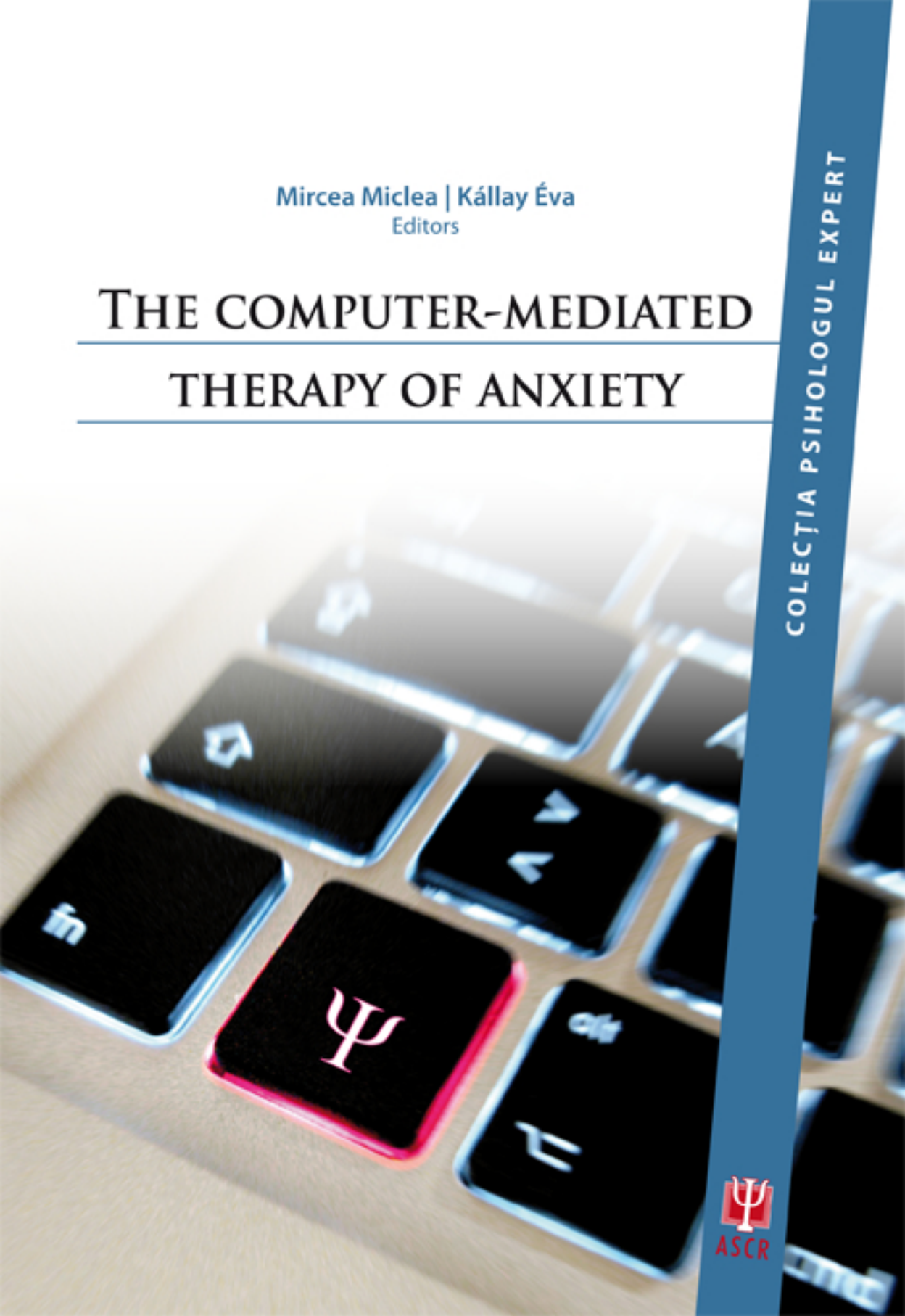
Mircea Miclea | Kállay Éva
Editors

THE COMPUTER-MEDIATED THERAPY OF ANXIETY



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The computer-mediated therapy of anxiety

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Chapter one

Introduction

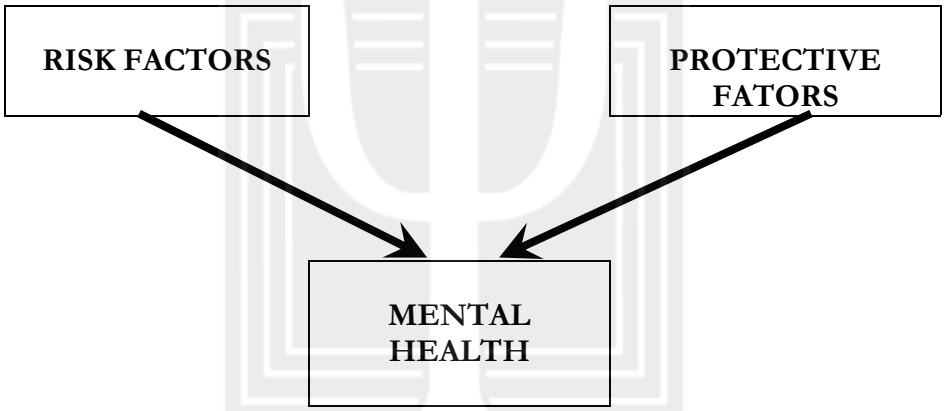
Mircea MICLEA & KÁLLAY Éva

"A society concerned to enhance factors and processes that promote mental health is a better society for everybody".
Lahtinen, Lehtinen, Riikonen, & Ahonen (1999, p.29)

Mental health is a salient component of health in general (Lahtinen, Lehtinen, Riikonen, & Ahonen, 1999).

According to the WHO **mental health** is: "a state of well-being in which the individual realizes his or her abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" (WHO, 2001). On the other hand **mental illness** refers to "mental health problems and strain, impaired functioning associated with distress, symptoms, and diagnosable mental disorders, such as schizophrenia and depression" (Green Paper, 2005, p. 4).

A person's mental health is determined by several factors falling in the following categories: **risk** (predisposing) and **protective** factors.



The most important ***risk factors*** belong to the biological (e.g., genetics, gender), individual (e.g., personal experiences), family and social context (e.g., family environment, social support), precipitating factors (e.g., stressful life events), as well as economic and environmental (e.g., social status, living conditions, work conditions, housing, education) realms. According to the 2004 WHO Geneva Report, the most important ***precipitating events*** that may impact a person's mental health are: war; displacement; alienation; social and physical isolation; lack of appropriate education, transport and housing; access to drugs and alcohol; peer rejection; poor nutrition; poverty; violence; social disadvantage; discrimination; work stress; unemployment.

On the other hand, the most important ***protective factors*** include: social integration, positive interpersonal interactions, social support, empowerment, and so on.

Table 1.
Risk and protective factors in mental helath. Precipitating events.

Risk factors	**Protective factors** Intrapersonal and contextual	**Precipitating events**
Genetic factors	Temperament (easygoing)	War
Gender	High intellectual ability	Displacement
Personal experiences	Internal locus of control	Alienation
Family environment	Well-developed problem-solving skills	Social and physical isolation
Social context	Flexible emotion regulation strategies	Lack of appropriate education, transport and housing
Age	Effective coping skills	Access to drugs and alcohol
Personal and family mental disorder history	Responsibility	Peer rejection
Level of education	Support-seeking skills	Poor nutrition
Intelligence	The ability to build solid social support networks	Poverty
Chronic emotional malfunctioning	Goal development and commitment	Violence
	Interests and affiliations	Social disadvantage
	Secure attachment with family members	Discrimination
	Positive family environment	Unemployment
	Supportive relationships with family, peers,	Work stress, etc
	and other adults	
	Socioeconomic advantage	

These factors are in a permanent interaction with each other, and determine:

- the maintenance of efficient functioning,
- the development, maintenance, and aggravation of malfunctioning, as well as
- the alleviation and recovery from mental ill health.

Figure 1 (based on Hosman, 1997, as cited in Lahtinen et al., 1999) represents these multiple interactions as well as the way in which these factors influence mental health).

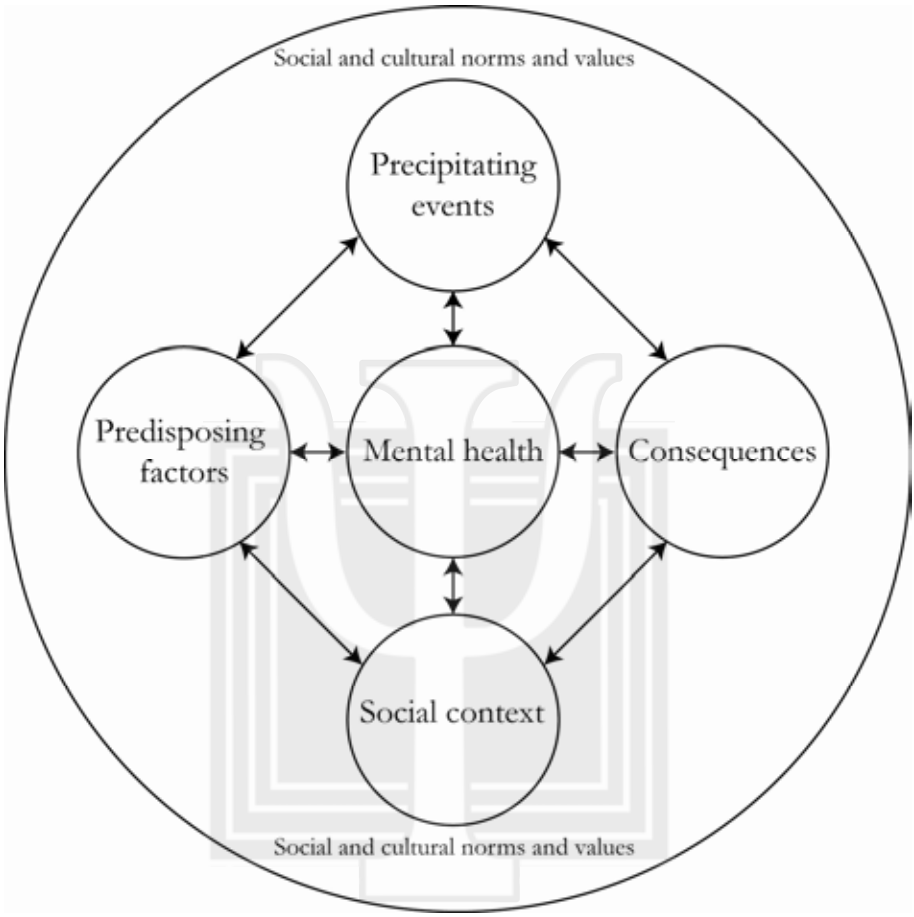
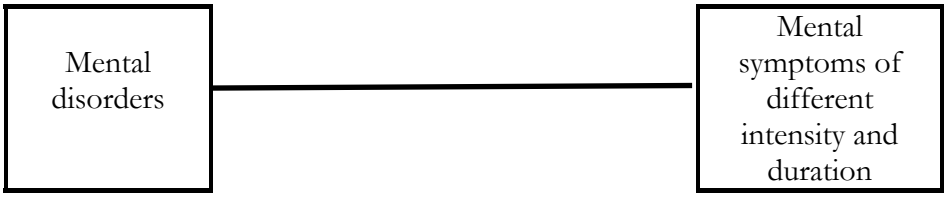


Figure 1.
Risk and protective factors influencing mental health (based on Hosman, 1997, as cited in Lahtinen et al., 1999).

According to Lahtinen et al. (1999), mental ill-health may be perceived in the form of a continuum, with mental disorders at one pole and mental symptoms at the other.



The definition of mental disorders is based on the presence of different symptoms, which do not include psycho-organic disorders or substance abuse disorders. In case these symptoms are long-lasting, cannot be controlled by the individual, are exacerbated (compared to the requirements of the context), are so severe that they significantly interfere with normal human functioning, they are referred to clinical diagnosis (e.g., generalized anxiety disorders, personality disorders, depression, etc.)

On the other hand, a considerable number of people may also experience symptoms of sub-clinical intensity, as mild states of anxiety, fatigue, sadness, lack of motivation, poor concentration, worrying, etc., which do not hinder everyday functioning, however may still significantly reduce the quality of the particular person's life.

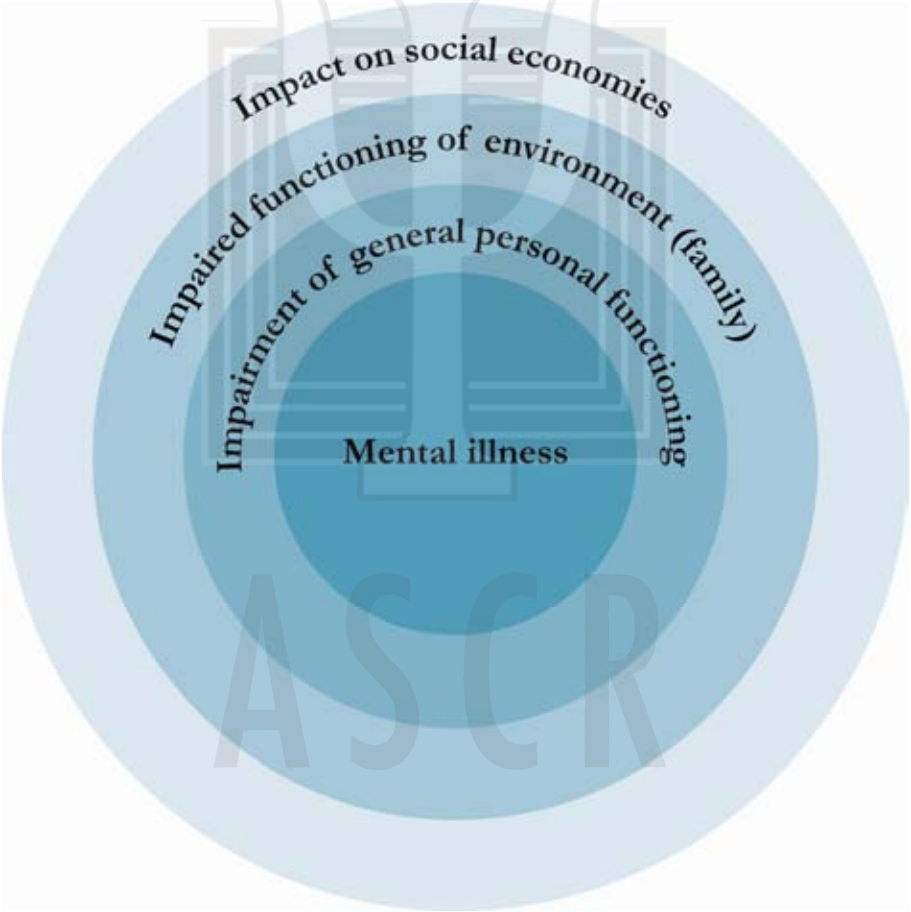
All forms of mental ill-health reduce the person's capacity to function efficiently, to live a meaningful life, attain and experience success and enjoy life. Consequently, in all cases, the quality of life in those afflicted with mental ill-health is also affected to varying degrees. On the other hand, not only the afflicted people are those who suffer. In most cases, the proximal and distal environment is affected as well (personal and professional life).

Thus, mental health is a necessary condition for humans to experience life as meaningful, to function efficiently, be creative and productive (Lahtinen et al., 1999). Mental illness prevents us to perceive and interpret our internal and external environment correctly. Thus, in persons with affected mental health the adaptive processes necessary for thinking, speaking and efficient communication, development and sustenance of healthy relationships, integration into society and community, are also impaired.

