation);
- Discussion about the problems identified by the EFS and setting goals;
- Eliciting and adjusting the patients' expectations for therapy;
- Educating the patient about depression;
  - Setting the homework;
  - Providing a summary;
  - Giving and eliciting feedback.

### *11.2. Session 2*

Session 2 focuses on continuing to build the therapeutic alliance and elaborating on the fitness problems revealed by EFS. This session also provides the opportunity to discuss the patient's understanding of the distal/evolutionary causes of depression.

Structurally, session 2 includes:

- Continuation of the construction of the therapeutic relationship;

- Elaborating the problem list generated by the EFS;
- Homework suggestions:
  - Self-monitoring of depression and anxiety symptoms;
  - EFS-generated behavioral activation (i.e., homework targeted at solving some problems identified by the EFS);
  - Monitoring of previous coping strategies with depression.

### *11.3. Sessions 3-6*

Sessions 3 to 6 focus on working on each of the fitness deficiencies identified by EFS at intake. These problems are conceptualized using evolutionary insights. For instance, some dysfunctional beliefs and their consequences can be seen as adaptive mental structures left over from the Environment of Evolutionary Adaptedness (EEA) (Irons, 1998). This helps the patient to begin to experience control and self-acceptance of their depressive symptoms. For example, a patient can present guilt – a depression symptom – about feelings or expressions of anger, fueled by beliefs such as: ‘I’m a horrible person because I got angry and yelled at my neighbor.’ In this case, guilt is typically seen as a secondary emotional problem (dysfunctional emotion about other emotions) (A. Ellis et al., 2007b). Evolutionary explanations of anger (for example, anger as an adaptive reaction during the EEA) can lower self-criticism and promote self-acceptance by reducing the intensity of the secondary emotion (guilt in this example), thus enabling the psychotherapist to work on the primary, present problem (anger in this example).

Homework is negotiated during these sessions, and generally consists of self-monitoring of emotions and behaviors, cognitive restructuring, and behavioral activation tasks generated from the EFS. Specific behaviors that the patient does not engage in as captured by the EFS (for example, spending time in nature, exercise, healthy eating habits) are targeted for activation. In addition, problem-solving, conflict resolution, and assertiveness training are used to enhance relationships with the patient’s relatives where appropriate, thus tapping into indirect fitness, while direct fitness (for example, mate value, health, income) is enhanced with standard CT techniques.

Structurally, sessions 3-6 include:

- Working on each problem generated by the EFS, and generated by the patient, based on the ABCDE model;
- Conceptualizing and reframing problems according to the insights from evolutionary psychology;
- Working toward strengthening the patients’ rational beliefs and weakening the irrational beliefs;
- Encouraging the patients to see the links between problems, particularly those which are characterized by common irrational beliefs.
- Homework suggestions:
  - EFS-generated behavioral activation;
  - Emotion control by cognitive restructuring when prone to depressive symptoms;

- Self-monitoring while using cognitive restructuring techniques in imagined situations;
- Self-monitoring while using cognitive restructuring techniques in real life situations;
- Rehearsal of relaxation exercises.

#### *11.4. Sessions 7-10*

Sessions 7 to 10 are targeted at making headway towards the resolution of some or all the problems previously identified by the EFS, working toward strengthening the patient's adaptive beliefs and weakening the maladaptive ones, and encouraging them to see the links between problems, particularly those that are characterized by common dysfunctional beliefs. Core beliefs are identified and approached in this part of the therapy. Standard CT techniques are used to change beliefs and behaviors, but the therapist often refers back to the evolutionary-informed CT conceptualization. Homework continues to focus on EFS-generated behavioral activation, rehearsing adaptive statements in real-life situations and applying the techniques and conceptualization to novel, diverse problems.

Structurally, sessions 7-10 include:

- Making headways towards the resolution of all or some of the problems previously identified by the EFS;
- Working toward strengthening the patients' adaptive beliefs and weakening the maladaptive beliefs;
- Encourage the patients to see the links between problems, particularly those which are characterized by common irrational beliefs;
- Homework suggestions:
  - Continuing EFS-generated behavioral activation;
  - Rehearsing rational statements in real life situations;
  - Use cognitive conceptualization to deal with negative emotions related to depression.

#### *11.5. Sessions 11-12*

Sessions 11 and 12 prepare the patient for the task of becoming their own future therapists, which includes a discussion about relapse prevention. The homework focuses on strengthening confidence in healthy core beliefs and promoting self-acceptance and other-acceptance. Self-control techniques in difficult situations are practiced, and solutions for possible relapses are tested before the end of the therapy.

Structurally, sessions 11-12 include:

- Prepare patient for the task of becoming their own future therapist;
- Discuss dependency problems and relapse prevention;

- Homework suggestions:
  - Continuing EFS-generated behavioral activation;
  - Continuous use of the self-control techniques in real-life situations.

## Appendix 1 – The Evolutionary Fitness Scale (EFS). English version.

Prior to the first session, the patient completes an Evolutionary Fitness Scale (Giosan et al., 2018). The EFS is an assessment of where the patient stands on various dimensions of fitness. The EFS covers major dimensions that are thought to have an effect on fitness, such as health, attractiveness, safety of, and fit with the environment, resourcefulness, upward social mobility, mate value, offspring quality, extended family. To a large extent, in Cognitive Evolutionary Therapy the patient's answers to the EFS guide the specific therapeutic interventions.

The Evolutionary Fitness Scale (Giosan et al., 2018):

1. I have at least one best friend.
2. In general, my extended family members, especially my first-degree relatives, have enjoyed great longevity.
3. I have many friends ready to help me in case of need.
4. I eat very healthy.
5. I have significant medical problems.
6. I may not be a millionaire, but I make enough money to afford many of the things I want.
7. People find me sexually attractive.
8. I engage in activities, at my job or elsewhere, that put my life at risk.
9. I am generally satisfied with my sex life.
10. My health coverage is enough to pay for any unexpected medical bills.
11. I visit my relatives frequently.
12. I am not afraid of intrusions or burglaries in the house I live.
13. I often get the chance to spend time outside.
14. I am more attractive to potential sexual partners than the majority of my peers.
15. I am an active outdoors person.
16. I get to tend to pets and animals often.
17. I like to gather wild strawberries and other edible things from nature when given the opportunity.
18. I eat at least three servings of vegetables or fruits per day.
19. I eat nuts frequently.
20. I eat plenty of fish.
21. I get enough sleep.
22. Most of the days I eat lean meats (e.g., chicken breast) rather than fat cuts.
23. I exercise at least four times a week.
24. I am in a better physical shape than the majority of people my age.

25. I am not afraid to walk at night in my neighborhood.
26. I have the ability to protect me and my family in case of natural disasters or accidents (e.g., flood, fire).
27. I would find a date easily, if I wanted to.
28. I frequently go out with my friends.
29. I fit well with my coworkers or schoolmates.
30. The circumstances in which I find myself now are a good match with my personal goals and aspirations.
31. I fit well with my neighbors.
32. My family members brag about me.
33. I am admired by my friends.
34. I help many people.
35. I am important to people other than my family.
36. My friends contact me often.
37. My family contact me often.
38. I believe people find my partner more attractive than the majority of his/her peers.
39. I am satisfied with my sex life with my partner.
40. My partner and I are very compatible sexually.
41. I believe my partner is faithful to me.
42. My partner enjoys good health.
43. I have a harmonious, conflict-free, relationship with my partner.
44. If I made no money, I could rely on my partner's income for a while without a significant drop in my quality of life.
45. If I wanted to, my partner would have a child with me.

*If you have children, please fill out the following items:*

46. My relatives would take care of my children, in case of need.
47. My children are better at sports than the majority of their peers.
48. My children are in top 10% at school.
49. I could count on my close friends to take care of my children in case of need.
50. My children rarely get sick.
51. People say my children are very cute.
52. I am pleased with my child's boyfriend/girlfriend selection.
53. I have a close relationship with my children.
54. My children's ideas often irritate me.