Recent studies have evinced that the number of those who suffer from mental disorders presents a tendency of dramatic increase in the last years (European Commission, 2005). At least one in four adult Europeans experience serious mental health problems because of an anxiety disorder or depression (Improving the mental health of the population, 2007; Wittchen & Jacobi, 2005), number which amounts to 82.7 million individuals. Research has shown

that most of these people suffer from anxiety disorders (25%), followed by depression (17%). Nevertheless, mental health problems may also be caused by more serious disorders as schizophrenia (Improving the mental health of the population, 2007). The same tendency regarding the increase of mental ill-health cases has also been observed among children and adolescents (Cunningham, Rapee, & Lyneham, 2006).

As we have already mentioned, mental ill-health represents a significant threat to the person's quality of life, as well as for those who live and work with him/her, causing severe forms of malfunctioning both to the affected person, and to his/her environment (Antony, Roth, Swinson, Huta, & Devins, 1998).



Some of the negative consequences of mental illness on individuals stem directly from the symptoms they experience. Such people cannot any longer experience and enjoy life to its fullest, it impairs the person's capacity to experience him/herself, function optimally and fruitfully interact with other persons.

In other cases, the negative consequences result from problems related to mental illness, as social exclusion, stigma, and discrimination of those who have the misfortune to experience such ailments (Improving the mental health of the population, 2007).

In the same time, since mental health is basically linked to physical health, a considerable percentage of those suffering of mental ill-health also suffer of physical health problems, often due to the secondary effects of their medication.

Some mental health problems are associated with higher than normal mortality rates (Improving the mental health of the population, 2007). An extremely sad, nevertheless illustrative example for this issue is the high rate of suicide in Europe, which leads to premature death (the highest rates being attained in Lithuania, Slovenia, Hungary, Estonia, Latvia, and Finland; Brock A, Baker A, Griffiths C *et al., 2004*). "Currently, in the EU, some 58,000 citizens die from suicide every year, more than the annual deaths from road traffic accidents, homicide, or HIV/AIDS" (European Commission, 2005).

In a similar vein, it has been evinced that a considerable number of people suffering of mental health problems present behaviors of deliberate self-harm (Improving the mental health of the population, 2007, p. 17), which further on aggravates their state.

The professional life and employment of those suffering of mental disorders is also affected. Work and employment is primarily a means by which someone assures his/her survival – in other words, it is the most common way to earn money. However, work confers not only financial security, but is also a serious source of meaning in life, a way in which one may construct social status and identity, and is also a source of achievement (Baumeister, 1991).

There is a bidirectional relationship between work and mental health. Stressful jobs, unorganized work environment, lack of professional and instrumental support, impossibility to exert some amount of control over different aspects of work, inequity in payment, unfairness, etc., may have a negative impact on the individual's mental health. Mental health problems across Europe caused by work-related stress seem to affect a considerable number of employees (more exactly, one third of the workforce). If we only consider the phenomenon of burnout (a typically work-related mental health impairment), recent research suggests that over 28% of the European employees report stress at work (European Commission, 2005), more specifically, 20% of the German, 22% of the American, and 27% of the British physicians are affected by burnout, while among teachers the percentage amounts to 30-40% (Linzer, Visser, Oort, Smets, McMurray, & De Haes, 2001; Bergner, 2004; Bauer, Stamm, Virnich, Wissing, Kriston, Muller, et al., 2005; Schaarschmidt, 2005; Golembiewski, Boudreau, Sun, & Luo, 1998).

On the one hand, those who suffer of mental ill-health are at risk of loosing their jobs, since the number of leave days due to the experienced symptoms is significantly higher than in healthy individuals. Similarly, people affected by mental health issues present lower efficiency and productivity at

work, because of their impaired mental state. For instance in France, only in year 2000, 31.9 million working days were lost because of depression, while in Sweden a quarter of long-term sick leaves were due to mental health problems. Germany has registered a dramatic 74% increase in the number of long-term sick leaves during 1995-2002 (Knapp et al., 2007).

The mental health problems of a person may (and usually do) also seriously impact the life of those who provide informal care for such people – family and friends (e.g., Magliano, 1998). The most commonly cited complaints due to a family member's mental health problems relate to disrupted family life, social alienation because of restricted social activities (care provided amounts to long periods of time which hinders implication in social life), feelings of loss, etc. In the same time, due to the intense strain implied in the care of a person suffering of mental health, a considerable percentage of the care-providers' also experience physical and mental health problems. According to the UK Social Exclusion Unit (2004, p.4.), caregivers themselves are twice more likely to develop mental health problems than those who do not care for persons suffering of mental ill-health.

Similarly, the financial status of the family with a member suffering of mental health problems is also jeopardized. Only in the UK, the lost income due to mental health problems amounts to over £690 million each year (*The rising cost of dementia in the UK. Are we prepared?,* 2007).

As we have already discussed, people suffering of mental health problems are oftentimes stigmatized. Moreover, society stigmatizes the sufferer's family as well, which may lead to feelings of disadvantage, neglect, and marginalization (Improving the mental health of the population, 2007; ODPM 2004).

National economies are also seriously affected. According to the European Brain Council investigating 28 European countries, the estimated total cost of mental health problems was as high as 295 billion euros only in year 2004.

Only in the United Kingdom, the financial burden caused by mental illness amounts to £77 billion every year, while the USA spend approximately $42.3 billion dollars in trying to find remedies and solutions for the problems caused by mental disorders (Greenberg, Sisitsky, Kessler, Finkelstein, Berndt, Davidson et al.' 1999). According to the European Commission's report (2005), 3-4% of national GDP's are spent on problems caused by mental illness, partially because mental ill-health is the primary cause of early retirement and disability pensions.

"The costs of visits to primary care physicians, and the utilization of health care services in general by individuals with anxiety disorders, are double what they are for those without anxiety disorders, even if the latter are physically ill" (Simon, Ormel, Von Korff, & Barlow, 1995, as cited in Barlow, 2002, p. 1).

As seen, anxiety disorders are probably the most prominent cluster of mental health problems that may cause all of the above-mentioned inconveniences.

"Anxiety disorders can be defined as conditions characterized by pathological anxiety that has not been caused by physical illness, is not associated with substance use, and is not part of a psychotic illness" (Starevic, 2010).

PREVALENCE AND COMORBIDITY OF ANXIETY DISORDERS

During the last few years, a plethora of studies have increasingly acknowledged not only that anxiety disorders are highly prevalent, but also that the burden of illness associated with these disorders is often significant (Wittchen & Jacobi, 2005; European Commission, 2005; Kállay & Miclea, 2010).

In a systematic review of the prevalence and incidence studies on anxiety disorders, Somers at al. (2006) found that the best-estimate rates for 1-year and lifetime prevalence of total anxiety disorders were 10.6% and 16.6%, respectively. The ratio between 1-year and lifetime rates indicates that a large number of people experience anxiety disorders on a continuing or recurring basis. Significantly, across studies, anxiety disorders were approximately twice as prevalent among women, with overall age specific rates remaining relatively stable or increasing across the lifespan. An important epidemiologic study (Wittchen & Jacobi, 2005) has identified that among mental health problems, anxiety disorders as a whole are clearly the largest diagnostic group, with a 12-month prevalence ranging between 0.7-3.1% for panic disorder, 0.1-10.5% for agoraphobia, 0.6-7.9% for social phobia, 0.2-4.3% for generalized anxiety disorder (GAD), 0.8-11.1% for specific phobias, and 0.1-2.3% for obsessive-compulsive disorder (OCD).

Different studies have incriminated several factors that contribute to the individual and social burden of anxiety disorders (Kessler et al., 2005; Miu & Visu-Petra, 2009). For instance, anxiety disorders are very persistent; they are highly comorbid with other anxiety disorders or mood disorders; lead to substantial impairments in work productivity and social roles; finally, anxiety disorders have an early age of onset, with a median around the age of 15 years (Kessler et al., 2005).

Need for professional assistance

As we have seen this far, the number of individuals suffering of mental disorders is huge and constantly growing. In the same time the psychological, physical, and financial burden imposed by these issues on the person's and his/her environment's life are debilitating. Nevertheless, at least according to

the 2011 Mental Health Atlas, the resources allotted to prevent and treat mental health problems are still insufficient.

> "Globally, spending on mental health is less than two US dollars per person, per year and less than 25 cents in low income countries. Almost half of the world's population lives in a country where, on average, there is one psychiatrist or less to serve 200,000 people." (Mental Health Atlas, 2011, p.9).

Due to the fact that the number of individuals suffering of mental disorders is constantly increasing, while the number of certified therapists is limited, the psychotherapy of emotional disorders is forced to reconsider its basic principles and forms of delivery (Miclea, Miclea, & Ciuca, 2008; Cunningham, Rapee, & Lyneham, 2006). In the same time, because of the traditional format of therapy (once a week, face-to-face interactions between therapist and patient) a huge imbalance between the need to psychotherapeutical services and the available offer has been created. In Great Britain or USA, for instance, 84% of the individuals with anxiety disorders or depression remain untreated, while the waiting lists are for 1-2 years (Marks, 2004).

TREATMENT OF ANXIETY DISORDERS

A large number of therapeutic interventions have been devised to alleviate the negative effects of anxiety disorders. The most popular interventions include: relaxation training, meditation, biofeedback, supportive counseling, couple/family therapy, medication, stress management techniques etc., which proved to be efficient in the treatment of these disorders. However, most experts sustain, based on solid empirical evidence, that cognitive-behavioral therapies (CBT) are the most effective in the treatment of anxiety disorders (this effectiveness has been tested for all anxiety disorders).

The major characteristics of CBT are (based on Leahy & Holland, 2000; Clark & Beck, 2010):

- a problem-focused approach of the most salient cognitive and behavioral aspects of the targeted disorders;
- usually, the therapy lasts for 12-15 weeks, with one face-to-face session with the therapist;
- the first steps include: the assessment of symptoms, the establishment of therapeutic goals and tasks, etc.
- the reduction of symptoms is attained by assigning behavioral and cognitive tasks and techniques (e.g., exposure: in vivo, in vitro; cognitive restructuring; problem solving training; identification and

challenging of distorted automatic thoughts, etc.). In this way, the patient learns how to control (reduce, prevent) symptoms of anxiety;
- homework assignments help patients to consolidate the abilities learnt and exercised during therapy. Such homework may include: recording of fear inducing thoughts and feelings in stressful situations, self-exposure (in vivo, in vitro) to specific learn inducing situations, reading salient materials for gathering knowledge about anxiety disorders, etc.
- as symptoms ameliorate, depending on the therapeutic plan, the therapist may also target to identify and correct underlying mechanisms that may expose the patient to future relapse;
- after finishing the treatment, the patient may benefit from "booster sessions" in order to sustain the positive impact of the intervention (if necessary).

Even if traditional interventions have proven to be efficient, there still exist barriers which hinder either the search or the maintenance of intervention. The most common barriers to traditional therapy are:

• the financial expenses of therapy (both at individual and community levels, e.g., Turner, Beidel, Spaulding, & Brown, 1995)

• spatial and temporal access to therapy (residence: rural vs. urban; working schedule, etc.; Przeworski, & Newman, 2006),

• availability of specialized therapist (Amstadter et al., 2009; Litz et al., 2007; Przeworski & Newman, 2006; van den Berg, Shapiro, Bickerstaffe, & Cavanagh, 2009)

In these conditions, the traditional form of intervention for anxiety disorders should "reconsider its basic principles and forms of delivery" (Miclea, Miclea, & Ciuca, 2008, p. 131). Computer assisted interventions have an extremely promising future in this sense.

COMPUTER-MEDIATED INTERVENTIONS

The last decades have witnessed an explosive development of the information technology.

Besides the mushrooming of devices functioning on IT principles, the number of individuals favoring computer and internet usage for self-help resources has also dramatically increased around the world (European Commission, 2005; Horrigan & Smith, 2007). Recent studies (e.g., Bessell, Anderson, Sansom, & Hiller, 2003; Risk & Petersen, 2002) have shown that approximately 91% of the investigated participants favor internet resources as first choice of search for self help (Atkinson & Gold, 2002; Horrigan & Rainie,

2006; Proudfoot, 2004; Risk & Petersen, 2002; Bessell, Anderson, Sansom, & Hiller, 2003). Information regarding mental health is the most demanded, and 42% of these searches refer to anxiety problems, depression, and bipolar neurosis (Proudfoot, 2004). The generation of digital natives (i.e., people who grew up interacting daily with digital technology) is just reaching the age of maturity, meaning that in the future, the use of digital, multimedia devices for solving mental health problems will exponentially increase.

In sum, the actual form of psychotherapy is outdated both by the demands of the market, as well as by the new expectancies and attitudes induced by the information and communication technology (ICT).

Computer-supported/mediated psychotherapy is a recent tentative to innovate the psychotherapeutic process and match both the existent demands of the market and the new attitudes of those who seek help in the digital era. Computer-mediated psychotherapy (CMP) consists of a combination of ICT and human capabilities aiming to alleviate emotional disorders and provide opportunities for personal growth. It is ranging on a continuum, from a completely computerized therapy (e.g., CD-Rom or client-administered psychological software) to the use of psychotherapeutic software and platforms solely as an extension for the work of the psychotherapist. In one form or another CMP has come closer to e-learning or blended learning, and could benefit from conceptual and methodological transfer originating in these more mature disciplines.

As Proudfoot (2004) emphasized, "the clinician is no longer the main gateway to health information, patient education, treatment and support" (p. 354). Instead, the Internet has become one of the major sources of easily accessible information, available to the large masses (Risk & Petersen, 2002).

In the beginning, scientific communities have been sceptical about the efficiency of computer assisted psychotherapies (Przeworski & Newman, 2010; Wright & Wright, 1997).

The most cited speculations regarding the efficiency of CSP regard issues related to:

- dropout rates,
- adherence to treatment,
- clients' expectancies of success,
- possible alienation of patients,
- effect on therapist-client bond,
- possible negative impact on efficient communication (reduced perception of facial cues, body language) (Przeworski & Newman, 2010).

In spite of these negative predictions, outcome studies for computer-assisted and therapist-assisted interventions have found that the rate of dropouts and satisfaction with treatment are not significantly different between the two forms of intervention (Carlbring, Ekselius, & Anderson, 2003; Carlbring, Nilsson-Ihrfelt, Waara, Kollenstam, Burman, Kaldo, et al., 2005; Richards & Alvarenga, 2002). Moreover, CSP have been found to be more cost-effective than traditional, face-to-face interventions (Newman, Consoli, & Taylor, 1997).

Among the already identified strengths of CMP may be cited:

- the financial costs of CMP based treatments are significantly lower than those of traditional, face-to-face interventions (Marks, Cavanaugh, & Gega, 2007; Proudfoot, 2004);
- the spatial, temporal, and financial availability of intervention is also significantly enhanced – patients, clients may have access to CMP from home, work, etc., without necessarily meeting the therapist (Proudfoot, 2004; Wright & Wright, 1997);
- enhanced possibility to avoid the social stigma associated with attendance of mental health services (Amstadter et al., 2009; Marks, Cavanaugh, & Gega, 2007);
- diversification of self-help resources (Wright & Wright, 1997);
- allows easy adjustments to the needs of specific interest groups (facile updating, refinement and extension depending on specific needs (Amstadter et al., 2009);
- possibility to store, analyze, compare, and monitor individual results (Newman, Kenardy, Herman, & Taylor, 1997);
- possibility to enhance compliance with homework (Proudfoot, 2004; Selmi, Klein, Greist, Sorrell, & Erdman, 1990), etc.

However, besides these advantages there also are serious shortcomings specific to this new kind of interventions. The most cited ones are:

- their inefficacy for technophobe patients, who prefer traditional., face-to-face interventions (Marks, Cavanagh, & Gega, 2007). Nevertheless, we feel compelled to complete with the idea that these aspect is probably true only for digital immigrants (digital natives, who are already accustomed with the use and the advantages of computerized technologies, present no reluctance towards such interventions). As time goes by and the number of people accustomed with the use computers increases, this disadvantage with fade away.
- In some cases, non-verbal communication may be seriously impaired in computerized interventions. Because of these shortcomings, the

deliverance by the therapist of appropriate empathic feedback is hindered, jeopardizing the efficient patient-therapist relationship (Nadelson, 1987, as cited in Wright & Wright, 1997).

The major aim of this present volume is to identify the most important factors implied in the computer-mediated therapy of anxiety disorders, which may have significant consequences on fundamental aspects implied in the delivery of therapy in the 21st century.

The secondary objectives of this volume are:

a. to assess the efficiency of computer-mediated therapy (cognitive-behavioral) in the improvement of anxiety disorders.
b. to analize the costs implied in the computer-mediated therapy (CMT) in anxiety.
c. to analyze the characteristics of the users of CMT, in order to maximize its efficency in the improvement of anxiety.
d. to identify the optimal place of CMT within the structure of mental health services.

The present volume has three major parts.

After the introductory chapter, Andrei C. Miu and Laura Visu-Petra present the major aspects implied in the Computer-assisted evaluation of attentional biases in anxiety.

The next part consists of two chapters dedicated to the presentation of specific computer mediated interventions in particular anxiety disorders, chapters authored by Mircea Miclea, Renata Melinda Heilman, and Kállay Éva.

Mircea Miclea, Stefania Miclea, Amalia Maria Ciuca, and Ozana Budau author the chapters of the third part, targeting the major issues involved in the development of efficient computer-mediated therapies in the treatment of anxiety disorders.

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Chapter two

Computer-assisted evaluation of attentional biases in anxiety

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1. Introduction

Computers are nowadays indispensable in behavioral research and therapy. For instance, their use in mental chronometry research (i.e., perceptual-motor tasks that infer cognitive operations from reaction times or RT) has made possible precise manipulations of stimulus presentation, which can be displayed for as short as several milliseconds, and exact measurements of response latencies. With the aid of computers, cognitive experimental tasks have attained the type of temporal resolution that allowed, for instance, the dissociation of automatic and consciously controlled processes in cognitive functions such as attention or memory. The use of computers may have had an equally important contribution to the cognitive revolution in psychology, as the development of cognitive experimental tasks. This leap from pencil-paper to computer-assisted versions of cognitive experimental tasks or psychometric tests has been rapid and discrete in psychology, and the same is probably true for computer applications in other experimental sciences (for early perspectives see Skinner & Pakula, 1986; Sampson, 1986; Elwork & Gutkin, 1985). A second leap, from offline to online, Internet-based versions of psychological assessment and intervention, is now underway (e.g., Buchanan & Smith, 1999; Miclea et al., 2010) and computers are again the key to this progress. Overall, the current use

of computers in psychology has allowed researchers to manipulate stimuli and observe responses at the temporal resolution of basic cognitive processes, and is currently opening psychological assessment and therapy to millions of Internet users.

The aim of this chapter is to illustrate the utility of computers in anxiety research from the field of experimental psychopathology (Mathews & MacLeod, 2005; Williams, Watts, MacLeod, & Mathews, 1997; Miu & Visu-Petra, 2010; Visu-Petra, Cheie, & Miu, 2011). In the first part of the chapter, we will briefly introduce the assumptions of the cognitive-experimental approach to anxiety disorders; describe in more detail the attentional probe task and illustrate the applications of this task with an original study; and identify research issues that have benefited from the development of computer versions of the attentional probe task. In the second part of the chapter, we will present the Attentional Control Theory, describe the antisaccade task, which is also widely used in anxiety research, and review important studies from anxiety research on children.

2. Information processing theories of anxiety

This approach was stimulated by the schema theory of emotional disorders (Beck, 1976) and the network model of emotional memory (Bower, 1981) (for overview see MacLeod & Rutherford, 1998; Miu & Visu-Petra, 2010). The central idea of this approach is that anxiety involves cognitive biases that favor the processing of negative emotional information. According to the information processing theories of anxiety, these biases would result in selective attention to negative information, negative interpretation of ambiguity, and enhanced memory for negative information. Moreover, it was hypothesized that these biases may take place in any sensory modality; occur relatively automatically, but also operate voluntarily; and be contingent upon a discrete change in the internal or external environment of a person.

In order to test these hypotheses, psychologists have developed numerous experimental tasks (e.g., attentional probe tasks; emotional analogs of the Stroop task; homophone interpretation tasks; emotional memory tasks) that assess either the facilitation or impairment of performance associated with cognitive biases (Williams, Mathews, & MacLeod, 1996; Williams, Watts, MacLeod, & Mathews, 1997). For instance, one strategy to show how performance can benefit from the tendency to attend selectively to the emotionally relevant information has involved "shadowing" (i.e., attending) an auditory channel in dichotomic listening experiments. In order to make the identification of emotional stimuli difficult, participants to one such study (Burgess et al., 1981) were required to repeat aloud texts presented to one ear ("shadowed" channel) and ignore prose presented to the other ear, while also trying to detect target items (i.e., threatening or neutral words) among words occasionally interjected into either auditory channel. Patients with phobias

recognized significantly more threatening, but not neutral words, presented to the unattended channel (Burgess et al., 1981). In contrast, Mathews and MacLeod (1986) found that when patients with generalized anxiety disorder (GAD) were required to press a button each time the word "Press" appeared on a computer screen, while shadowing prose presented to one ear and ignoring a list of threatening and neutral words presented to the other ear, they were slower than healthy controls specifically during the presentation of threatening words in the unattended channel.

A similar interference effect was found in emotional analogs of the Stroop task, which involved naming the color of threatening (e.g., disease, injury, coffin) and neutral words (e.g., melody, hobby, playful) (see Williams, Mathews, & MacLeod, 1996). Slowed latencies to name the color of threatening words were taken as evidence of the difficulty to ignore the semantic content of these items. Evidence for such slowing has been reported in high trait anxiety controls and patients with anxiety disorders (Mathews & MacLeod, 1985; Mogg et al., 2000). Emotional Stroop analogs have been available in card-based or computer-based formats (MacLeod, 2004), and researchers have initially chosen between these formats on the basis of convenience (e.g., card-based formats were preferable outside the laboratory before laptops became available). However, these two task formats may not measure the same dimensions of selective encoding. Using both formats of emotional Stroop analogs, Kindt, Bierman, and Brosschot (1996) reported that indices of color-naming interference for threatening words did not correlate in patients with phobias (see also Dalgleish, 1995). In the card-based format, more than a hundred words associated with each experimental condition (e.g., threatening words) are presented together on a single card and the dependent measure is the time taken to name the color of all words on a card. Color-naming interference of each word may be influenced by the words physically surrounding it. Therefore, the interference effect is more robust, but the locus of the interference effect is uncertain in card-based emotional Stroop analogs. In computer-based formats of this task, each word is presented serially, and words from different conditions are randomly presented. Color naming of each presented word is only influenced by its own semantic content.

Another advantage of computer-based formats of emotional Stroop analogs and other tasks used in anxiety research is the possibility to presents stimuli for very brief intervals, which preclude conscious awareness of these stimuli without preventing their semantic processing. Using this approach, MacLeod and Rutherford (1992) presented negative and positive emotional words for 20 milliseconds. These stimuli were masked by inverted and rotated letters of the same colors, which prevented the conscious apprehension of the words. Anxiety was associated with color-naming slowing on trials in which the letter was preceded by subliminally presented negative words (see also Mogg, Bradley, Williams, & Mathews, 1993). Therefore, computers allowed the investigation of more specific issues related to cognitive biases in anxiety, such as that of the automaticity of these biases.

3. Attentional probe task

Dichotomic listening and emotional Stroop analogs have indicated that anxiety is associated with increased distraction to unpleasant stimuli and impaired performance on a central task. However, these "interference" approaches do not show the distribution of attention during the presentation of emotional information, and consequently, they are not appropriate to directly test the hypothesis that anxiety selectively facilitates the encoding of negative emotional stimuli.

The attentional probe task allows the investigation of the distribution of attention toward or away from unpleasant stimuli. This task is based on the findings of Posner (1980) who found that cueing attention to a spatial location benefits the detection of a subsequent probe that appears in that location, and impairs (i.e., slows down) the detection of a probe when it appears in an alternative position. In the attention probe task, participants are briefly presented with pairs of differentially valenced stimuli (i.e., one threatening and one neutral) that appear in the two halves of the computer screen. After a brief interval during which the screen goes blank (this interval is called stimulus onset asynchrony or SOA), a visual probe is displayed in either location and participants are required to indicate its presence or its identity. Therefore, according to Posner's (1980) classification of cues as endogenous (e.g., a central arrow pointing right or left) or exogenous (e.g., stimuli that appear on the left or right of the screen), the pair of words used in the attention probe task is closer to endogenous cues because the words must be processed to a certain extent in order to direct attention to the location of the words. However, the processing of cues can also be automatic, as reported in studies that used masking. Based on the latency of participants' responses, two types of attentional processes can be inferred: (1) attentional engagement with threat, inferred from the congruent trials in which the probe appeared in the location where the negative emotional stimulus had been displayed; and (2) attentional disengagement from threat, inferred from the incongruent trials in which the probe was presented in the location where the neutral stimulus had been displayed. Comparisons between anxious and non-anxious participants can indicate biased attentional engagement with or disengagement from threat.

MacLeod, Mathews, and Tata (1986) were the first to use this method in GAD patients. The task included 288 pairs of threatening and neutral words that were displayed for 500 milliseconds, separated vertically on a computer screen. A small dot probe (NB: which is why the attentional probe task is also known as the "dot probe" task, although many variants do not actually use a dot as probe) appeared immediately after the offset of each word pair, either in the location of the threatening or the neutral word. In contrast to controls, GAD patients showed reduced latencies for probes that replaced the threatening words than probes that replaced the neutral word, which reflected facilitated orientation to threat in GAD. Using closely similar methods, other studies found increased latencies for probes that replaced the neutral word than

probes that replaced the threatening word, which was taken to indicate impaired disengagement from threat in anxiety and thus deficits in attentional shifting from threat (Fox, Russo, Bowles, & Dutton, 2001). However, biased attentional engagement with threat has been more extensively in anxiety disorders (MacLeod & Mathews, 2005) and recent experiments that manipulated this bias indicated that it has a causal role in inducing worry, which is a central cognitive component of GAD (Hirsch et al., 2011). Nonetheless, it remains possible that these two types of attentional biases are associated with different forms of anxiety (e.g., GAD vs. phobias and panic disorder).

One version of the attentional probe task used electrocardiogram (ECG) and moving lines pictures as threatening and neutral stimuli (Kroeze & van den Hout, 2000). Each picture was presented for 3 seconds, in a slower and a quicker version, and they were followed by one of the characters "E" or "F" in either location of the screen. This version of the task was designed to test the selective attention to interoceptive cues (i.e., heart rate) and heart rate acceleration in patients with panic disorder. The results indicated that patients with panic disorder and controls showed similar latencies when the character that they had to identify replaced an ECG image. However, the patients displayed increased latencies in trials in which the character replaced the moving line picture that had been presented opposite to an ECG image, irrespective of the heart rate suggested in the image. This seems to indicate impaired attentional disengagement from ECG images, which may signal a type of threat to which panic disorder patients are hypervigilant.

Other studies have used facial expressions as emotional cues in the attentional probe task. For instance, Bradley, Mogg, and Millar (2000) tested the effect of state anxiety on attention to threatening, sad, happy and neutral faces in a version of the attentional probe task. Pairs of emotional and neutral faces were presented side by side, followed by a triangle probe that participants had to detect as fast as possible. By subtracting RT when the probe and the emotional face were on the same side of the screen (i.e., congruent trials) from RT when they were on different sides of the screen (i.e., incongruent trials), bias scores were derived for vigilance (i.e., positive values of the bias score) and avoidance (i.e., negative values of the bias score). The results indicated that participants with high or medium state anxiety displayed increased vigilance to threatening faces relative to neutral faces.

By varying SOA between the emotional cues and the probe, the attentional probe task has also allowed the investigation of the automaticity of attentional biases to threat. Attentional biases observed at very short SOA are thought to rely on automatic processing, and those that develop at more extended SOA reflect the involvement of consciously controlled or strategic processing. One of the first studies that took this approach found that anxiety was associated with facilitated engagement with threat even when the emotional and neutral word pair was presented for as short as 14 milliseconds and masked with a random letter line to prevent their conscious apprehension (Bradley, Mogg, & Lee, 1997).

Other versions of the attention probe task more closely modeled the endogenous cueing condition from Posner's (1980) experiment. Instead of presenting pairs of emotional and neutral stimuli, centrally presented faces were displayed, whose eyes gazed to the right or the left side of the screen. In order to test whether anxiety was associated with a selective processing of the eye gaze of threatening faces, this task included fearful and neutral faces that cued attention to either side of the screen. As in the other versions of the attentional probe task, the probe appeared in either side of the screen in order to dissociate attentional engagement (i.e., when the probe appeared in the location indicated by the gaze) and attentional disengagement (i.e., when the probe appeared in the opposite location relative to the gaze). Using this task, Mathews, Fox, Yiend, and Calder (2003) found that probes were detected faster when they appeared in the location cued by the eye gaze, and this effect was similar for neutral and fearful faces in non-anxious participants. However, in anxious participants, attention was more likely to be directed by the eye gaze when the face was fearful. In other words, fearful faces were stronger endogenous cues of attention in anxiety.

4. An empirical example

In this section, we will briefly present the results of a study in which we (A. C. Miu, S. E. Pană, & J. Avram, unpublished results) investigated the effect of trait anxiety on attentional biases in an attention probe task adapted after Mathews et al. (2003). Two limitations of the study of Mathews et al. (2003) were identified: the use of median split as a method to categorize trait anxiety scores as high or low, which is not statistically recommended (e.g., Hoyt, Imel, & Chan, 2008); and not having controlled for depression scores. Therefore, the present study used multiple regression to investigate the relationships between trait anxiety, trait depression, and attentional biases to threat.

N = 81 participants (71 women) were included in this study, with ages between 19 and 41. The means and standard deviation were of 39.16 ± 10.6 for trait anxiety, and 8.2 ± 3.68 for trait depression scores.

The visual attention task was similar to the one described in Mathews et al. (2003). We selected sixteen photographs illustrating four men and four women who expressed both neutral and fearful faces from the Ekman and Friesen (1976) series. The fearful faces were expressed by the same characters as the neutral ones and were chosen on the basis that they were readily recognized as representing fear rather than other emotions (Ekman & Friesen, 1976). We removed the hair and background areas from the photographs, obtaining pictures in which only the face area was visible, with eyes looking straight ahead. The next step was to produce two new versions of each face by digitally moving the pupils to simulate left or right hand gaze. The photographs were displayed in the center of the screen, subtending a vertical visual angle of 7°. The targets (the upper case letters T or L) subtended a 3° visual angle and were presented 5° from the midpoint of the screen on a 19-inch coloured monitor.