55. My children confide in me.
56. I get into frequent arguments with my children.
57. I don't like my children's friends.
58. My children trust and follow my advice.

Appendix 2 – The Evolutionary Fitness Scale (EFS). Romanian version.

1. Am cel puțin un prieten foarte bun.
2. În general, rudele mele, în special cele apropiate, au trăit mult.
3. Am mulți prieteni gata să mă ajute în caz de nevoie.
4. Mănânc foarte sănătos.
5. Am probleme mari de sănătate.
6. Chiar dacă nu sunt foarte bogat(ă), fac destui bani ca să îmi permit multe din lucrurile pe care mi le doresc.
7. Cred că oamenii mă consideră atractiv(ă).
8. Am o meserie sau fac activități care îmi pun viața în pericol.
9. În general sunt satisfăcut(ă) de viața mea sexuală.
10. Am acces la servicii medicale de bună calitate.
11. Îmi vizitez rudele frecvent.
12. Nu îmi este frică de intruziuni sau tâlhării în casa în care locuiesc.
13. Am de multe ori șansa să îmi petrec timpul în aer liber.
14. Sunt mai atractiv(ă) sexual decât majoritatea celorlalți de vârsta mea.
15. Sunt o persoană activă, care iese în natură.
16. Am des ocazia să îngrijesc sau să mă joc cu animale.
17. Îmi place să culeg fragi sau alte fructe din natură, atunci când am posibilitatea.
18. Mănânc cel puțin trei porții de vegetale sau fructe pe zi.
19. Consum frecvent nuci și semințe.
20. Mănânc mult pește.
21. Dorm suficient.
22. De obicei mănânc carne slabă (de ex. piept de pui) și nu grăsimi.
23. Fac exerciții fizice cel puțin de patru ori pe săptămână.
24. Sunt într-o formă fizică mai bună decât majoritatea celorlalți oameni de vârsta mea.
25. Nu mi-e teamă să merg noaptea pe stradă în zona în care locuiesc.
26. În caz de pericol neprevăzut (de ex. inundație, incendiu), pot să mă protejiez pe mine și pe familia mea.
27. Dacă aș dori, mi-ar fi ușor să îmi găsesc un nou partener romantic.
28. Ies des cu prietenii mei.
29. Mă potrivesc cu colegii mei de școală sau de muncă.
30. În prezent, punctul în care mă aflu în viața mea se potrivește cu scopurile și aspirațiile mele.
31. Mă simt bine în comunitatea în care trăiesc.

32. Familia mea se laudă cu mine.
33. Prietenii mei mă admiră.
34. Ajut mulți oameni.
35. Sunt important(ă) și pentru alți oameni, nu doar pentru familia mea.
36. Prietenii mei mă contactează des.
37. Membrii familiei mele mă contactează des.
38. Cred că oamenii consideră că persoana care îmi este partner(ă) este mai atractivă decât majoritatea celorlalți de vârsta ei.
39. Sunt satisfăcut(ă) de viața mea sexuală cu partenerul/partenera mea.
40. Eu și partenerul/partenera mea ne potrivim foarte bine din punct de vedere sexual.
41. Cred că partenerul/partenera mea îmi este fidel(ă).
42. Partenerul/partenera mea nu are probleme mari de sănătate.
43. Am o relație de cuplu armonioasă, fără conflicte.
44. Dacă nu aș lucra, aș putea să mă bazez pentru o vreme pe venitul partenerului/partenerii, fără să simt o scădere semnificativă a calității vieții mele.
45. Dacă aș dori, partenerul/partenera mea ar face un copil cu mine.

*Dacă aveți copii completați următoarele:*

46. Rudele mele ar avea grijă de copiii mei, dacă aș avea nevoie.
47. Copiii mei sunt mai buni la sport decât majoritatea celor de vârsta lor.
48. Copiii mei sunt printre primii din clasă la învățătură.
49. Dacă ar fi nevoie ca cineva să aibă grijă de copiii mei, m-aș putea baza pe prietenii mei.
50. Copiii mei se îmbolnăvesc rar.
51. Oamenii apreciază cât de frumoși sunt copiii mei.
52. Sunt mulțumit(ă) de partenerul romantic al copilului meu.
53. Am o relație apropiată cu copiii mei.
54. Ideile copiilor mei mă irită adesea.
55. Copiii mei mi se destăinuie.
56. Mă cert deseori cu copiii mei.
57. Nu îmi plac prietenii copiilor mei.
58. Copiii mei au încredere în sfaturile mele și le urmează.

### Appendix 3 - Nutrition

If necessary, the therapist should devise a nutritional plan for the patient, incorporating (some of) the foods our ancestors consumed during the times of our evolutionary history. Our ancestors' diet consisted primarily of fruits (e.g., apples, tomatoes, berries), non-starchy vegetables (e.g., cabbage, lettuce), nuts (e.g., hazelnuts, walnuts), occasional honey, and game meat (Cordain, 2011; Cordain et al., 2005). The typical pre-agricultural diet was virtually free of legumes (e.g., potatoes or beans), dairy products (e.g., milk or cheese) or grains (e.g., bread). The very little – if any – amounts of grains our ancestors consumed were in the form of sprouts, i.e., grains that could be eaten raw, uncooked. Our ancestors' vitamin intake was considerably higher than ours (Cordain, 2011; Cordain et al., 2005) and the meat our ancestors consumed had considerably lower amounts of saturated fat compared to farmed meat. The glycemic index of the typical foods our ancestors consumed was very low compared to the modern foods.

The evolutionary argument is that the fact that humans lived for millions of years on this type of diet led to specific adaptations to these kinds of foods. In other words, time was too short since the discovery of agriculture for human to evolve adaptations to modern foods, such as dairy or grains. This explains a multitude of ailments affecting humans today. One example is lactose intolerance, whose high prevalence in humans - up to 65% (NIH, n.d.) - is explained by the fact that our ancestors did not consume other animals' milk. Other examples are heart disease, diabetes, blood pressure, or cancer (Cordain, 2011).

While a direct link between diet and depression is yet not fully established, research documents strong links between a highly nutritious and balanced diet and health outcomes in general. As such, an evolutionary-driven intervention should include a nutritional component as described above.

Of course, compromises will have to be made in this regard, as not all patients will readily transition to a markedly different diet, and, in addition, some of the staple foods we consumed in our evolutionary past are hard to procure nowadays. For example, game will have to be replaced with low fat grocery-store meats, such as free-range turkey or chicken breast, as in countries such as US game commercialization is illegal. Wild berries will have to be replaced with foods that are available in grocery stores, preferably not very sweet, such as apples. White bread, which has the same glycemic index as glucose, can be replaced with nuts, or with sprouted bread.

## Appendix 4 – Physical activity

Our ancestors' lifestyle was very active compared to ours. They walked extensively in search for food (up to 20 miles per day), had to outrun predators, catch prey, migrate frequently.

Ample research documents the benefits of physical activity on both mental and physical health (Eaton & Eaton, 2003). More specifically, physical activity showed positive effects on depression, anxiety and self-esteem (Biddle & Asare, 2011; North, McCullagh, & Tran, 1990), as well as on general mental health (Clyne, 2001). People who engage in regular physical activity display more desirable health outcomes across a variety of physical conditions (Penedo & Dahn, 2005). Similarly, participants in randomized clinical trials of physical-activity interventions show better health outcomes, including better general and health-related quality of life, functional capacity and mood states (North et al., 1990; Penedo & Dahn, 2005). Several reviews suggest that even low doses of physical activity may be protective against depressive symptoms in children and adolescents (Biddle & Asare, 2011), adults (Teychenne, Ball, & Salmon, 2008), and the elderly (Palmer, 2005; Potter, Ellard, Rees, & Thorogood, 2011).