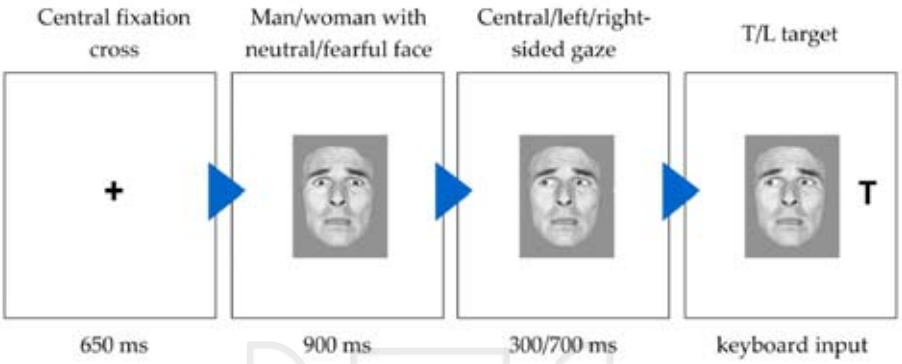

Fig. 1
Schematic diagram of a trial in the attentional probe task adapted after Mathews et al. (2003).

The visual attention task involved presenting 384 unique trials in a random order (Fig. 1). The sequence of events in a trial was: central fixation cross (675 ms), fearful/neutral face with eyes looking straight ahead (900 ms) followed by the same fearful/neutral face with the eyes either remaining in the same position, or moving to the right or the left side, simulating the orientation of the gaze in that direction (300/700 ms), followed by the target letter in the left/right side of the screen (displayed until the participant pressed one of the two response buttons). We presented all possible combinations between (1) the eight individuals (4 men and 4 women) expressing (2) neutral and fearful faces; with (3) central, left- and right-sided gaze; lasting either for (4) 300 ms or for 700 ms (SOA), and (5) the two target letters (L and T) appearing in (6) the left and the right side of the screen. Therefore, there were 8 × 2 × 3 × 2 × 2 × 2 trials.

The participants were instructed to keep their eyes on the central fixation cross, and press the relevant key as accurately and quickly as possible after the appearance of one of the two target letters. In order to reduce the effect of the dominant hand, we asked the participants to respond only with their dominant hand. The task involved 12 practice trials and two blocks of testing with a rest period between them. We measured RT for each trial. The central eye gaze trials were grouped in the analyses by SOA (300 ms and 700 ms) and facial expression (neutral and fearful). The left- and right-sided gaze trials were grouped by the location of the target letters (obtaining two conditions: congruent and incongruent), and by facial expression (neutral and fearful).

Errors and outlying latencies (i.e., less than 100 ms and greater than 1500 ms) were removed (9.29% of all responses) (Mathews et al., 2003). A 2 (SOA: 300 vs. 700) × 2 (emotion: neutral vs. fearful) ANOVA on control central eye gaze trials indicated a significant main effect of SOA ($F[1, 80] = 11.13$, $p = 0.0003$), but no significant effects of emotion or SOA × emotion.

The longer SOA reduced latencies with a mean difference of 8.81 ms, but fearful faces did not delay in themselves the responses. Therefore, we included SOA in all the subsequent analyses focused on AT.

We also checked for the effects of congruency and emotion in 2 (SOA: 300 vs. 700) × 2 (congruency: congruent vs. incongruent) × 2 (emotion: neutral vs. fearful). There was a significant congruency effect, with delayed responses in incongruent compared to congruent trials ($F[1, 80] = 108.31$, $p < 0.0001$). There was a mean difference of 16.58 ms between incongruent and congruent trials. In addition, there was also an emotion effect ($F[1, 80] = 10.82$, $p = 0.001$), with slower responses in fearful trials in comparison to neutral trials. There were no significant effects of SOA or variable interactions.

Next, we calculated mean speeding on congruent trials due to fearful versus neutral faces (neutral – fearful latency differences), and mean slowing for incongruent trials due to fearful versus neutral faces (fearful – neutral latency differences). These biases were regressed on trait anxiety and trait depression scores. The results of these regression analyses indicated that trait anxiety ($\beta = -0.51$, $p = 0.0002$), but not trait depression ($\beta = 0.13$, not significant) significantly predicted 21.4% of the mean speeding on congruent trials due to fearful versus neutral faces. Trait anxiety and trait depression were not related to the mean slowing for incongruent trials due to fearful versus neutral faces.

In summary, this study showed that trait anxiety significantly predicted the attentional engagement with threat in this version of the attentional probe task. By employing multiple regression analysis, this study replicated the previous results of Mathews et al. (2003), and extended those results by showing that the effect of trait anxiety was not confounded by trait depression.

5. Attentional control theory

A recent development in the literature investigating attentional biases in anxiety has been the Attentional Control Theory (ACT) (Eysenck, Derakshan, Santos, & Calvo, 2007), which marks a significant extension of the previous Processing Efficiency Theory (PET) (Eysenck & Calvo, 1992). Considering its growing empirical support and influential role in contemporary anxiety research, we will review its main theoretical assumptions. This support has been almost exclusively provided by computerized assessments of the "emotional capture" of attention in contexts in which threatening information was either present or absent (see Eysenck & Derakshan, 2011 for a recent review). The theory relates to anxiety in the normal range, rather than in clinical populations, and envisions state anxiety as a consequence between dispositional factors (trait anxiety) and situational stress (Eysenck, 1992). From the PET predictions, the ACT retains the distinction between performance effectiveness (accuracy) and efficiency (resources spent), revealing greater effects of anxiety on task efficiency, than on effectiveness. Worrisome thoughts characteristic to individuals high in trait anxiety generate cognitive interference by affecting working memory capacity

and processing, especially the functioning of the central executive (Eysenck, 1992). However, there is also a positive effect of worrying, in the potentially enhanced motivation to minimize this aversive state by involving additional strategies and resources to compensate for the reduced efficiency. The ACT proposes a more mechanistic account of this interference, revealing the central executive dimensions influenced by anxiety: inhibition, shifting, and, to a lesser degree, memory updating. Anxiety is thought to disrupt the balance between a goal-driven attentional system and a stimulus-driven attentional system (Corbetta & Shulman, 2002) by favoring the latter. In other words, threat-related information is prioritized over the individual's goals related to task performance. However, when stimulus-driven information is sufficient for performance (i.e. in visual search tasks), the performance of high-anxious individuals might be even enhanced.

Considering that the present chapter is focused on the computer-assisted methods of assessing attentional biases, the extensive empirical support derived from studies aiming to test ACT's predictions is highly relevant. However, since there are several pertinent reviews of this literature (Eysenck & Derakshan, 2011; Derakshan & Eysenck, 2009), revealing the anxiety-related interference with the three executive dimensions (especially inhibition and shifting), we will rather focus on a computer-assisted experimental method used to assess these relationships, the *antisaccade task* (Hallet, 1978). This classic task has been ingeniously used to assess the effects of anxiety on both inhibition and shifting. The task involves the measurement of eye movements to generate a direct measure of attentional processes. Participants are presented with an abrupt peripheral stimulus to one side of a central fixation point and the instructions require them to voluntary direct their gaze to the contralateral side of the screen. Inhibition is needed to suppress the reflexive saccade to the peripheral stimulus (measured in a prosaccade condition of the task) and to produce the volitional saccade towards the opposite location (the antisaccade condition). Using an antisaccade task with neutral stimuli, Derakshan, Ansari, Hansard, Shoker, and Eysenck (2009) confirmed that high-anxious subjects took longer to produce the antisaccades, but not the prosaccades, although performance accuracy was not impaired. In a second experiment with emotional facial expressions, they showed a slowing effect of anxiety on the first correct saccade from the antisaccade task was greatest when the cue was threatening (angry emotional expression), confirming the emotional capture of attention by this negative stimulus.

Looking at shifting efficiency, a mixed antisaccade design was used (Ansari, Derakshan, & Richards, 2008) in which participants were randomly presented with antisaccade and prosaccade blocks of trials, with a cue signaling the execution of an antisaccade or prosaccade trial. Using this task, the authors showed that high-anxious participants did not present the "switch benefit" documented in low-anxious participants, that is, an improvement in response latency when switching between different types of trials. A more recent experiment used the same mixed antisaccade task (Ansari & Derakshan, 2011)

combined with event-related potentials measurements. More specifically, they analyzed the Contingent Negative Variation cortical potential, considered to reflect activation (or preparation) of cortical areas required to process an expected stimulus or event. Their results indicated that high-anxious individuals showed greater levels of Contingent Negative Variation activity at frontal sites (in a specific condition) than their low-anxious counterparts, suggesting that they exerted greater cognitive effort and invested more attentional resources in preparation for the task goal.

To summarize, similar to the previous discussion related to the Stroop task or the visual probe task, a classical experimental measure such as the antisaccade task has been used in its "traditional" version and revealed processing efficiency differences between high-anxious and low-anxious participants. In addition to that, modified versions of the task were created to incorporate emotional information and obtain evidence that the attentional bias towards threatening information is indeed specific to high-anxious participants. However, a limitation of the current research on the relationship between higher levels of trait anxiety and executive functioning (via attentional control disruptions) is that most studies have investigated the effects of anxiety upon distinct dimensions of executive control, in separate experimental designs. It is important to relate individual differences in anxiety to distinct facets of executive control in a unitary design. Moreover, anxiety itself could be best conceived as a multidimensional construct (Endler, 1997), at the intersection of personal and situational variables. Some preliminary results (Visu-Petra, Miclea, & Visu-Petra, in press) indicate that, in a specific context (e.g., psychological testing with ego-threatening instructions), only the cognitive-worry component of state anxiety, and the predisposition to respond with anxiety to social evaluation (but not to other types of stressors, such as physical danger, or ambiguity), are predictors of anxiety's disruptive effect on executive control (inhibition, shifting). Moreover, in the updating task which contained no time pressure, subjects with higher levels of social anxiety were shown to outperform their low-anxious counterparts, potentially supporting the motivational function of anxiety predicted by ACT.

6. Assessing anxiety-related attentional biases in children

The assessment of attentional biases in children has largely followed the rationale and methodology from adult research, although some research directions have been elaborated specifically for the younger population (see Miu & Visu-Petra, 2010, for a review). This assessment procedure shares the advantages and disadvantages of computerized testing, plus some additional "perils" related to computerized assessment in children. Children enjoy playing computer games, so it is easier to present an (otherwise) monotonous task as a game, with interesting characters and rewarding feedback. It also allows for more standardized applications of instructions and tasks, as well as for complex

chronometric and additional psychophysiological measures to be collected. The study of attentional processes in very young children, however, poses specific problems. Although even in toddlers and pre-schoolers the hand-eye coordination enables the measurement of accuracy and RTs, these responses can be collected only if the tasks engage the child's attention for sufficient time to allow for adequate response collection (Berger, Jones, Rothbart, & Posner, 2000).

Several computerized tasks have been used to investigate attentional biases in younger or older children, based on experimental methods such as the ones described above for adults: (1) *attentional probe* with emotional words (Hunt, Keogh, & French, 2007; Taghavi et al., 2003; Vasey, Daleiden, Williams, & Brown, 1995), emotional pictures (Waters, Lipp, & Spence, 2004), emotional facial expressions (Susa, Pitică, Benga, & Miclea, in press, Waters, Henry, Mogg, Bradley, & Pine, 2010); and (2) *emotional Stroop task analogs* (Richards, Richards, & McGeeney, 2000; Moradi, Taghavi, Neshat-Doost, Yule, & Dalgleish, 1999; Martin, Horder, & Jones, 1992; Martin & Jones, 1995; Kindt, Bierman, & Brosschot, 1997; Morren, Kindt, van den Hout, & van Kasteren, 2003). These studies yielded mixed results on the presence of early attentional biases in children of various ages.

In order to illustrate an experimental task that has been recently used in developmental research of attentional biases (see Olatunji, Ciesielski, Armstrong, & Zald, 2011, for a recent investigation and summary of existing research with adults), we will present some results from studies that used *the visual search* paradigm. When using neutral stimuli, negative findings were found in the literature on visual search: Lubow, Toren, Laor, & Kaplan (2000) looked at children with a diagnosis of anxiety disorder and found that their performance on a visual search task (containing information with no emotional valence) did not differ from that of controls. Therefore, most of the studies of anxiety-related effects used stimuli with emotional valence, such as real pictures of facial expressions or schematic faces to investigate the visual search of present/absent deviants (e.g. an angry face among non-fear-relevant distractors – angry or neutral faces). Individual differences in anxiety have been associated with an early-developing ability to detect and respond rapidly to stimuli associated with danger and threat.

Based on adult research (e.g., Byrne & Eysenck, 1995), Hadwin et al. (2003) used a visual search task to explore whether increased anxiety would be associated with a faster time to detect angry (versus happy and neutral schematic faces). Typically developing children aged 7–10 years searched for faces amongst increasing numbers of scrambled faces distractors and were asked to offer responses about the presence or absence of faces. In two experiments, increased anxiety (and not depression) was associated with faster RT to make decisions about the absence of angry (not happy or neutral) faces. Because this decision increased with the number of distractors, the authors suggested that angry absent searches reflected top down processing related to motivation for identifying the absence of threat in anxious children (Hadwin,

Garner, & Perez-Olivas, 2006). Waters and Lipp (2008) found that 8 to 11-years-old children were faster and more accurate in detecting angry target faces embedded in neutral backgrounds than vice-versa, and they were slower in detecting the absence of a discrepant face among angry than among neutral faces. In a second experiment which took into account the level of anxiety, they found that children with higher levels of anxiety were quicker to find both angry and sad faces whereas low anxious children showed an advantage for angry faces only – this was interpreted as evidence for a general negativity bias in high-anxious children. Waters, Lipp, & Spence (2008) did not investigate the visual search for facial expressions, but rather on visual search for fear-related animals, versus neutral animals. Their result supported preferential search for animal fear stimuli in children and suggested that high fearfulness affects children's ability to disengage attention from feared stimuli. A more recent investigation from the same research group (Waters, Lipp, & Randhawa, 2011) replicated these findings and created two experimental procedures ("Search" and "Interference") to nuance the cognitive processes involved in the task.

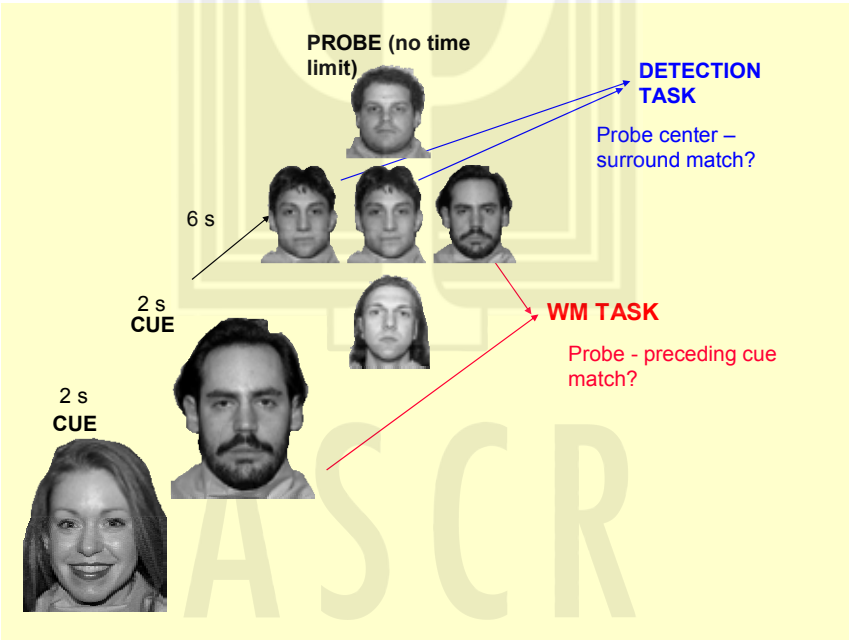

Fig. 2
Design of the WM-DET task used with pre-schoolers (based on Visu-Petra et al., 2010).