Contemporary humans engage in little physical exercise compared to the physically active lifestyle engaged in by ancestral hunter-gatherers (Cordain, Gotshall, & Eaton, 1997; Eaton & Eaton, 2003; Lima et al., 2008; O'Keefe & Cordain, 2004; Walker & Adam, 2003). Our ancestors would have gone through prolonged periods of sedentariness only following injuries, which provide the body cues to engage in life-preserving metabolic and stress related responses such as inflammation. In the modern societies, inflammatory responses are the cause of many chronic diseases, one explanation being the fact that contemporary humans are much more sedentary than our ancestors (Charansonney & Després, 2010).

Appendix 5 – Evolutionary inspired interventions, based on the Evolutionary Fitness Scale

	<b>Item</b>	<b>Evolutionary factor(s) tapped</b>	<b>Some suggestions for therapy</b>
			Note: wherever appropriate, therapy targets both behavioral activation and correction of dysfunctional thinking
1.	I have at least one best friend	Direct fitness	- If patient can't name a best friend, explore reasons and refute dysfunctional thinking. - Explore modalities to increase connectedness with at least one non-relative.
2.	In general, my extended family members, especially my first-degree relatives, have enjoyed great longevity	Indirect fitness	- Determine the factors that led to decreased longevity. If accidents/disasters/wars, etc., don't insist. - If illnesses, discuss if better health care/preventative care is needed and ways to achieve that.
3.	I have many friends ready to help me in case of need	Direct fitness	- Patient is encouraged to join groups such as churches, volunteer organizations, social groups (e.g., hobby groups). - Solutions such as meetup should be explored.
4.	I eat very healthy	Direct fitness Mismatch theory	- See item 18.
5.	I don't have major medical problems	Direct fitness	- Explore ways to correct some of the problems (e.g., doctor referrals, healthier lifestyle) where appropriate.
6.	I may not be a millionaire, but I make enough money to afford many of the things I want	Direct fitness Indirect fitness	- Explore solutions to increase the chance of making more money (e.g., furthering education, a business venture/partnership, acquiring new skills, etcetera).
7.	People find me sexually attractive	Direct fitness	- Discuss ways to increase attractiveness (e.g., clothes, hairdos, makeup, posture, demeanor). - Discuss what attractiveness means for the client. - Change self-perceptions.
8.	I engage in activities, at my job or elsewhere, that put my life at risk	Direct fitness	- Consider sex differences. Women are more risk-averse than men. - In therapy with male patients, an analysis of the cost-benefits of the risk should be made. - In therapy with female patients, ways to reduce the risk of those activities will be discussed/explored if the patient so desires.
9.	I am generally satisfied with my sex life	Direct fitness	- If appropriate, normalize expectations by presenting the average number of times people of various ages have sex. - If the patient has a partner, discuss the reasons for the incompatibility. The patient might need sex/couple therapy.
10.	My health coverage is enough to pay for any unexpected medical bills	Direct fitness	- Explore ways to better network with doctors and identify good and affordable health clinics.
11.	I visit my relatives frequently	Indirect fitness	- Explore solutions for more frequent contact with family members. - If distance is an issue, explore virtual solutions (e.g., Skype).
12.	I am not afraid of intrusions or burglaries in the house I live.	Direct fitness	- Explore solutions to increase home security (e.g., alarm system, guard dog, etcetera)
13.	I often get the chance to spend time outside	Mismatch theory	- If permanent relocation to "greener places" is not an option, ways to be in closer touch with nature will be explored (e.g., hiking, trips "off the beaten path," parks, etc.)
14.	I am more attractive to potential sexual partners than the majority of my peers	Direct fitness	- See item 7.
15.	I am an active outdoors person	Mismatch theory	- See item 13.

16.	I get to tend to pets and animals often	Mismatch theory	<ul style="list-style-type: none"> <li>- Discuss ways to be in closer touch with animals (e.g. bird feeding in parks).</li> <li>- Explore the possibility of buying (or borrowing) a pet.</li> <li>- Suggests visit to the zoo or animal farms.</li> <li>- Suggest visits to friends who own pets.</li> </ul>
17.	I like to gather wild strawberries and other edible things from nature when given the opportunity	Mismatch theory	<ul style="list-style-type: none"> <li>- Discuss/explore solutions for a more active hunter/gatherer lifestyle (e.g., mushrooms picking after rain / wild strawberries / apple picking).</li> </ul>
18.	I eat at least three servings of vegetables or fruits per day	Direct fitness Mismatch theory	<ul style="list-style-type: none"> <li>- Explain the basic premises of a hunter-gatherer diet, and how this diet is generally associated with positive health outcomes (Therapist should be familiar with Loren Cordain's works).</li> <li>- Ask that the patient get clearance from a general practitioner to transition towards a diet richer in lean meats/nuts/veggies/fruits and poorer in processed carbohydrates like white bread, sugar, dairy products.</li> <li>- Develop concrete plans as appropriate.</li> <li>- See Appendix 2</li> </ul>
19.	I eat nuts frequently		<ul style="list-style-type: none"> <li>- See item 18.</li> </ul>
20.	I eat plenty of fish		<ul style="list-style-type: none"> <li>- See item 18.</li> </ul>
21.	I get enough sleep	Direct fitness Mismatch theory	<ul style="list-style-type: none"> <li>- Determine the barriers to getting enough sleep, besides depression.</li> <li>- Discuss alternatives/solutions to achieve ~8 hours of sleep per day. (Note: Ilardi's (2009) evolutionary inspired therapy for depression includes sleep as one component of the author's 6-step program.)</li> </ul>
22.	Most of the days I eat lean meats (e.g., chicken breast) rather than fat cuts.		<ul style="list-style-type: none"> <li>- See item 18.</li> </ul>
23.	I exercise at least four times a week	Direct fitness Mismatch theory	<ul style="list-style-type: none"> <li>- See item 24.</li> </ul>
24.	I am in a better physical shape than the majority of people my age.	Direct fitness	<ul style="list-style-type: none"> <li>- Set up plans to get in better shape (e.g., gym subscription).</li> <li>- Set up plans to hire a personal trainer, if adequate.</li> <li>- Ask the patient to get a doctor's clearance for increased physical activity.</li> <li>- Instruct the patient to engage in social physical activities over lonely ones (e.g., team games like basketball or volleyball).</li> </ul>
25.	I am not afraid to walk at night in my neighborhood.	Direct fitness	<ul style="list-style-type: none"> <li>- Explore solutions. Is moving to a different neighborhood feasible?</li> <li>- If patient works night shifts, is a schedule change feasible?</li> <li>- If local regulations permit, explore the possibility of defense solutions (e.g., pepper spray).</li> <li>- If appropriate, explore the possibility of taking up defense classes (this would tap into items 23 and 24 as well).</li> </ul>
26.	I have the ability to protect me and my family in case of natural disasters or accidents (e.g., flood, fire).	Direct fitness Indirect fitness	<ul style="list-style-type: none"> <li>- Ask patient if s/he has ever thought of emergency plans.</li> <li>- Explore various emergency plans.</li> <li>- Instruct the patient to conduct emergency drills.</li> </ul>
27.	I would find a date easily, if I wanted to.	Direct fitness	<ul style="list-style-type: none"> <li>- Address the psychological obstacles involved in finding a date first (e.g., approach anxiety, low self-esteem, negative body language)</li> <li>- Explore ways for the patient to be in greater contact with potential partners (e.g., joining social groups sharing a hobby, going out more often, meetups, relocation, etcetera).</li> <li>- Decide on some solutions and work with the patient to implement them.</li> </ul>
28.	I frequently go out with my friends.	Direct fitness Mismatch theory	<ul style="list-style-type: none"> <li>- Explore the barriers (e.g., scheduling conflicts, workload, lack of motivation)</li> </ul>