Using a visual search task with or without working memory demands in a sample of preschoolers (59 to 88 months), Visu-Petra, Ţincaş, Cheie, and Benga (2010) investigated both detection (matching) of identical facial identities or visual search based on recognition memory for a previously seen visual stimulus (see Fig. 2 for a description of the design). They found that, compared

to their low-anxious counterparts, high-anxious children had overall slower RT. They were both less efficient and less accurate in recognizing happy faces, but more accurate in detecting and recognizing previously seen angry faces. Also, high-anxious children were less accurate in recognizing happy (relative to neutral) facial expressions, while low-anxious children were less accurate in response to angry (relative to happy and neutral) faces. The results confirm previous findings from research with adults (Moser Huppert, Duval, & Simons, 2008; Silvia, Alan, Beauchamp, Maschauer, & Workman, 2006), revealing a negative bias favoring the recognition of threatening faces in children with high levels of anxiety, as well the absence of a positive bias towards positive visual information, for high-anxious participants only.

7. Conclusions

This chapter argued that computer-based versions of cognitive experimental tasks such as the attentional probe task or the antisaccade task have made a crucial contribution to the extensive research on information processing models of anxiety. In addition to bypassing the limits of previous card-based versions, computerized tasks that evaluated attentional biases for instance, have been very diverse (e.g., lexical, pictorial and facial) and allowed the investigation of important issues such as the automaticity of attentional biases in anxiety. It is difficult to imagine what the field of experimental psychopathology (or indeed cognitive psychology in general) would have been had not psychologists integrated computers in their research.

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Chapter three

Advances in computer-based psychotherapy of anxiety disorders

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Prevalence and comorbidity of anxiety disorders

During the last years, numerous studies highlighted that anxiety disorders have high prevalence rates and also that the social burden associated with these disorders is often significant (Wittchen & Jacobi, 2005; European Commission, 2005; Kállay & Miclea, 2010). A report of the European Commission estimates that more than 27% of adult European population experience at least one form of mental illness throughout their lives and that the most common forms of mental illness in the EU are anxiety and affective disorders (European Commission, 2005). In a systematic review of the prevalence and incidence studies on anxiety disorders, Somers at al. (2006) found that the best-estimate rates for 1-year and lifetime prevalence of total anxiety disorders were 10.6% and 16.6%, respectively. It should be noted that studies reported that anxiety disorders were approximately twice as prevalent among women with overall age-specific rates remaining relatively stable or increasing across the lifespan. An important epidemiologic study (Wittchen & Jacobi, 2005) has identified that among mental health problems, anxiety disorders as a whole are clearly the largest diagnostic group, with a 12-month prevalence ranging between 0.7-3.1% for panic disorder, 0.1-10.5% for agoraphobia, 0.6-7.9% for social phobia, 0.2-4.3% for generalized anxiety disorder (GAD), 0.8-11.1% for specific phobias, and 0.1-2.3% for obsessive-compulsive disorder (OCD).

Prevalence and comorbidity of anxiety disorders

Studies emphasized several factors that contribute to the individual and social burden associated with anxiety disorders (Kessler et al., 2005; Miu & Visu-Petra, 2009). For example, anxiety disorders are highly comorbid with other anxiety disorders or mood disorders; they lead to substantial impairments in work productivity and social roles; are very persistent; finally, anxiety disorders have an early age of onset, with a median around the age of 15 years (Kessler et al., 2005).

Summing up, the results of previous studies suggest that the burden of anxiety disorders is greater than the capacity of specialized health service providers (Somers et al., 2006). Moreover, it was concluded that the total burden anxiety disorders place on the health care system and the health of the community outweighs that of more severe mental problems, such as schizophrenia (Singleton et al., 2001; van den Berg, Shapiro, Bickerstaffe, & Cavanagh, 2004).

Scientists proposed that one strategy to overcome some of the barriers to accessing specialized treatment might involve the development of computer-based psychotherapy programs (CP) for common mental disorders (Titov, Andrews, Kemp, & Robinson, 2010; Wells et al., 2006). These CP programs rely mostly on cognitive behavioural therapy (CBT), have a very rigorous structure and include a large variety of behaviour change strategies, presented in online lessons, homework assignments, and communication with a therapist, through email, telephone or online forum (Titov, 2007). Studies so far have demonstrated that Internet-based CBT programs are efficient in alleviating the symptoms associated with a number of mental disorders, such as depression (Andersson et al., 2005a; Perini, Titov, & Andrews, 2009; Titov et al., 2010), panic disorder (Carlbring et al., 2005; Klein, Richards, & Austin, 2006; Kiropoulos et al., 2008; Shandley et al., 2008), GAD (Titov et al., 2009d; Robinson et al., 2010), social phobia (Berger, Hohl, & Caspar, 2009; Titov et al., 2008a; Titov, Andrews, & Schwencke 2008; Titov et al., 2008b; Titov et al., 2009a; Titov et al., 2009b; Titov et al. 2009c; Andersson et al., 2006; Carlbring et al., 2007), psychotic symptoms and distress (Wykes, Steel, Everitt, & Tarrier, 2008), and somatoform disorders (Kroenke, 2007). In spite of the large number of people suffering from one of these mental disorders, data from the UK and USA indicate that few patients with a detected psychiatric disorder receive CBT (Shafran et al., 2009). It is worth mentioning that 15 years ago, the most common psychosocial treatment for GAD, panic disorder or social phobia was psychodynamic intervention (Goisman, Warshaw, & Keller, 1999). In addition, even when patients do receive CBT, there is evidence that these therapeutic interventions are often not appropriately delivered (Shafran et al., 2009; Andrews & Titov, 2009).

In a nutshell, in spite of the large empirical support that CBT has, as a therapeutic method for a large variety of mental disorders, there are still many factors that prevent most of the patients who need CBT from receiving it (for a

review, see Kállay & Miclea, 2010). One factor that in noteworthy to mention is the insufficient number of CBT trained therapists compared to the high demand, which leads to unacceptable waiting times (Clinical Standards Advisory Group, 1999). In conclusion, it is imperative to advance alternatives to traditional face-to-face treatment (Lovell & Richards, 2000), beyond the existing adjunctive use of self-help materials (Keeley et al., 2002). In the following sections we will present some of the recent advances in computer-based CBT (CCBT) in preventing and treating anxiety disorders.

Computer – based CBT

Using computers in psychiatric treatment has been a controversial issue ever since 1966, when the first prototype for computer assisted psychotherapy was developed (Wright & Wright, 1997). The first attempt to develop a computer program designed to help clinicians was called "Eliza" (Weizenbaum, 1966) and was able to conduct a general therapeutic interview. Even though the "Eliza" program was severely flawed, as a means to conduct the interview, the author's intention was only to design a pilot project for the use of "natural language" in communicating with a computer. In the following years, many attempts were made to simulate therapeutic dialogue (Wagman, 1980; Slack et al., 1990; Colby & Colby, 1990). Nevertheless, the most remarkable conclusion is that it seems to be highly unlikely that computers will be able to substitute the therapist or to successfully replicate the conversation between patient and therapist (Bloom, 1992). For this reason, most developers of therapeutic software have chosen to emphasize the strengths and unique attributes of computers instead of using a natural language paradigm (Wright & Wright, 1997). Consequently, modern CP programs are created to be user friendly, demand little or no clinician time, and can be used instead of or together with face-to-face therapy (Cavanagh & Shapiro, 2004; Green & Iverson, 2009). A variety of computer technologies have been employed, ranging from DOS applications in the early days to, more recently, virtual reality, interactive voice response systems using telephony, the Internet, and interactive television. In addition to the standard PC, palm top computers, telephones, mobile phones (text messaging), and television have been used (Proudfoot, 2004). The latest generation of CP programs feature state-of-the art interactive, multi-media functionality, incorporating both specific active therapeutic techniques and non-specific features of the therapeutic relationship (Proudfoot et al., 2003a; Wright et al., 2002).

In the last decade, the Internet was increasingly used to deliver psychotherapeutic interventions. Several different terms have been used to denote this special professional activity: e-therapy (or counselling), online therapy, Internet therapy, cybertherapy, and sometimes it is referred to as e-health or telehealth, as a part of more general activities (Barak et al., 2008). There are a number of factors that can be used to differentiate among various types of Internet delivered therapeutic applications. One of the most significant

factors refers to the online-intervention method employed. If it includes online human communication, then it is usually termed e-therapy, and if it is self-help, website-based therapy it is termed web-based therapy. One other factor involves yet another Internet-enabled capacity - whether an intervention is delivered in "real-time" (synchronously) or is delayed (asynchronously). Yet another important fact that differentiates Internet CBT approaches refer to the number of participants that are directly involved in the therapeutic approach, namely if the therapy is delivered to one individual at the time or a group. The currently existing internet therapeutic interventions are not intended to emulate traditional face-to-face interventions. In contrast, Internet CBT provides a number of other important roles, such as: offering clients an evidence-based alternative if they do not have access to traditional face-to-face therapy; they can be used as an adjunct to face-to-face sessions in a clinical setting; the first stage of a stepped-care model (e.g. Griffiths & Christensen, 2006; Ritterband et al., 2003).

Studies so far have emphasised that the best approach to address the community's need for mental health services is to provide CP interventions within a stepped care model (Carlbring, et al., 2006 a, b; Griffiths & Christensen, 2006). Shortly put, stepped care models of treatment involve offering more intensive treatment or support for clients who do not benefit from the simple treatment, therefore tailoring the interventions to the clients' needs (NICE, 2002; Green & Iverson, 2009). According to Green and Iverson (2009), there are several benefits of using CP programs in a stepped care model, and next we will briefly present these advantages:

- CP programs are mostly useful for clients who manifest less severe symptoms or who are currently on waiting lists for traditional psychotherapeutic interventions. For the clients who respond well to CP programs and their symptoms are alleviated through CP programs and who need no further treatment, CP programs are both an effective and cost-efficient approach to a mental health service. On the other hand, for clients who do not undergo significant improvement with the aid of CP programs, the level of care can be elevated by providing additional face-to-face CBT.
- In addition, patients who have a strong preference for a form of computer-based therapeutic support over the guidance provided by a therapist can also benefit significantly from CP programs.
- CP programs are beneficial for clients who are ambivalent about seeking treatment, and they offer a private and informed way for potential clients to make decisions about their treatment needs.

The level of therapist contact or the support provided can also be used to differentiate between four types of Internet provided CBT (Andersson et al., 2005b). The first type, named "pure self-help" programs are carried entirely without the help of a mental health specialist and require a self-paced completion of the therapeutic modules by the clients. The second type of interventions, the "predominately self-help" programs, require a therapist to conduct an initial diagnostic assessment and to offer some instructions on how to use the Internet CBT program and then the clients are left to complete the therapeutic modules. Programs involving "minimal therapist contact", the third type, are the focus of the majority of the published randomised controlled trials, entailing the facilitative assistance of a trained professional in the completion of course material, with regularly provided feedback and guidance, generally delivered via email contact (Andersson et al., 2007; Spek et al., 2007). The forth category, "predominately therapist administered" interventions, involves the greatest degree of active therapist involvement through regular sessions as an adjunct of self-help materials (Andersson et al., 2005a; Carlbring & Andersson, 2006).

Before undergoing any form of CP program, it is imperative that individuals are thoroughly screened and diagnosed in order to determine the appropriate type of intervention that will be implemented. In addition, clients have to be monitored monitored for changes in symptom severity during program completion (Andersson et al., 2005b). studies conducted in the last several decades have yielded important results confirming the success rate of CP programs in reducing symptoms associated with a large number of mental health problems, including depression (Proudfoot et al., 2003a; Wright & Wright, 1997; Selmi et al., 1990), panic (Newman, Consoli, & Taylor, 1997; Carlbring et al., 2001), posttraumatic stress (Lange, van de Ven, & Schrieken, 2003), eating disorders (Agras et al., 1992; Murray et al., 2003), phobias (Ghosh & Marks, 1987; Marks et al., 2004), chronic pain (Kenardy & Adams, 1993), sexual dysfunction (Binik et al., 1988) and obsessive-compulsive disorder (Greist et al., 1998).

Computer – based interventions in anxiety disorders

Some of the most frequently raised concerns about the utility of CP interventions include their clinical efficacy, cost-effectiveness of treatment, patient satisfaction and the therapist's role in the CP program.

Clinical efficacy of CP programs

Taking into account, on one hand, all the advantages of using CP in the treatment of mental disorders and, on the other hand, the important burden that anxiety disorders impose on the mental health care system, it is not

surprising that several research groups have created different CP programs aimed to prevent or reduce different types of anxiety symptoms.

One of the first CP programs was designed as a computer-aided self-exposure treatment for panic disorders, agoraphobia, social or specific phobias. A controlled study investigated the results of using this intervention technique (Ghosh, Marks, & Carr, 1988). In this study, patients were randomised to self-exposure therapy by a computer system, a book or the psychiatrist. At the end of the treatment there were no differences between the groups in terms of phobic symptoms, work and social adjustment and the gains were maintained to the 6-month follow-up (Ghosh, Marks, & Carr, 1988).

A well-known Internet CBT program for agoraphobia and panic disorders, "Fear Fighter", is a nine-step therapist assisted program that involves the implementation of a personalized self-exposure treatment (Marks et al., 2004). Randomised controlled trials (RCTs) have been conducted by Kenwright and Marks (2004) and Schneider, Mataix-Cols, Marks, & Bachofen (2005) indicating generally positive outcomes. In addition, this CP program is just as effective as therapist-delivered CBT, with a 73% saving in therapist time (Marks et al., 2004), thus making the "Fear Fighter" a very important intervention for anxiety disorders.

Another powerful Internet-delivered self-help program for panic disorders was provided by Carlbring's research group. This program constitutes of six sessions that cover topics and exercises of psycho-education, breathing technique, cognitive training, exposure and relapse prevention. Moreover, all the sessions are conducted via the Internet and require a minimal therapist's support, encouragement and assessment that is provided through emails. On average, a therapist spends about 90 minutes per patient, over the 7-12 week program, including assessment, administration of intervention instructions, and responding to email. RCT results indicate that participants improved significantly relative to the controls on the frequency, duration and intensity of panic attacks, and on associated clinical measures, as well as life satisfaction. Participants rated the program highly: they considered it to be personal and reported that the lack of face-to-face contact facilitated the sharing of sensitive and important issues (Carlbring et al., 2006a, 2001, 2005; Carlbring, Eskelius, & Andresson, 2003).