			- Discuss solutions and work on their implementation in the form of homework.
29.	I fit well with my coworkers	Mismatch theory	- Explore ways to correct the problem (e.g., job change).
30.	The circumstances in which I find myself now are a good match with my personal goals and aspirations	Direct fitness	- Make concrete initial plans to change circumstances, if necessary - Set deadlines.
31.	I fit well with my neighbors	Mismatch theory	- Explore solutions (e.g., moving to a different area).
32.	My family members brag about me	Direct fitness Indirect fitness	- Discuss solutions to increase status (e.g., more education if appropriate, job change, community involvement, etcetera).
33.	I am admired by my friends	Direct fitness	- Discuss the psychological aspects of establishing and maintaining friendships and admiration from others (e.g., good communication, assertiveness, active listening skills, empathy and emotional intelligence). - Explore ways to increase status and own importance (e.g., furthering education, business ventures, physical attractiveness). - Explore ways to capitalize on patient's unique assets and skills by joining groups that value them (Tooby & Cosmides, 1990)
34.	I help many people	Direct fitness Reciprocal Altruism	- Therapist works with patient to develop a caring mentality (attitude) along with concrete plans for helping others.
35.	I am important to people other than my family		- See item 33.
36.	My friends contact me often	Direct fitness	- Therapist encourages the patient to take initiative and get in touch with friends. Therapist also instructs the patient to ask his/her friends to contact him/her regularly - Patient is encouraged to disclose their problem with friends but discouraged to spend too much time talking about depression. Time should be spent on shared social activities. - Ask the patient for permission to work with the patient's friends (to the extent this is possible/appropriate), to increase contact with the patient. - Ask the patient to keep a log of these activities and intervene as necessary
37.	My family contact me often	Direct fitness Indirect fitness	- Ask the patient to instruct his/her family members to get in touch with him more often. Instruct the patient to talk about his/her problems with the family, while avoiding ruminating. - Ask the patient for permission to work with the patient's immediate family (to the extent this is possible/appropriate), to increase contact with the patient (approach somewhat similar to that in the Behavioral Activation Treatment for Depression – BATD) - Ask the patient to keep a log of weekly contacts. Ask the family members to increase contact if still necessary. - Instruct the patient (or family) to engage in shared activities, rather than in discussions about the patient's depression. Instruct the patient to disclose about his/her problems, but not to ruminate about them with family.
38.	I believe people find my partner more attractive than the majority of his/her peers.	Direct fitness	- Analyze what "attractiveness" means for the patient. - Analyze what the importance of others' assessments in this regard is for the patient. - Discuss ways to make the patient's partner more attractive (e.g., clothing, hairdos, physical shape, etc.). The patient should play an

			active role in this. Therapist must show great sensitivity in intervening on the third party.
39.	I am satisfied with my sex life with my partner.	Direct fitness	- See item 9.
40.	My partner and I are very compatible sexually	Direct fitness	- See item 9.
41.	I believe my partner is faithful to me	Direct fitness	- Discuss with great sensitivity.
42.	My partner enjoys good health	Direct fitness	- Analyze and discuss the seriousness of the problems, and possible solutions. - Address psychological barriers to medical treatment, such as procrastination of checkups, avoidance, or inefficient communication with the partner.
43.	I have a harmonious, conflict-free, relationship with my partner	Direct fitness	- Analyze sources of conflict. - Discuss solutions. - Refer patient to couple's therapy after the end of current treatment, if necessary.
44.	If I made no money, I could rely on my partner's income for a while without a significant drop in my quality of life	Direct fitness	- Discuss/explore backup financial planning that would help in case of need. - Refer the patient to a financial planner, if necessary
45.	If I wanted to, my partner would have a child with me	Direct fitness.	- Discuss, if appropriate, the reasons why having children is not an option at the moment. - Explore solutions and planning (e.g., job stability, flextime, financial planning, family planning, etc.)
46.	My relatives would take care of my children, in case of need	Direct fitness	- Explore ways to be in closer contact with family members, if possible. - See item 11.
47.	My children are better at sports than the majority of their peers	Direct fitness	- Discuss ways to send the patient's children to sports. - Make concrete plans and establish deadlines.
48.	My children are in top 10% at school	Direct fitness	- Make plans to improve academic performance (e.g., tutoring, spending more time with the child's homework, etc.) - Adhere to the solutions proposed.
49.	I could count on my close friends to take care of my children in case of need	Direct fitness	- See items 1 and 3.
50.	My children don't get sick often	Direct fitness	- Discuss ways to make the patient's children stronger (e.g., healthy eating habits, sports, etcetera).
51.	People say my children are very cute	Direct fitness	- See item 47.
52.	I am pleased with my child's boyfriend/girlfriend selection	Indirect fitness	- Discuss perceptions - Discuss intergenerational conflict - Discuss solutions/strategies
53.	I have a close relationship with my children	Direct fitness	- Explore the reasons for the relationship problem. - Explore solutions.
54.	My children's ideas often irritate me	Direct fitness	- See item 53.
55.	My children confide in me	Direct fitness	- See item 53.
56.	I get into frequent arguments with my children	Direct fitness	- See item 53.

57.	I don't like my children's friends	Direct fitness	- See item 52.
58.	My children trust and follow my advice	Direct fitness	- See item 53.

## REFERENCES

- Andreasen, N. C. (1985). *The Broken Brain: The Biological Revolution in Psychiatry*. William Morrow Paperbacks.
- APA. (1994). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.). Washington, DC: APA.
- Asay, T. P., & Lambert, M. J. (1999). The empirical case for the common factors in therapy: Quantitative findings. In *The heart and soul of change: What works in therapy*. (pp. 23–55). Washington, DC, US: American Psychological Association. Retrieved from <http://psycnet.apa.org/books/11132/001>
- Atkinson, A. K., & Rickel, A. U. (1984). Postpartum depression in primiparous parents. *Journal of Abnormal Psychology*, 93(1), 115–119. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/6699268>
- Bailey, K. G. (1997). Series on mismatch theory and the fourfold model. *ASCAP Newsletter*, (February, March, April, December).
- Bailey, K. G. (2000). Evolution, kinship, and psychotherapy: Promoting psychological health through human relationships. In P. Gilbert & K. G. Bailey (Eds.), *Genes on the couch: Explorations in evolutionary psychotherapy* (pp. 42–67). East Sussex: Brunner-Routledge.
- Bailey, K. G., Wood, H. E., & Nava, G. R. (1992). What do clients want? Role of psychological kinship in professional helping. *Journal of Psychotherapy Integration*, 2(2), 125–147.
- Barash, D. P. (2012). *Homo Mysterious - Evolutionary Puzzles of Human Nature*. Oxford University Press.
- Barkow, J. H., Cosmides, L., & Tooby, J. (Eds.). (1995). *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*. Oxford University Press, USA.
- Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. International Universities Press.
- Beck, A. T. (1979). *Cognitive therapy of depression*. Guilford Press.
- Beck, A. T. (2005). The current state of cognitive therapy: a 40-year retrospective. *Archives of General Psychiatry*, 62(9), 953–959. <https://doi.org/10.1001/archpsyc.62.9.953>
- Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression*. New York, NY: Guilford Press.
- Beck, A. T., Steer, A. R., & Brown, G. K. (1996). *Manual for the Beck Depression Inventory—II*. San Antonio, TX: The Psychological Corporation.
- Beck, J. S. (1995). *Cognitive Therapy: Basics and Beyond* (1st ed.). The Guilford Press.
- Bernard, M. E. (1991). *Using Rational-Emotive Therapy Effectively: A Practitioner's Guide*. Springer.
- Biddle, S. J. H., & Asare, M. (2011). Physical Activity and Mental Health in Children and Adolescents: A Review of Reviews. *British Journal of Sports Medicine*, 45(11), 886–895. <https://doi.org/10.1136/bjsports-2011-090185>
- Bogaert, A. F., & Rushton, J. P. (1989). Sexuality, delinquency and r/K reproductive strategies: Data from a Canadian university sample. *Personality and Individual Differences*, 10, 1071–1077.

- Buist-Bouwman, M. A., Ormel, J., de Graaf, R., & Vollebergh, W. A. M. (2004). Functioning after a major depressive episode: complete or incomplete recovery? *Journal of Affective Disorders*, *82*(3), 363–371. <https://doi.org/10.1016/j.jad.2004.02.007>
- Burns, T. P. (1992). Adaptedness, evolution and a hierarchical concept of fitness. *Journal of Theoretical Biology*, *154*(2), 219–237. [https://doi.org/10.1016/S0022-5193\(05\)80404-7](https://doi.org/10.1016/S0022-5193(05)80404-7)
- Buss, D. M. (2000a). *The Dangerous Passion: Why Jealousy Is as Necessary as Love and Sex*. Free Press.
- Buss, D. M. (2000b). The evolution of happiness. *The American Psychologist*, *55*(1), 15–23. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11392858>
- Buss, D. M. (2005). *The Handbook of Evolutionary Psychology*. John Wiley & Sons.
- Buss, D. M. (2015). *Evolutionary Psychology: The New Science of the Mind* (5th ed.). Abingdon, OX: Routledge.
- Campbell, S. B., & Cohn, J. F. (1991). Prevalence and correlates of postpartum depression in first-time mothers. *Journal of Abnormal Psychology*, *100*(4), 594–599. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/1757673>
- Campbell, S. B., Cohn, J. F., Flanagan, C., Popper, S., & Meyers, T. (1992). Course and Correlates of Postpartum Depression During the Transition to Parenthood. *Development and Psychopathology*, *4*(01), 29–47. <https://doi.org/10.1017/S095457940000554X>
- Charansonney, O. L., & Després, J. P. (2010). Disease prevention - should we target obesity or sedentary lifestyle? *Nature Reviews. Cardiology*, *7*(8), 468–472. <https://doi.org/10.1038/nrcardio.2010.68>
- Chiesa, A., & Serretti, A. (2011). Mindfulness based cognitive therapy for psychiatric disorders: a systematic review and meta-analysis. *Psychiatry Research*, *187*(3), 441–453. <https://doi.org/10.1016/j.psychres.2010.08.011>
- Clyne, A. (2001). Physical Activity and Mental Health. *Physiotherapy*, *87*(1), 49–50. [https://doi.org/10.1016/S0031-9406\(05\)61195-9](https://doi.org/10.1016/S0031-9406(05)61195-9)
- Confer, J. C., Easton, J. A., Fleischman, D. S., Goetz, C. D., Lewis, D. M., Perilloux, C., & Buss, D. M. (2010). Evolutionary psychology. Controversies, questions, prospects, and limitations. *The American Psychologist*, *65*(2), 110–126. <https://doi.org/Review>
- Cordain, L. (2011). *The paleo diet: lose weight and get healthy by eating the foods you were designed to eat* (Revised). Hoboken, N.J.: John Wiley & Sons.
- Cordain, L., Eaton, S. B., Sebastian, A., Mann, N., Lindeberg, S., Watkins, B. A., ... Brand-Miller, J. (2005). Origins and evolution of the Western diet: health implications for the 21st century. *The American Journal of Clinical Nutrition*, *81*(2), 341–354.
- Cordain, L., Gotshall, R. W., & Eaton, S. B. (1997). Evolutionary aspects of exercise. *World Review of Nutrition and Dietetics*, *81*, 49–60. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9287503>
- Cosmides, L. T. J. (1997). Evolutionary Psychology: A Primer. Retrieved from <http://cogweb.ucla.edu/ep/EP-primer.html>
- Crawford, C., & Krebs, D. (1998). *Handbook of evolutionary psychology: Ideas, issues, and applications*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Crow, T. J. (1991). Origins of psychosis and the “Descent of Man.” *British Journal of Psychiatry*, *159*, 76–82.

- Crow, T. J. (1995). A Darwinian approach to the origins of psychosis. *British Journal of Psychiatry*, *167*, 12–25.
- Crow, T. J. (1997). Is schizophrenia the price that Homo Sapiens pays for language? *Schizophrenia Research*, *28*, 127–141.
- Cuijpers, P. (2011). The patient perspective in research on major depression. *BMC Psychiatry*, *11*, 89. <https://doi.org/10.1186/1471-244X-11-89>
- Cuijpers, P., Smit, F., Bohlmeijer, E., Hollon, S. D., & Andersson, G. (2010). Efficacy of cognitive-behavioural therapy and other psychological treatments for adult depression: Meta-analytic study of publication bias. *The British Journal of Psychiatry*, *196*, 173–178.
- David, D., Lynn, S. J., & Ellis, A. (Eds.). (2009). *Rational and Irrational Beliefs: Research, Theory, and Clinical Practice*. Oxford University Press, USA.
- David, D., & Szentagotai, A. (2006). Cognitions in cognitive-behavioral psychotherapies; toward an integrative model. *Clinical Psychology Review*, *26*(3), 284–298. <https://doi.org/Review>
- Davis, C., & Carter, J. C. (2009). Compulsive overeating as an addiction disorder. A review of theory and evidence. *Appetite*, *53*(1), 1–8. <https://doi.org/10.1016/j.appet.2009.05.018>
- Dennett, D. C. (1995). *Darwin's dangerous idea: Evolution and the meanings of life*. New York: Simon and Schuster.
- Dimidjian, S., Barrera, M., Martell, C., Muñoz, R. F., & Lewinsohn, P. M. (2011). The Origins and Current Status of Behavioral Activation Treatments for Depression. *Annual Review of Clinical Psychology*, *7*(1), 1–38. <https://doi.org/10.1146/annurev-clinpsy-032210-104535>
- Dobson, K. S., & Shaw, B. F. (1987). Cognitive assessment with major depressive disorders. *Cognitive Therapy and Research*, *10*(1), 13–29. <https://doi.org/10.1007/BF01186286>
- Dobzhansky, T. (1969). On Cartesian and Darwinian aspects of biology. In *Philosophy, science and method* (pp. 165–178). New York: S. Martin's Press.
- Dunbar, R. I. (1992). Neocortex size as a constraint on group size in primates. *Journal of Human Evolution*, *22*(6), 469–493. Retrieved from [http://product.ubion.co.kr/upload20120221100633896/ccres00056/db/\\_2261\\_1/embedded/sns3.pdf](http://product.ubion.co.kr/upload20120221100633896/ccres00056/db/_2261_1/embedded/sns3.pdf)
- Dunkel, C., & Decker, M. (2010). Convergent validity of measures of Life-History strategy. *Personality and Individual Differences*, *48*, 681–684.
- Durisko, Z., Mulsant, B. H., & Andrews, P. W. (2015). An adaptationist perspective on the etiology of depression. *Journal of Affective Disorders*, *172*, 315–323. <https://doi.org/10.1016/j.jad.2014.09.032>
- Durrant, R., Adamson, S., Todd, F., & Sellman, D. (2009). Drug use and addiction: evolutionary perspective. *Australian and New Zealand Journal of Psychiatry*, *43*(11), 1049–1056. <https://doi.org/10.3109/00048670903270449>
- Eaton, S. B., & Eaton, S. B. (2003). An evolutionary perspective on human physical activity: implications for health. *Comparative Biochemistry and Physiology. Part A, Molecular & Integrative Physiology*, *136*(1), 153–159. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/14527637>
- Ellis, A. (1994). *Reason and emotion in psychotherapy*. Secaucus, NJ: Carol Pub. Group.