The program Behaviour Therapy Steps (BT Steps) was developed to guide self-help efforts for patients suffering from OCD. A different technology is used by BT Steps to guide clients through the nine steps of a CBT intervention, namely telephone interactive voice response. The intervention's steps can be followed by clients at their own pace and include topics such as assessment, exposure and ritual prevention. Greist et al. (2002) compared clients with a primary *DSM–IV* (1994) diagnosis of OCD lasting at least 2 years who were randomly assigned to receive BT Steps, 11 sessions of CBT with a trained clinician, or 10 weeks of manual-guided daily relaxation therapy with daily diaries. Both BT Steps and CBT groups improved significantly compared to the relaxation group. As a follow-up to the Greist et al. (2002) study,

Kenwright et al., (2005) examined whether BT Steps was more effective in reducing OCD symptoms when participants could call BT Steps on demand or when calls were scheduled. Results from this RCT indicated that participants with scheduled appointments exhibited lower dropout rates and greater improvements on the obsessive-compulsive symptoms. The Greist et al. (2002) and Kenwright et al. (2005) findings provide initial evidence that BT Steps program is effective in reducing OCD symptoms. These studies suggest that BT Steps is more efficacious than relaxation therapy and possibly as efficacious as clinician-guided CBT for OCD. In addition, a computerized version is currently being tested as an alternative to the telephone-delivered version (Tumur et al., 2007).

"Beating the Blues" (BtB) was created for anxiety and depression disorders and was intensely investigated by various research groups (Cavanagh et al., 2006; Proudfoot et al., 2003, 2004; van den Berg, Shapiro, Bickerstaffe, & Cavanagh, 2004). The program includes eight interactive multi-media therapy sessions and each session stars with a 15-min introductory video. Each session is adapted to the client's needs and the progress made by the client since the previous session. Empirically supported CBT strategies represent the starting points of the treatment options, such as changing automatic thoughts and core beliefs. Moreover, each session provides feedback for the client as well as the treatment provider and a homework assignment is required to be completed between sessions. (Proudfoot et al., 2003b, 2004). Two RCTs (Proudfoot et al., 2003b, 2004) suggest that BtB is more efficacious than treatment as usual by a general practitioner for reducing anxiety and depressive symptoms, regardless of concurrent pharmacotherapy, illness duration or illness severity. More importantly, these gains were maintained over a 6-month follow-up period. Relying on the data mentioned above, we conclude that CP is a valuable alternative to traditional face-to-face therapy.

Cost-effectiveness of CP programs

The cost-effectiveness of CP programs has been investigated by a number of studies so far. Some of the major results of these investigations relate to the fact that with the aid of the Fear Fighter system, therapists can treat four times more panic/phobia patients compared with face-to-face therapy, with similar clinical outcomes and patient satisfaction (Marks et al., 2004). It also important to note that in a cost-minimisation analysis (not including savings in therapist time), it was calculated that Fear Fighter had lower unit costs than standard CBT or drug treatment (37% of the costs to treat a patient over 1 year with face-to-face CBT and 45% of the cost of treating a patient with medication). Similarly, in a controlled study of the CCBT program for panic disorder, savings in overall service delivery costs were shown to be $540 per panic treatment (Newman, Kenardy, Herman, & Taylor, 1997). In a nutshell, there is enough evidence produced by RCT studies to support the idea of cost-

effectiveness of CP programs, both in terms of service delivery costs and patient time per clinician. Nevertheless, one must also consider the substantial costs involved in developing such CP programs and future studies should investigate also this aspect associated with CP.

Patient satisfaction and the therapist's role in CP

One of the major benefits of CCBT is that it can assist the therapeutic process by taking over some of the tasks and therapist time required in traditional face-to-face therapy. A report published by the National Institute for Health and Clinical Excellence (NICE, 2006) recommends using BtB for mild and moderate depression and "Fear Fighter" for anxiety disorders such as phobia, panic attacks and GAD. These programs are evaluated to save up to 80% of therapist's time. However, for other CCBT programs therapist time saved ranges from 0% for "Interapy" (Lange et al, 2003) and virtual reality systems (Rothbaum et al, 2001) to 100% for free, unmoderated CCBT websites (Christensen et al, 2004 a, b). A study conducted by Barak and coworkers (Barak et al., 2008) revealed the fact that web-based interventions have the same effectiveness as e-therapies. Nevertheless, considering the differences between the two approaches, one cannot assume that the two intervention types function equally well for all patients and/or all mental health problems. Web-based therapy functions as a self-help intervention that allows the individual to make use of the therapeutic resources, such as online information, a clinical protocol based on BCT principles, or psychoeducation interventions. The sole role of the therapist in web-based interventions lies in preparing all the materials and providing them online for clients, in such a way that is attractive, user-friendly and optimally effective. In e-therapy, on the other hand, the therapist plays a more active role since he/she is engaged in the process of therapeutic communication with clients and in exploiting the Internet for a channel of communication of choice (Suler, 2000, 2004, 2008). It is possible, therefore, that clients characterized by different preferences, needs, or habits would benefit differentially from each of these two approaches in interaction with the problem area (Barak et al., 2008). It currently appears that a degree of therapist input, not necessarily extensive, is needed in successful program implementation (Andersson et al., 2006), with publicly accessible websites demonstrating higher attrition rates and poorer treatment outcome (Christensen et al., 2006b). Nevertheless, these websites are currently the best available tool for widely disseminating low-cost psychological assistance.

The clients' attitude towards CP programs also has to be investigated in addition to efficacy and effectiveness of these CP programs in order to determine to what extent clients are satisfied with this type of intervention compared to traditional face-to-face CBT. To answer this question, Cook and Doyle (2002) found that clients of e-mail- or chat-based therapy rated therapeutic working alliance similar and even superior to that of face-to-face

therapy. In one ather study that described the results obtained by a computer-aided self-help clinic where several CCBT programs were implemented, the authors presented the following levels of patient-satisfaction: good to moderate for the technical aspects of the system, good to moderate for the content and structure of the system and more importantly, very good to good evaluations for the live support from a clinician and the clinic as a whole was rated as good (Marks et al., 2004). To sum up, patients were fairly satisfied with their CCBT program, and even more satisfied with their live support and the clinic as a whole. Overall, patients who have used CP programs for various affective or anxiety disorders report high satisfaction (Proudfoot et al., 2003a; Wright & Wright, 1997), whereas their drop-out rates were similar to those observed in more traditional psychotherapeutical settings (Ghosh, Marks, & Carr, 1988; Proudfoot et al., 2004). Moreover, there were also studies that have reported that people feel more comfortable about self-disclosure to a computer than to another person (Newman, Consoli, & Taylor, 1997). For instance, the computer-literate younger generation is especially comfortable with communicating and solving mental health problems via this medium. Computers seem to be an acceptable and viable form of access to information and help especially for young males, whose current rates of consultation to mental health professionals are the lowest (Proudfoot, 2004).

Meta-analysis studies of the effectiveness of Computer-based Psychotherapy

The large number of RCTs published so far on the topic of CP programs requires the use of meta-analyses (MA) in order to combine results from different studies to give a single estimate of effect size (ES) and to help clinicians, researchers, and health care funders see the bigger picture (Marks & Cavanagh, 2009).

A MA conducted by Wantland and coworkers (2004) included 22 studies web-based versus non-web based psychological interventions aimed at educating and promoting behavioural change in patients with chronic illness. Their results indicated a large variability in ES, More relevant to the topic of this paper is the meta-analysis of Spek et al. (2007), who examined 12 studies that directly tested the effectiveness of web-based CBT for anxiety and depression. These authors found a large ES for the web-based CBT treatment of anxiety and a small-to-moderate ES for the treatment of depression. Moreover, the aforementioned authors (Spek et al., 2007) found that provision of therapist support moderated these findings, as therapist support provided online resulted in large effects and no support resulted in small effects. ranging from -0.01 to +0.75, which averaged out to a moderate mean ES. Another MA realized by Hirai and Clum (2006) investigated the effectiveness of various self-help methods, such as computer, Internet self-help interventions printed materials and videotapes, used to reduce anxiety symptoms. Their results

suggest that computer and Internet-based self-help interventions yield equally effective treatment outcomes as the other self-help interventions. Barak et al. (2008) collected 64 empirical articles that examined the effectiveness of on-line therapy of different forms and performed a meta-analysis of the 92 studies reported in them. These studies involved a total of 9764 patients who were treated through various Internet-based psychological interventions for a wide variety of problems and whose effectiveness was assessed by different types of measures. Throughout the investigated studies, the authors found an overall medium ES of 0.53, similar to the value reported for the traditional face-to-face therapy. This finding is based on quite a few comprehensive reviews of the efficacy of psychotherapy, such as the Consumer Report study (see Seligman, 1995) and the comprehensive meta-analyses conducted by Smith and Glass (1977), Wampold and colleagues (1997), Luborsky and colleagues (1999), or Lambert and Ogles (2004). Irrespective of intervention methods and approaches for Internet-based psychotherapies, such as self-help web-based therapy versus online communication-based therapy, problem areas, Internet channels and modalities, age of patients types of measure of effectiveness, and other variables, studies found a valid average ES (Barak et al., 2008). A meta-analysis study conducted by Cuijpers and coworkers (2009) included 23 RCTs and focused on compared CP with non-CP interventions in anxiety disorders, namely 10 studies for phobias, 9 studies for panic disorders/agoraphobia, 3 studies fro PTSD and 1 study fro obsessive-compulsive disorders. The overall mean effect size of CP compared with non-CP was 1.08, which indicates a non-significant difference between the traditional therapeutic approach and CP programs. Moreover, CP effects did not differ either across various anxiety disorders or across various types of CP delivery systems (Internet, stand-alone PC, palmtop computers, etc.).

Computer-Based Psychotherapy for children and adolescents

Numerous studies yielded the results that affective and anxiety disorders are the most prevalent mental health conditions in adolescence, with lifetime prevalence between 17% and 28% by the age of 18 (Kessler, Avenevoli, & Merikangas, 2001; Lewinsohn & Rohde, 1993; Roza, Hofstra, Van der Ende, & Verhulst, 2003). When considering only anxiety disorders, studies have shown that there is 5% to 10% prevalence only in children and adolescents (Costello et al., 2003; Cunningham, Donovan, & March, 2007). The long term consequences of not treating these emotional problems are associated with a range of adverse academic, vocational and social problems (Cunningham, Donovan, & March, 2007; Costello, Angold, & Keeler, 1999; Ginsburg, LaGreca, & Silverman, 1998; Last, Hansen, & Franco, 1997). In addition, studies have found that despite the high incidence of common mental health problems that occur throughout adolescence, young people rarely seek professional help for their emotional problems through the means of regular

health care services. Moreover, a growing number of studies have emphasized the highly effective nature of face-to-face CBT for anxiety disorders in children and adolescents (James, Soler, & Weatherall, 2005). Significantly, only one in four young people with an anxiety disorder is properly diagnosed and receives professional help (Cunningham, Donovan, & March, 2007). Just as in adult population, some of the barriers that prevent young people from accessing mental health professionals for assistance with their anxiety include privacy and anonymity, stigma, cost, geographic isolation, access to therapists, and discomfort with traditional therapy procedures (Booth et al., 2004). In consequence, it appears that it is highly necessary to use alternative treatment approaches, that potentially overcome these barriers (Cunningham, Donovan, & March, 2007).

Several research groups focused their efforts to create computer-based interventions for adolescents and children. Their starting point was the proven effectiveness of these interventions for adult population. Specifically, one of the first programs that target youth anxiety disorder problems is named "The Cool Teens" program (Cunningham, Rapee, & Lyneham, 2006a, 2006b; Cunningham, Rapee, Lyneham, Schniering, & Wuthrich, 2006). The program is presented as an interactive, multimedia CD-ROM that addresses anxiety disorders in adolescents aged 14-18 years. The program was created for home-based independent use and delivers important information, examples, interactive exercises, hypothetical scenarios, and case studies through numerous different media (text, audio, illustration, cartoon, and live video). The program includes eight computer-based CBT modules, and each module takes about 15-30 minute to complete. At present, evaluations of Cool Teens program remain in a preliminary stage. So far, a user satisfaction study investigated the multimedia components and the general aspects of the program, and the results were very encouraging (Cunningham, Rapee, & Lyneham, 2006b). Currently, a full randomized clinical control trial involving 150 young people is ongoing (Cunningham, Donovan, & March, 2007).

The BRAVE program stands for Body Signs, Relax, Activate helpful thoughts, Victory over fears and Enjoy yourself, and began as an anxiety program for children aged 7-12 years, which combines traditional face-to-face group therapy with Internet-based intervention (Holmes, Spence, & March, 2009; Spence, Holmes, March, & Lipp, 2006). The program was extended into a full Internet-based intervention for 8-12 years children, namely the BRAVE for Children – Online (Spence, March, & Holmes, 2005), and the BRAVE for Teenagers – Online, for adolescents aged 13-17 years (Spence, Holmes, Donovan, & Kenardy, 2006). The two BRAVE programs involve ten one hour sessions for the children or adolescents, 5-6 parent sessions, and two booster sessions conducted 1 month and 3 months after the initial completion of the program. Several studies are currently conducted to test the effectiveness and cost-efficiency of the BRAVE program. The results obtained by Spence and collaborators (Spence, Holmes, March, & Lipp, 2006) indicate that the traditional clinic version of the program has the same benefits in reducing

anxiety symptoms as the Internet version of BRAVE program for children. In addition, both types of interventions significantly reduce children's anxiety symptoms compared to the waiting list. Net compliance was good both in children and parents: they spent a mean of 46 minutes per internet session, viewed 96% of treatment pages, and completed 91% of homework forms and quizzes of the treatment pages during the ten-week child and six-week parent treatment phase (Marks, Cavanagh, & Gega, 2007). Another group of researchers (Hoek et al., 2009) conducted a RCT testing the efficacy of preventive Internet-based guided self-help problem-solving therapy with adolescents reporting depressive and anxiety symptoms. A secondary objective of their study was to test potential mediating and moderating variables in order to gain insight into how the intervention works and for whom it works best. Results of their study offer encouragement with regard to the implementation of an effective self-help Internet intervention for reducing anxiety and depressive symptoms in adolescents and preventing or postponing the onset of anxiety and depressive disorders (Hoek et al., 2009).

To sum up, although many adolescents report symptoms of anxiety, they do not seek professional help in regular healthcare system. The filed of CP programs undergoes a major growth and it is expected that the number of studies addressing the efficacy of CP programs will increase in the following years. Nevertheless, results published by studies so far are very encouraging in terms of effectiveness in accessing professional help and reducing anxiety symptoms.

CONCLUSIONS AND FUTURE DIRECTIONS

Based on the existing literature, especially the RCTs and meta-analysis studies, the following conclusions can be supported with empirical data:

1. On average, CP interventions are as effective and nearly as efficacious, as face-to-face therapy (Barak et al., 2008; Wantland et al., 2004; Spek et al., 2007; Hirai & Clum, 2006; Marks et al., 2009; Cuijpers et al., 2009).

2. In most cases, online therapy can be delivered effectively through the Internet applications or several other online communication options (Barak et al., 2008).

3. Typically, the benefits of CP with clinician-guidance are superior to self-guided programs, but on a public health scale self-guided programs are likely to be helpful, and both types are cost-effective relative to face-to-face treatment (Marks & Cavanagh, 2009; Titov, Andrews, Kemp, & Robinson, 2010).