- Ellis, A., Dryden, W., & DiGiuseppe, R. (2007a). *The Practice of Rational Emotive Behavior Therapy*. New York, NY: Springer Publishing Company.
- Ellis, A., Dryden, W., & DiGiuseppe, R. (2007b). *The Practice of Rational Emotive Behavior Therapy*. New York, NY: Springer Publishing Company.
- Ellis, B. J., Figueredo, A. J., Brumbach, B. H., & Schlomer, G. L. (2009). Fundamental Dimensions of Environmental Risk. *Human Nature, 20*(2), 204–268. <https://doi.org/10.1007/s12110-009-9063-7>
- Evans, D. (1999). The social competition hypothesis of depression. *The ASCAP Newsletter, 12*, 12–15.
- Fagerstrom. (1992). The meristem-meristem cycle as a basis for defining fitness in clonal plants. *Oikos, 63*(3), 449–453. <https://doi.org/10.2307/3544971>
- Figueredo, A. J., Vásquez, G., Brumbach, B. H., & Schneider, S. M. R. (2005). The K-factor, covitality, and personality: A psychometric test of Life History Theory. *Human Nature, 18*, 47–73.
- Figueredo, A. J., Vasquez, G., Brumbach, B. H., Schneider, S. M. R., Sefcek, J. A., Tal, I. R., ... Jacobs, W. J. (2006). Consilience and Life History Theory: From genes to brain to reproductive strategy. *Developmental Review, 26*, 243–275.
- Fisher, H. E., & Thomson, J. A. J. (2007). Lust, romance, attachment: Do the side effects of serotonin-enhancing antidepressants jeopardize romantic love, marriage and fertility? In S. M. Platek, J. P. Keenan, & T. K. Shackelford (Eds.), *Evolutionary Cognitive Neuroscience*. Cambridge: MIT Press.
- Fisher, R. A. (1958). *The genetical theory of natural selection*. New York: Dover.
- Fiske, A. P., & Haslam, N. (1997). Is obsessive-compulsive disorder a pathology of the human disposition to perform socially meaningful rituals? Evidence of similar content. *The Journal of Mental Disease, 185*, 211–222.
- Freud, S., & Brill, A. A. (1915). *The Interpretation of dreams*. G. Allen & Unwin, Limited.
- Garn, H., & Renz, H. (2007). Epidemiological and immunological evidence for the hygiene hypothesis. *Immunobiology, 212*(6), 441–452. <https://doi.org/10.1016/j.imbio.2007.03.006>
- Gilbert, P. (1992). *Depression: The Evolution of Powerlessness* (2nd edition). Psychology Press.
- Gilbert, P., & Bailey, K. G. (Eds.). (2000). *Genes on the couch: Explorations in evolutionary psychotherapy*. East Sussex: Brunner-Routledge.
- Giosan, C. (2006). High-K Strategy Scale: A measure of the High-K independent criterion of fitness. *Evolutionary Psychology, 4*, 394–405.
- Giosan, C. (2013). ‘Slow’ reproductive strategy: A negative predictor of depressive symptomatology. *Australian Journal of Psychology, 65*(3), 156–162. <https://doi.org/10.1111/ajpy.12016>
- Giosan, C., Cobeanu, O., Mogoase, C., Muresan, V., Malta, L. S., Wyka, K., & Szentagotai, A. (2014). Evolutionary cognitive therapy versus standard cognitive therapy for depression: a protocol for a blinded, randomized, superiority clinical trial. *Trials, 15*(1), 83. <https://doi.org/10.1186/1745-6215-15-83>
- Giosan, C., Cobeanu, O., Wyka, K., Muresan, V., Mogoase, C., Szentagotai, A., & Malta, L. S. (n.d.). Cognitive evolutionary therapy versus standard cognitive therapy for depression: A randomized clinical trial. *Submitted for Publication*.

- Giosan, C., Muresan, V., & Moldovan, R. (2014). Cognitive evolutionary therapy for depression: a case study. *Clinical Case Reports*, 2(5), 228–236. <https://doi.org/10.1002/ccr3.131>
- Giosan, C., Wyka, K., Mogoșe, C., Cobeanu, O., & Szentagotai, A. (2018). The Evolutionary Fitness scale: A measure of the independent criterion of fitness. *EvoS Journal: The Journal of the Evolutionary Studies Consortium*, 7(1), 181–205. Retrieved from <http://giosan.com/publications/evofitnessscale.pdf>
- Hagen, E. H. (2002). Depression as bargaining: The case postpartum. *Evolution and Human Behavior*, 23, 323–336.
- Hagen, E. H. (2003). The bargaining model of depression. In P. Hammerstein (Ed.), *Genetic and cultural evolution of cooperation* (pp. 95–123). Cambridge: MIT Press.
- Hamilton, W. D. (1964). The genetical evolution of social behavior. I and II. *Journal of Theoretical Biology*, 7, 1–52.
- Heim, C., Owens, M. J., Plotsky, P. M., & Nemeroff, C. B. (1997). The role of early adverse life events in the etiology of depression and posttraumatic stress disorder. Focus on corticotropin-releasing factor. *Annals of the New York Academy of Science*, 821, 194–207.
- Ilardi, S. S. (2009). *The Depression Cure: The 6-Step Program to Beat Depression Without Drugs*. Da Capo Press.
- Irons, W. (1998). Adaptively relevant environments versus the environment of evolutionary adaptedness. *Evolutionary Anthropology: Issues, News, and Reviews*, 6(6), 194–204. [https://doi.org/10.1002/\(SICI\)1520-6505\(1998\)6:6<194::AID-EVAN2>3.0.CO;2-B](https://doi.org/10.1002/(SICI)1520-6505(1998)6:6<194::AID-EVAN2>3.0.CO;2-B)
- Jakobsen, J. C. (2011). Review: interpersonal psychotherapy is effective as an acute or maintenance treatment for unipolar depression. *Evidence-Based Mental Health*, 14(4), 108. <https://doi.org/Comment>
- John, S., & Segal, D. L. (2014). Case Conceptualization. In *The Encyclopedia of Clinical Psychology*. John Wiley & Sons, Inc. <https://doi.org/10.1002/9781118625392.wbecp106>
- Keedwell, P. (2008). *How Sadness Survived: The Evolutionary Basis of Depression*. Radcliffe Publishing.
- Kelly, M. A., Cyranowski, J. M., & Frank, E. (2007). Sudden gains in interpersonal psychotherapy for depression. *Behaviour Research and Therapy*, 45(11), 2563–2572. [https://doi.org/Research Support, N.I.H., Extramural](https://doi.org/Research%20Support,%20N.I.H.,%20Extramural)
- Keng, S. L., Smoski, M. J., & Robins, C. J. (2011). Effects of mindfulness on psychological health: a review of empirical studies. *Clinical Psychology Review*, 31(6), 1041–1056. <https://doi.org/10.1016/j.cpr.2011.04.006>
- Kennedy, D. P., & Adolphs, R. (2011). Social neuroscience: Stress and the city. *Nature*, 474(7352), 452–453. <https://doi.org/10.1038/474452a>
- Kessler, R. C., Berglund, P. A., Demler, O., Jin, R., Koretz, D., Merikangas, K. R., ... Wang, P. S. (2003). The epidemiology of major depressive disorder: Results from the National Comorbidity Survey replication (NCS-R). *Journal of the American Medical Association*, 289, 3095–3105.
- Knight, C. (2011). “Most people are simply not designed to eat pasta”: evolutionary explanations for obesity in the low-carbohydrate diet movement. *Public Understanding of Science*, 20(5), 706–719. <https://doi.org/10.1177/0963662510391733>
- Kriegman, D. (2000). Evolutionary psychoanalysis: Toward an adaptive, biological perspective on the clinical process in psychoanalytic psychotherapy. In P. Gilbert & K. G. Bailey (Eds.), *Genes on a couch: Explorations in evolutionary psychotherapy* (pp. 71–92). East Sussex: Brunner-Routledge.