4. No differences were found in therapy expectations between patients who had previous computer experience and those who did not. Significantly, studies have shown that, irrespective of age, both men and women have a positive reaction when treated with CCBT. This suggests that CCBT may be an acceptable treatment option for a wide range of people (Cavanagh et al., 2009).

5. CP may reduce direct and indirect costs of treatment and increase access for people unable to find a local therapist, those unable to attend treatment during usual working hours, and those concerned about stigma (Cavanagh & Gega, 2007).

The encouraging results from studies evaluating ICBT have triggered a rapid increase in "Internet clinics" (services providing ICBT or similar programs). For example, within the last 6 months at least 4 Internet clinics have begun operating in Australia (Titov, Andrews, Kemp, & Robinson, 2010).

Recently, a Romanian research team (Miclea, Ciuca, & Miclea, 2009) proposed a very promising multi-user platform, namely *PAXonline,* intended to prevent and treat a large variety of anxiety disorders (generalized anxiety, obsessive-compulsive disorder, PTSD, different phobias, etc.). In this program, the patients have the opportunity to interact both with their general practitioner and with psychotherapists, being offered: assessment tools, different communication modalities, and e-contents in various formats to help them understand and explain their symptomatology. Clients may enroll in specific therapeutic programs and benefit, at their choice, by the virtual assistance of a certified psychotherapist. Communication with other patients is facilitated via forums, and patients receive constant feedback about the outcomes of the treatments. Based on repeated assessments, progress of recovery may be easily monitored along the intervention (for more see www.paxonline.ro) (Miclea et al., 2009).

If we were to take a glimpse into the future, it seems very possible that many other CP programs will be created, targeting different mental illnesses. As long as CP programs will continue to receive empirical support and their dissemination will increase, one could wonder how this will affect the work of clinical psychologists and psychiatrists. To reassure those who fear that computers will take over entirely the mental health care system, we can enlist several arguments in favour of the work made by psychologists and psychiatrists (Marks, Cavanagh & Gega, 2007). First, as noted, short support is still usually needed to enhance adherence to and benefit from CCBT. The support can vary from screening for suitability and risk assessment, to offering technical advice, monitoring progress and outcome, and giving self-help tips and emotional support for issues not covered by the CCBT system. In large part, this support is usually offered by psychologists and psychiatrists. A second reason why therapists need not fear for their jobs is that some patients will

always prefer face-to-face to computer-guided help. A third reason is that self-help guidance for certain problems is unavailable from any current or planned CCBT system, a situation unlikely to change any time soon. Finally, as it has been shown, severe cases of mental illness do not benefit from CP programs enough to significantly reduce symptom severity, making it imperative that these patients receive face-to-face interventions.

In conclusion, CP programs offer enormous benefits to the healthcare system and the demand for these programs is rapidly increasing. They reduce the costs associated with the patient's treatment, they reduce the time spent by a therapist to treat a client, and they are more accessible to a large group of people who might need mental heath assistance. The limiting factors to full acceptance continue to be addressed and as effective solutions to these concerns are found and implemented, computer-delivered treatments will make a substantial contribution to effective mental healthcare.

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Chapter four

The computer-mediated treatment of Posttraumatic Stress Disorder and stress-induced mental health problems

KÁLLAY Éva & Mircea MICLEA

Even if traumatic encounters are probably as old as mankind, the serious investigation of specific, highly debilitating negative reactions to traumatic encounters only began in the 19th century (Beveridge, 1997). The phenomenon has been approached from several points of view, leading to a heated debate between psychiatry and psychology, regarding the etiology of the posttraumatic symptoms. The most disputed aspects were whether:

(i) reactions are preponderantly organic or psychological?
(ii) they are produced by the event or by the subjective interpretation the individual assigns to the event?
(iii) the result is totally dependent on the characteristics of the event or on specific personal risk factors.

More specific issues of debate continue with questions as:

(*iv*) do patients diagnosed with PTSD fake their symptoms and malinger, or the suffering is genuine,
(*v*) are traumatic memories authentic and accurate, or severely distorted and unreliable, and so on (van der Kolk, 2007).

Research regarding posttraumatic reactions intensified after the two world-wars, when military psychiatrists have noticed that extreme events in combat could trigger acute stress symptoms in previously well-adjusted

individuals (McNally, 2003). Medical staff generally liked to believe that these symptoms subsided soon after ending the military service (Wilson, 1994).

Paradoxically, in increasingly larger populations the symptoms did not subside after the end of military service, and in many cases it led to long-lasting severe disabilities.

During and after the Vietnam War, professionals have observed that the number of returning soldiers who continued to experience for a considerable period of time intensive, debilitating symptoms of distress, and found very difficult to continue their life (Scott, 1990) increased constantly. Others, who returned home apparently symptom-free, developed months, years later the specific posttraumatic symptomatology named "post-Vietnam syndrome".

Thus, it has been noticed that even if anxiety, horror, shock, etc., are relatively common short-term reactions of trauma exposed people, these reactions may in time turn into a multitude of disorders (e.g., phobias, depression, personality disorders, etc.).

The atrocities of the Second World War and the Korean War have intensified interest regarding the investigation of specific, differentiable aspects of traumatic encounters and their consequences. Under the pressure of increasing numbers of highly distressed war-survivors, when editing the first Diagnostic and Statistical Manual of Mental Disorders (DSM-I, American Psychiatric Association, 1952) the American Psychiatric Association has included among the diagnosable disorders the "*gross stress reaction*", which basically represented specific reactions to encountering diverse traumas (Friedman, Resick, & Keane, 2007). This very first diagnosis did not comprise excessively elaborate criteria; however, it clearly referred to diagnose people who were healthy before the traumatic encounter, but who later continued to experience symptoms attributable to the encounter with the extreme stressor (e.g., civilian catastrophe, combat, etc.). For presumably social and political reasons (Bloom, 2000), the disorder of gross stress reaction was left out of the second edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-II, 1968).

Thus, terms encompassing severe posttraumatic reactions have officially entered both the International Classification of Diseases, in 1978 (ICD – 9, WHO), and the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) in 1980 (APA, 1980; Young, 1999). The ICD incorporated posttraumatic reactions in the subcategories of '*acute reactions to stress*' and '*adjustment reaction*', while the DSM-III under the term of Posttraumatic Stress Disorder (PTSD). The 'acute reaction to stress' referred to relatively transient disorders without a specifically established severity or nature, experienced by individuals presenting no mental disorders before the traumatic encounter (Turnbull, 1997). PTSD has covered a large range of disabilities, from chronic to those of delayed onset. It was included into the category of anxiety disorders, however it also encloses most of the hallmark characteristics of depression (Brewin & Andrews, 2000).

The introduction of the PTSD in the DSM-III (1984) has fired lots of controversies among specialists (Friedman, Resick, & Keane, 2007). Those who thus got a tool, a nosological category to work with on different populations exposed to extreme stress (e.g., Holocaust survivors, victims of rape and domestic violence, disabled combat soldiers), warmly welcomed this initiation. In the same time, it reassured the lay population that the effects of different forms of trauma started to be taken seriously, and its maintenance in the Diagnostic and Statistical Manual of Mental Disorders was not the result of a momentary whim (Friedman, Resick, & Keane, 2007). However, those specialists who objected to the introduction of PTSD in the DSM, argued against:

- the unnecessary pathologization of traumatic reactions;
- its legitimity as a valid syndrome;
- expressed their doubts regarding the PTSD's clinical purpose and its reliability, the validity of traumatic memories, just to mention only a few of the most frequent cons (Friedman, Resick, & Keane, 2007).

According to the DSM-III, PTSD is a constellation of specific reactions to a stressor "*that would evoke significant symptoms of distress in almost everyone*" (APA 1980, p. 238). The diagnosis comprised the following main symptom clusters:

(i) *existence of a recognizable stressor that would evoke significant symptoms;*
(ii) *re-experiencing of the trauma (thoughts, nightmares and 'flashbacks');*
(iii) *numbing (feelings of detachment from others, loss of interest in activities, constricted affect), and*
(iv) *miscellaneous symptoms (exaggerated startle, sleep disturbance, memory impairment, etc.) (McNally, 2004).*

PTSD has become the prototype of negative posttraumatic reactions purporting strong beliefs about adversity and subsequent distress. Common sense and professional assumptions have considered that human experiences are directly dependent on the nature of the (negative) event. Thus, to elicit intense, long-lasting negative reactions, an event: has to be relatively rare and unexpected, has to have certain intensity, has to be negatively valenced and even more importantly, the event itself can be accounted for the development of reactions (Bowman, 1997). From the point of view of negative reactions (especially PTSD), these have been considered to be normal responses to overwhelming traumatic events (Brewin, Andrews, & Valentine, 2000), directly dependent on the parameters of the event and not on individual characteristics.

The fourth edition of the DSM has further distilled (and simultaneously made more intricate) the definition of the etiological factor, thus defining the traumatic exposure as the situation in which "*the person experienced,*

witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others," and which evoked "*intense fear, helplessness, or horror*" (APA 1994, pp. 427–28). According to this new definition, a person who presents the necessary number of symptoms or finds out about someone else's direct exposure to a noxious event, may be as eligible to be diagnosed with PTSD as the individual who presents the symptoms and faced the event directly. Quite a large number of researchers have brought serious critiques to this permanently widening definition of what may be accounted for a traumatic event.

The 2000 revised edition of the DSM-IV has introduced, beside PTSD, another clearly traumatic event related disorder, namely the Acute Stress Disorder (ASD). ASD highly resembles the PTSD (e.g., the same stressor criterion, re-experiencing symptoms, avoidance, arousal, etc.), however it also differs by the necessary presence of at least three dissociative responses (Friedman, Resick, & Keane, 2007).

At a more thorough scrutiny, it can be noticed that since the introduction of DSM-III, the criteria for PTSD have been revised for a few times – nevertheless, none of the versions has substantially modified the fundamental set o symptomatic criteria (Ozer et al., 2003).

Beside the core criteria of DSM-IV for PTSD: *(a)* re-experiencing the event (e.g., nightmares, intrusive thoughts); *(b)* avoidance and numbing (e.g., avoiding reminders, not being able to have loving feelings), and *(c)* increased arousal (e.g., difficulty sleeping, hypervigilance, exaggerated startle response; APA, 1994), the cardinal feature of PTSD, that of the linking of the disabling aspects of the phenomenology to the event, has persisted over time. This may mainly be caused by the fact that intrusive images or thoughts, specific to PTSD typically reflect some aspect (or relationship) of the actual event. These almost uncontrollable intrusive images and thoughts (which represent one of the major sources of discomfort in PTSD) do not have a distressing random content, and more importantly, they cannot be easily expelled once they have become conscious (Ozer et al., 2003).

Diagnosis of PTSD according to DSM-IV-TR (2000)

Depending on the onset and duration of symptoms, PTSD may be:

- **Acute**: if duration of symptoms is less than 1 month.
- **Chronic**: if symptoms last three months or more.
- **Delayed onset**: if at least six months have passed between the traumatic encounter and the onset of symptoms (DSM-IV-TR, 2000).

Diagnostic criteria for PTSD according to DSM-IV-TR, 2000 are presented in Table 1.

<table>
<tr><td rowspan="7">PTSD</td><td rowspan="2">Criterion A1</td><td colspan="2">Exposure to an extreme traumatic stressor</td></tr>
<tr><td>Direct exposure

Actual or threatened death or serious injury; other threat to one's physical integrity;
Witnessing an event that involves death, injury, or a threat to the physical integrity of another person.</td><td>Indirect exposure

Learning about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close associate (disorganized-agitated behavior in children).</td></tr>
<tr><td>Criterion A2</td><td colspan="2">Response to the event: intense fear, helplessness, horror.</td></tr>
<tr><td>Criterion B</td><td colspan="2">Persistent re-experiencing of the traumatic event as:
a. Recurrent and intrusive thoughts, images, perceptions about the event.
b. Recurrent distressing dreams.
c. Re-living of the traumatic event
d. Intense distress at the exposure of stimuli similar to those of the traumatic event.
e. Physiological reactivity to internal/external stimuli similar to those of the traumatic event.</td></tr>
<tr><td>Criterion C</td><td colspan="2">Persistent avoidance of stimuli associated with the trauma:
Avoidance of: thoughts, feelings, activities, places, people involved in the traumatic encounter.
Inability to remember some aspects of the encounter.
Reduced interest in activities previously attended to.
Feelings of estrangement.
Sense of shortened future, etc.</td></tr>
<tr><td>Criterion D</td><td colspan="2">Persistent symptoms of increased arousal
Sleeping difficulties; high levels of irritability; concentration difficulties, hipervigilance, etc.</td></tr>
<tr><td>Criterion E</td><td colspan="2">The full symptomatology must be present at least for 1 month.</td></tr>
<tr><td>Criterion F</td><td colspan="2">Symptoms cause clinically significant impairment in social, professional, or other areas of functioning.</td></tr>
</table>

Table 1.
Diagnostic criteria for PTSD (DSM-IV-TR, 2000)

Epidemiology of negative posttraumatic reactions

Within the study of negative traumatic reactions, prevalence studies have produced strikingly different results, percentages ranging in PTSD populations seeking treatment from 14% up to 95% (Favaro, Maiorani, Colombo, & Santonastaso, 1999; Weine, Vojvoda, Becker, McGlashan, Hodzic, Laub, et al., 1998), lifetime prevalence between 9-13%, and 13-24% among individuals exposed to traumatic events (Cason, Resick, & Weaver, 2003). These coarse results become somewhat clearer when one considers several extremely important aspects of conducting rigorous epidemiological studies within PTSD. Thus, prevalence rates are usually estimated for longer (lifetime) periods of time, but prevalence for shorter periods are also done (both projections for future and past estimations). In the case of PTSD epidemiological research has targeted three interrelated but crucial aspects:

(i) prevalence of exposure to traumatic stress;

(ii) prevalence of PTSD in the general population; and

(iii) prevalence of PTSD within exposure to a specific traumatic event (Norris & Slone, 2007).

Consequently, in the light of the above mentioned aspects, prevalence rates are dependent on several factors. For example, in the USA, where the lifetime trauma exposure ranges between 50-60%, the PTSD prevalence is about 7.8% (Friedman, Resick, & Keane, 2007). In war zones on the other hand, both exposure and prevalence rates differ quite a lot. For example, in Algeria, trauma exposure is about 92%, with a PTSD prevalence of 37.4% (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; de Jong, Komproe, van Ommeren, El Masri, Araya, Khaled, et al., 2001). These findings have sustained the inference that there may be a dose-response relationship between severity of the traumatic experience and the onset of the disorder (Friedman, Resick, & Keane, 2007). The effect of the dose-response relationship has been observed in different traumatic contexts (war, sexual assault, natural and man-made calamities, terrorist attacks, etc.) (Norris, Friedman, & Watson, 2002; Galea, Ahern, Resnick, Kilpatrick, Bucuvalas, Gold, et al., 2002). An extremely interesting intra-cultural aspect has been noticed. The nature of the toxic event leads to different prevalence. Thus, in US for example, over 45% of the sexually assaulted women will later develop PTSD, while less than 9% female accident survivors develop PTSD (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993).

Regarding disasters and calamities, research has revealed that the prevalence of PTSD is higher after man-made or technological disasters than after natural calamities. Nevertheless, there are some authors who attribute these findings to differences in sampling procedure (Galea, Nandi, & Vlahov, 2005).