- Kumar, R., & Robson, K. M. (1984). A prospective study of emotional disorders in childbearing women. *British Journal of Psychiatry*, *144*, 35–47.
- Kurzban, R. (2011). *Why Everyone (Else) Is a Hypocrite: Evolution and the Modular Mind*. New Jersey: Princeton University Press.
- Kuyken, W., Padesky, C. A., & Dudley, R. (2008a). *Collaborative Case Conceptualization: Working Effectively with Clients in Cognitive-Behavioral Therapy*. Guilford Press.
- Kuyken, W., Padesky, C. A., & Dudley, R. (2008b). The Science and Practice of Case Conceptualization. *Behavioural and Cognitive Psychotherapy*, *36*(6), 757–768. <https://doi.org/10.1017/S1352465808004815>
- Leith, K. P., & Baumeister, R. (1996). Why do moods increase self-defeating behavior? Emotion, risk-taking and self-regulation. *Journal of Personality and Social Psychology*, *71*, 1250–1267.
- Lejuez, C. W., Hopko, D. R., LePage, J. P., Hopko, S. D., & McNeil, D. W. (2001). A brief behavioral activation treatment for depression. *Cognitive and Behavioral Practice*, *8*(2), 164–175. [https://doi.org/10.1016/S1077-7229\(01\)80022-5](https://doi.org/10.1016/S1077-7229(01)80022-5)
- Lennox, J. G. (1991). Commentary on Byerly and Michod. *Biology and Philosophy*, *6*, 33–37.
- Lewinsohn, P. M. (1974). Clinical and theoretical aspects of depression. In *Innovative treatment methods in psychopathology*. New York: Wiley.
- Lewinsohn, P. M., Hoberman, H. M., & Rosenbaum, M. (1988). A prospective study of risk factors for unipolar depression. *Journal of Abnormal Psychology*, *97*, 251–264.
- Lieberman, D. E. (2013). *The Story of the Human Body: Evolution, Health, and Disease*. New York, NY, US: Pantheon Books.
- Lima, V. S., Iniguez, A. M., Otsuki, K., Ferreira, L. F., Araújo, A., Vicente, A. C. P., & Jansen, A. M. (2008). Chagas Disease in Ancient Hunter-Gatherer Population, Brazil. *Emerging Infectious Diseases*, *14*(6), 1001–1002. <https://doi.org/10.3201/eid1406.0707>
- Lloyd, E., Wilson, D. S., & Sober, E. (2011). Evolutionary mismatch and what to do about it: a basic tutorial. *Evolutionary Applications*, 2–4.
- MacArthur, R. H., & Wilson, E. O. (1967). *The theory of island biogeography*. Princeton: Princeton University Press.
- Maercker, A., Michael, T., Fehm, L., Becker, E. S., & Margraf, J. (2004). Age of traumatisation as a predictor of posttraumatic stress disorder or major depression in young women. *British Journal of Psychiatry*, *184*, 482–487.
- Manicavasagar, V., Parker, G., & Perich, T. (2011). Mindfulness-based cognitive therapy vs cognitive behaviour therapy as a treatment for non-melancholic depression. *Journal of Affective Disorders*, *130*, 138–144.
- Manos, R. C., Kanter, J. W., & Busch, A. M. (2010). A critical review of assessment strategies to measure the behavioral activation model of depression. *Clinical Psychology Review*, *30*(5), 547–561. <https://doi.org/Review>
- Marks, I. M. (1987). *Fears, phobias, and rituals*. New York: Oxford University Press.
- Marks, I. M., & Nesse, R. M. (1994). Fear and fitness: An evolutionary analysis of anxiety disorders. *Ethology and Sociobiology*, *15*, 247–261.

- Martell, C. R., Addis, M. E., & Jacobson, N. S. (2001). *Depression in context: strategies for guided action*. W.W. Norton. Retrieved from <http://books.google.ro/books?id=Zcq7QgAACAAJ>
- Mazzucchelli, T., Kane, R., & Rees, C. (2009). Behavioral Activation Treatments for Depression in Adults: A Meta-analysis and Review. *Clinical Psychology-Science and Practice*, 16(4), 383–411. Retrieved from [://000271185900001](http://000271185900001)
- McGuire, M. T., Troisi, A., & Raleigh, M. M. (1997). Depression in evolutionary context. In S. Baron-Cohen (Ed.), *The maladapted mind: Classic readings in evolutionary psychopathology*. London: Erlbaum/Taylor & Francis.
- Mealey, L. (2000). Anorexia: A “losing” strategy? *Human Nature*, 11, 105–116.
- Michod, R. E. (1999). *Darwinian dynamics: Evolutionary transitions in fitness and individuality*. Princeton: Princeton University Press.
- Miller, S. D., Duncan, B. L., & Hubble, M. A. (1997). *Escape from Babel: Toward a Unifying Language for Psychotherapy Practice*. Norton. Retrieved from <http://books.google.ro/books?id=OI19QgAACAAJ>
- Mufson, L. (2008). Group interpersonal therapy reduces depression in adolescent survivors of war. *Evidence-Based Mental Health*, 11(1), 17. <https://doi.org/Comment>
- Mufson, L., Dorta, K. P., Wickramaratne, P., Nomura, Y., Olfson, M., & Weissman, M. M. (2004). A randomized effectiveness trial of interpersonal psychotherapy for depressed adolescents. *Archives of General Psychiatry*, 61(6), 577–584. [https://doi.org/Clinical Trial Comparative Study Randomized Controlled Trial Research Support, U.S. Gov't, P.H.S.](https://doi.org/Clinical%20Trial%20Comparative%20Study%20Randomized%20Controlled%20Trial%20Research%20Support,%20U.S.%20Gov't,%20P.H.S.)
- Mufson, L., Weissman, M. M., Moreau, D., & Garfinkel, R. (1999). Efficacy of interpersonal psychotherapy for depressed adolescents. *Archives of General Psychiatry*, 56(6), 573–579. [https://doi.org/Clinical Trial Comparative Study Randomized Controlled Trial Research Support, U.S. Gov't, P.H.S.](https://doi.org/Clinical%20Trial%20Comparative%20Study%20Randomized%20Controlled%20Trial%20Research%20Support,%20U.S.%20Gov't,%20P.H.S.)
- Nesse, R. M. (1998). Emotional disorders in evolutionary perspective. *British Journal of Medical Psychology*, 71, 397–415.
- Nesse, R. M. (2000). Is depression an adaptation? *Archives of General Psychiatry*, 57, 14–20.
- Nesse, R. M. (2005). Natural selection and the regulation of defenses: A signal detection analysis of the smoke detector principle. *Evolution and Human Behavior*, 26, 88–105.
- Nesse, R. M., & Williams, G. C. (1994). *Why Do We Get Sick? The New Science of Darwinian Medicine*. New York, NY: Times Books, Random House, Inc.
- Nesse, R. M., & Williams, G. C. (1996). *Why We Get Sick: The New Science of Darwinian Medicine* (1st ed.). Vintage.
- NIH, G. H. (n.d.). Lactose intolerance. Retrieved February 18, 2018, from <https://ghr.nlm.nih.gov/condition/lactose-intolerance>
- NIMS. (1994). *Depression fact sheet* (Vol. NIH Publication 00-4501). Bethesda, MD: National Institutes of Health.
- North, T. C., McCullagh, P., & Tran, Z. V. (1990). Effect of exercise on depression. *Exercise and Sport Sciences Reviews*, 18, 379–415. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/2141567>

- O'Keefe, J. H., & Cordain, L. (2004). Cardiovascular disease resulting from a diet and lifestyle at odds with our Paleolithic genome: how to become a 21st-century hunter-gatherer. *Mayo Clinic Proceedings Mayo Clinic*, 79(1), 101–108.
- Palmer, C. (2005). Exercise as a treatment for depression in elders. *Journal of the American Academy of Nurse Practitioners*, 17(2), 60–66. <https://doi.org/10.1111/j.1041-2972.2005.00012.x>
- Paykel, E. S., Emms, E. M., Fletcher, J., & Rassaby, E. S. (1980). Life events and social support in puerperal depression. *British Journal of Psychiatry*, 136, 229–346.
- Penedo, F. J., & Dahn, J. R. (2005). Exercise and well-being: a review of mental and physical health benefits associated with physical activity. *Current Opinion in Psychiatry*, 18(2), 189–193. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/16639173>
- Pianka, E. R. (1970). On r- and K-selection. *American Naturalist*, 104, 592–596.
- Pianka, E. R. (1978). *Evolutionary psychology*. New York: Harper & Row.
- Pinker, S. (2009). *How the Mind Works*. W. W. Norton & Company. Retrieved from <http://books.google.com/books?id=5cXKQUh6bVQC>
- Ploeger, A., van der Maas, H. L. J., & Raijmakers, M. E. J. (2008). Is Evolutionary Psychology a Metatheory for Psychology? A Discussion of Four Major Issues in Psychology From an Evolutionary Developmental Perspective. *Psychological Inquiry*, 19(1), 1–18. <https://doi.org/10.1080/10478400701774006>
- Pope Francis declares evolution and Big Bang theory are real and God is not “a magician with a magic wand” | The Independent. (n.d.). Retrieved February 18, 2018, from <http://www.independent.co.uk/news/world/europe/pope-francis-declares-evolution-and-big-bang-theory-are-right-and-god-isnt-a-magician-with-a-magic-9822514.html>
- Potter, R., Ellard, D., Rees, K., & Thorogood, M. (2011). A systematic review of the effects of physical activity on physical functioning, quality of life and depression in older people with dementia. *International Journal of Geriatric Psychiatry*, 26(10), 1000–1011. <https://doi.org/10.1002/gps.2641>
- Price, J. S., Sloman, L., Gardner, R., Gilbert, P., & Rohde, P. (1994). The social competition hypothesis of depression. *British Journal of Psychiatry*, 64, 309–315.
- Richman, J. A., Raskin, V. D., & Gaines, C. (1991). Gender roles, social support, and postpartum depressive symptomatology: The benefits of caring. *Journal of Nervous and Mental Disease*, 179, 139–147.
- Rosenberg, A. (1983). Fitness. *The Journal of Philosophy*, 80(8), 457. <https://doi.org/10.2307/2026163>
- Rowe, D. C., Vazsonyi, A. T., & Figueredo, A. J. (1997). Mating effort in adolescence: conditional or alternative strategy? *Journal of Personality and Individual Differences*, 23, 105–115.
- Rushton, J. P. (1985). Differential K theory: The sociobiology of individual and group differences. *Personality and Individual Differences*, 6, 441–452.
- Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: a new approach to preventing relapse*. Guilford Press. Retrieved from [http://books.google.ro/books?id=\\_QJ3cQT5UPsC](http://books.google.ro/books?id=_QJ3cQT5UPsC)

- Shrout, P. E., Link, B. G., Dohrenwend, B. P., Skodol, A. E., Stueve, A., & Mirotznik, J. (1989). Characterizing life events as risk factors for depression: The role of fateful loss events. *Journal of Abnormal Psychology, 98*, 460–467.
- Sloman, L., Price, J. S., Gilbert, P., & Gardner, R. (1994). Adaptive Function of Depression: Psychotherapeutic Implications. *American Journal of Psychotherapy, 48*, 1–16.
- Sober, E. (1993). *Philosophy of biology*. Boulder, Colorado: Westview Press.
- Spinella, M. (2003). Evolutionary Mismatch, Neural Reward Circuits, and Pathological Gambling. *International Journal of Neuroscience, 113*(4), 503–512. <https://doi.org/10.1080/00207450390162254>
- Teychenne, M., Ball, K., & Salmon, J. (2008). Physical activity and likelihood of depression in adults: A review. *Preventive Medicine, 46*(5), 397–411. <https://doi.org/10.1016/j.ypmed.2008.01.009>
- Thornhill, R., & Palmer, C. T. (2000). *A natural history of rape: Biological bases of sexual coercion*. Cambridge: The MIT Press.
- Thornhill, R., & Palmer, C. T. (2004). Evolutionary life history perspective on rape. In *Evolutionary psychology, public policy and personal decisions* (pp. 249–274). Mahway, NJ: Lawrence Erlbaum.
- Tinbergen, N. (1963). On aims and methods of Ethology. *Zeitschrift Für Tierpsychologie, 20*(4), 410–433. <https://doi.org/10.1111/j.1439-0310.1963.tb01161.x>
- Tooby, J., & Cosmides, L. (1990). The past explains the present: Emotional adaptations and the structure of ancestral environments. *Ethology and Sociobiology, 11*, 375–424.
- Trivers, R. L. (1971). The Evolution of Reciprocal Altruism. *The Quarterly Review of Biology, 46*(1), 35–57. <https://doi.org/10.1086/406755>
- Valenstein, E. S. (1998). *Blaming the brain: The truth about drugs and mental health*. New York: Free Press.
- Wakefield, J. C. (1997). Diagnosing DSM-IV-Part 1: DSM-IV and the concept of disorder. *Behavior Research and Therapy, 35*, 633–649.
- Wakefield, J. C., & First, M. (2003). Clarifying the distinction between disorder and non-disorder: Confronting the overdiagnosis (“false positives”) problem in DSM-IV. In K. A. Phillips, M. B. First, & H. A. Pincus (Eds.), *Advancing DSM: Dilemmas in psychiatric diagnosis*. Washington, D.C.: American Psychiatric Press.
- Walen, S. R., DiGiuseppe, R., & Dryden, W. (1992). *A Practitioner’s Guide to Rational-Emotive Therapy*. Oxford University Press. Retrieved from <http://books.google.ro/books?id=wH-YiZnJgB8C>
- Walker, B. F., & Adam, F. (2003). Nutrition, diet, physical activity, smoking, and longevity: from primitive hunter-gatherer to present passive consumer--how far can we go? *Nutrition Burbank Los Angeles County Calif, 19*(2), 169–173.
- Wampold, B. E., Minami, T., Baskin, T. W., & Tierney, S. C. (2002). A meta-(re)analysis of the effects of cognitive therapy versus ‘other therapies’ for depression. *Journal of Affective Disorders, 68*, 159–165.
- Watson, P. J., & Andrews, P. W. (2002). Toward a revised evolutionary adaptationist analysis of depression: The social navigation hypothesis. *Journal of Affective Disorders, 72*, 1–14.

- Watts, S. E., Turnell, A., Kladnitski, N., Newby, J. M., & Andrews, G. (2015). Treatment-as-usual (TAU) is anything but usual: A meta-analysis of CBT versus TAU for anxiety and depression. *Journal of Affective Disorders, 175*, 152–167. <https://doi.org/10.1016/j.jad.2014.12.025>
- Wenner, C. J., Figueredo, A. J., & Jacobs, W. J. (2005). Validation of the “Mini-K” using socially problematic behaviors. In *Annual Meeting of the Human Behavior and Evolution Society*. Austin, TX.
- WHO | "Depression: let's talk" says WHO, as depression tops list of causes of ill health. (n.d.). Retrieved February 18, 2018, from <http://www.who.int/mediacentre/news/releases/2017/world-health-day/en/>
- Williams, G. C. (1966). *Adaptation and natural selection*. Princeton: Princeton University Press.
- Wolpert, L. (1999). *Malignant sadness: The anatomy of depression*. New York: Free Press.
- Woodley, M., Baca, T. C. de, Fernandes, H. B. F., Madison, G., Figueredo, A.-J., & Aguirre, M. P. (2017). Slow and steady wins the race: K positively predicts fertility in the usa and sweden. *Evolutionary Psychological Science, 3*(2), 109–117. <https://doi.org/10.1007/s40806-016-0077-1>
- Wrosch, C., Scheier, M. F., & Carver, C. S. (2003). The importance of goal disengagement in adaptive self-regulation: When giving up is beneficial. *Self and Identity, 2*, 1–20.