There have also been identified age trends in PTSD prevalence, namely that as age increases the PTSD prevalence may decrease (Kessler, et al., 1995). In cumulative childhood traumas the lifetime conditional prevalence of PTSD varied depending on gender (35% for women and 10% for men), while for events encountered in adulthood (adulthood events), conditional lifetime prevalence for PTSD was 25% for women and 15% for men (Norris & Slone, 2007).

Another aspect connected to prevalence refers to the type of PTSD - chronic PTSD (lasts at least one year) or current. Prevalence of current (or recent) PTSD has repeatedly proven to be lower than in the case of chronic PTSD (Resnick et al., 1993; Kessler, Chiu, Demler, & Walters, 2005), with the corresponding variances depending on gender (Costello, Angold, Burns, Stangl, Tweed, Erkanli, et al., 1996).

Reiterating the ideas presented in previous subchapters, it would be erroneous to think that maladaptive post-traumatic reactions all lead to PTSD. Negative reactions that do not subside in time may result in depression, other types of anxiety disorders, alcohol, drug dependency, etc. (Gold, 2008; Galea et al., 2002), but not necessarily in PTSD.

A considerable number of studies have shown that depression is far more frequent in trauma survivors than PTSD (e.g., Carey, Stein, Zungu-Dirwayi, & Soraya, 2003). Simultaneously, studies have shown that there is a strong association between number of childhood traumatic encounters and later development of depression in adult trauma survivors (Felitti, 2002 as cited in Gold, 2008).

By the same token, a large proportion of those facing traumatic events may develop different forms of anxiety disorders (generalized anxiety disorder, agoraphobia, obsessive-compulsive disorder) (e.g., Maes, Mylle, Delmeire, & Altamura, 2000). However, the type of disorder developed in this case is highly dependent on the type the traumatic confrontation (Breslau et al., 1991).

Prevalence of substance and drug abuse in trauma survivors has shown a dose-response relationship (Dube, Anda, Felitti, Edwards, & Crift, 2002; Dube, Felitti, Dong, Chapman, Giles, & Anda, 2003). Some studies have hypothesized that alcohol and drug use and abuse represents an attempt on the behalf of the individual to suppress traumatic-confrontation induced symptoms (flashback memories, intrusive images and thoughts, etc.) (e.g., Ross, Kronson, Koensgen, & Barkman, 1992).

On the other hand, there is a considerably large population who presents some of the symptom criteria but does not present all the criteria necessary to be diagnosed with PTSD. The issue of sub-syndromal PTSD has been addressed by several authors (e.g., Stein, Walker, Hazen, & Forde, 1997), nevertheless, it is still a relatively understudied domain. The implications of these findings are important, since the number of people suffering of sub-syndromal PTSD is almost the double of those diagnosed with PTSD (Norris & Slone, 2007).

Treatment of posttraumatic reactions

Regarding the treatment of negative posttraumatic reactions we may differentiate between three periods of time in the process of posttraumatic reactions (Litz & Maguen, 2007):

a. ***immediate impact interval*** (0-48 hours after the traumatic encounter) – the individual(s) may manifest intense reactions of distress; depending on the nature of traumatic encounter, the person may also experience intense states of confusion, be highly disorganized, or may try to cope with or compensate for the resources lost in the event (e.g., this aspect is frequent in natural calamities) - 'psychological first aid' interventions;

b. ***acute interval*** (2 days – 1 month) – this period roughly corresponds to that of the acute stress disorder (ACD); in this interval the person still experiences high levels of distress, and usually tries to actively handle the traumatic event and its implications. This period seems to be more suitable to the implementation of secondary prevention programs (Litz & Maguen, 2007);

c. ***chronic interval*** (over 1 month, possibly lifespan adaptational difficulties) – in this interval, those who have developed highly maladaptive reactions leading to severe mental health problems due to the posttraumatic encounter are recommended to receive psychological interventions.

The most specific interventions of the immediate impact interval (or early stage interventions) are:

- Psychological Debriefing.
- First Aid.
- Cognitive Behavioral Intervention in early phases of posttraumatic maladaptation, etc.

The major aims of these early interventions are to:

- help individuals replenish lost material and personal resources,
- offer information about adaptive reactions,
- help traumatized individuals to extend sources of social support,
- help manage collateral maladaptive reactions,
- develop and optimize appropriate abilities to efficiently cope with possible future threats (For more information see, Kállay, 2011).

Interventions for PTSD

The most efficient form of intervention to treat PTSD has been repeatedly found to be Cognitive-Behavioral Therapies (CBT).

According to Monson and Friedman (2006), the major goals of CBT are:

(*i*) treat observable and measurable symptoms,
(*ii*) target symptom amelioration,
(*iii*) develop interventions that are limited in time and are goal-driven,
(*iv*) succeed to actively implicate the patient in the therapeutic process.

Empirical evidence sustains that Cognitive Behavior Therapy (CBT) is one of the most efficient treatments of PTSD and trauma-induced mental health disorders across different trauma-groups (Foa, Keane, Friedman, & Cohen, 2009; Klein, Mitchell, Gilson, Shandley, Austin, Kiropoulos, et al., 2010; McDonagh-Coyle, Friedman, McHugo, Ford, Sengupta, Mueser, et al., 2005;).

In most cases, CBT treatment packages targeting the amelioration of PTSD symptoms comprise several different intervention techniques, as:

- psycho-education,
- anxiety management,
- stress inoculation training,
- cognitive restructuring,
- exposure therapy,
- relaxation training,
- coping with collateral life problems,
- relapse prevention, etc. (for more see Leahy & Holland, 2000).

The typical CBT treatment package includes 9 to 12 weekly sessions, with sessions lasting between 60 to 90 minutes (Harvey et al., 2003; Leahy & Holland, 2000).

The most important treatment goal in the management of trauma related symptoms are:

1. to help the traumatized patient to understand his/her own reactions;
2. to assist him/her to find ways in which he/she can efficiently manage symptomatology (Litz, Engel, Bryant, & Papa, 2007).

More specific goals include:

- help the patient return to a stabile homeostatic equilibrium(reducing symptoms of hyperarousal and distress associated with intrusive memories; eliminate feelings of guilt);
- help the patient engage in previously avoided activities;

- assist the patient in finding ways through which he/she can find sources of meaning for his/her life;
- helping the patient understand that there is a strong association between his/her experiences and reactions and manifest behaviours;
- help the patient acquire relapse skills (for more see Kállay, 2011).

Based on efficiency studies, Cahill et al. (2009) have identified the following techniques that are usually included in treatment packages, and have a relatively large effect on treatment outcomes:

1. Exposure Therapy (ET)
2. Stress Inoculation Training (SIT)
3. Cognitive Processing Therapy (CPT)
4. Cognitive Therapy (CT)
5. Relaxation Training (RT)
6. Dialectical Behavior Therapy (DBT)
7. Acceptance and Commitment Therapy (ACT)

As we have already mentioned, there is a considerably large population who presents some of the symptoms may present intense dysfunctionality on different levels, but does not meet the criteria necessary to be diagnosed with PTSD or other mental disorders. Such negative symptoms may also significant lower of the quality of their lives, but such persons are rarely referred to or seek specialists (Wright & Wright, 1997).

The implication of sub-syndromal mental disorders has been considered extremely important (e.g., Anderson & Cuijpers, 2008; Stein, Walker, Hazen, & Forde, 1997) since the number of people suffering of different forms of negative posttraumatic reactions is almost the double of those diagnosed with PTSD (Norris & Slone, 2007).

As we have discussed in the Introductory chapter, a huge proportion of patients suffering of anxiety disorders remain untreated (Andrews, Henderson, & Hall, 2001; Lepine, 2002). The figures are similar in the case of PTSD, especially in adult crime victims (Norris, Kaniasty, & Scheer, 1990), combat soldiers and so on (for more see Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; de Jong, Komproe, van Ommeren, El Masri, Araya, Khaled, et al., 2001).

The major reasons for this lack of treatment are:

- Considerable financial expenses involved in the traditional treatment of anxiety disorders, both at individual and community levels (Turner, Beidel, Spaulding, & Brown, 1995);
- Availability of therapist specialized in the treatment of PTSD (Amstadter et al., 2009; Litz et al., 2007; Przeworski & Newman, 2006; van den Berg, Shapiro, Bickerstaffe, & Cavanagh, 2009);
- Spatial and temporal access to therapy (residence: rural vs. urban; working schedule, etc.; for more see, Przeworski, & Newman, 2006);
- Perception of stigma associated to the presence and treatment of mental illness (Klein et al., 2009), etc.

In these conditions, a novel approach to the treatment of anxiety disorders is imperative. As Miclea, Miclea, and Ciuca (2008) mentioned, the traditional treatment of anxiety disorders is presently "forced to reconsider its basic principles and forms of delivery" (p. 131). Quoting Proudfoot (2004), "the clinician is no longer the main gateway to health information, patient education, treatment and support" (p. 354).

As discussed in the introductory chapter, an extremely valuable solution lies in the possibilities computers and the internet purport.

On the one hand, computers are well-suited for rapid and efficient assessment of different symptoms and disorders, simultaneously enhancing the access to information and support (Newman, Consoli, & Taylor, 1997; Proudfoot, 2004).

On the other hand, computer usage has exponentially increased in the near past. The number of people who seek information (self-help, amelioration of different physical and mental health problems, etc.) on the internet is constantly growing (Horrigan & Rainie, 2007; Proudfoot, 2004). Consequently, the Internet has become an extremely facile means of accessible information, available almost to everyone (Risk & Petersen, 2002).

Computer Mediated Psychotherapy

The terms of computer-assisted, computer-mediated, computer-supported psychotherapies are used interchangeably for all the interventions which refer to a combination of ICT and human capabilities, which all have the major purpose to alleviate emotional disorders and provide opportunities for personal growth (Miclea, Miclea, & Ciuca, 2008).

Literature has identified several forms of CMP, depending on the degree to which it includes computerized devices. Some forms of intervention are completely computerized (e.g., CD-Rom or client-administered psychological software), while others only use some IT products (software,

platforms) in order to enhance the work of the therapist (Miclea, Miclea, & Ciuca, 2008).

At the moment, CMP being deliverable in different formats it may be efficiently tailored to the specific needs of the patient or client. In this way, it allows clients and practitioners to compile the most suitable package for the specific needs of each particular case. In most cases, computer mediated therapies include: internet treatment, virtual reality treatment (computer-generated 3-dimensional space), video-conferencing (visual interactive electronic meetings between the client and the practitioner), e-mails, etc., all implemented on any of the devices mentioned above (Przeworski & Newman, 2006).

As we have already discussed in the introductory chapter, CMP have both advantages and disadvantages.

The major advantages of CMP are:

- significantly lower financial costs of CSP based treatments than those of traditional, face-to-face interventions (Marks, Cavanaugh, & Gega, 2007; Proudfoot, 2004);
- enhanced spatial, temporal, and financial availability – patients, clients may have access to CSP from home, work, etc., without necessarily meeting the therapist (Proudfoot, 2004; Wright & Wright, 1997);
- enhanced possibility to avoid the social stigma associated with attendance of mental health services (Amstadter et al., 2009; Marks, Cavanaugh, & Gega, 2007);
- diversification of self-help resources (Wright & Wright, 1997);
- allows easy adjustments to the needs of specific interest groups (facile updating, refinement and extension depending on specific needs (Amstadter et al., 2009);
- possibility to store, analyze, compare, and monitor individual results (Newman, Kenardy, Herman, & Taylor, 1997);
- possibility to enhance compliance with homework (Proudfoot, 2004; Selmi, Klein, Greist, Sorrell, & Erdman, 1990), etc.

The most important disadvantages are:

- inefficacy of CMP for technophobe patients, who prefer traditional., face-to-face interventions (Marks, Cavanagh, & Gega, 2007).
- in some cases, non-verbal communication may be seriously impaired in computerized interventions. Because of these shortcomings, the deliverance by the therapist of appropriate empathic feedback is hindered, jeopardizing the efficient patient-therapist relationship (Nadelson, 1987, as cited in Wright & Wright, 1997).

- occasionally, CMPs may not always be able to solve all the uncertainties and questions the client might have, a situation less frequently encountered with professionals (Marks, Cavanagh, & Gega, 2007), etc.

Fortunately, efficiency studies have infirmed most of the above-mentioned disadvantages of computer-mediated psychotherapies. For instance, several studies have evinced that there are no significant changes in dropout rates between CMP and traditional interventions, as well as no significant change regarding satisfaction with the format of delivery (Carlbring, et al., 2003; Richards & Alvarenga, 2002; Metanoia, 2001). Moreover, most of the patients seem to get much better accommodated with CMP than with traditional, face-to-face therapies.

Regarding the quality of the therapeutic relationship it has been revealed that there are no significant differences between the two types of intervention (Cook & Doyle, 2002; Parks & Roberts, 1998).

The efficiency of computer-mediated psychotherapy for PTSD and stress-induced mental health problems

The number of computer-mediated psychotherapeutic interventions are relatively scarce, compared to other anxiety disorders. However, there are several, scientifically conducted reviews (Amstadter et al., 2009; Klein et al., 2009; Marks et al., 2007) that have considered the efficacy of the most complex CMP programs that target the reduction of PTSD symptoms of clinical intensity. According to these reviews, the most efficient CMPs for PTSD are:

- Interapy (Lange, Rietdijk, Hudcocikova, van de Ven, Schrieken, & Emmelkamp, 2003; Lange, van de Ven & Schrieken, 2003),
- an Internet-based, therapist-conducted CP program designed by Litz et al. (2007),
- an Internet-based CBT program aiming to ameliorate subclinical symptoms associated with traumatic or highly stressful encounters (Hirai & Clum, 2005), and
- an online early intervention program for disaster-stricken populations (Ruggiero, Resnick, Acierno, Carpenter, & Kilpatrick, 2006).

Next, we will briefly present each of the above-mentioned interventions.

Interapy (Lange et al., 2003) is an Internet-based program aiming to improve posttraumatic stress symptoms, prolonged grief, by combining CBT techniques with writing therapy. In most cases, an Interapy intervention involves Internet-

usage, which also include approximately 12 writing assessments and the usual homework assignments

The size effects of interventions using the Interapy platform are around .92(±.42) (e.g., a metaanalysis conducted by Barak, Hen, Boniel-Nissim and Shapira, in 2008). Other studies have found that, 50-80% of the patients treated with Interapy showed clinically significant improvements when compared with other control or waitlist conditions (e.g., Knaevelsrud & Maercker, 2007).

The Internet-based, therapist-conducted CP program designed by Litz et al. (2007) compared the efficacy of a CBT based therapist-supported Internet intervention and that of a supportive counseling.

According to these investigations, both interventions significantly reduced the severity of PTSD symptoms, however the therapist-supported CBT Internet-intervention proved to exert its effect much faster, reducing symptoms at a greater pace, especially avoidance, and hyperarousal (Klein et al., 2009).

The Hirai and Clum (2005) intervention comprised the following CBT modules: psycho-educational information, relaxation, cognitive restructuring, and exposure. All these modules were delivered on the internet, in the absence of a face-to-face contact with the therapist (Cuijpers et al., 2009). Compared to a waitlist condition, participants receiving this intervention presented a faster remittal of anxiety and depressive symptoms, and manifested significant decrease in avoidance behavior, frequency of intrusive thoughts, etc. In the case of this intervention, effect sizes have been found to be .62 (±.75) (for more see Barak et al.'s meta-analysis, 2008)

The Ruggiero et al.'s (2006) internet-based intervention aims to increase recovery in adult patients presenting trauma-related symptomatology. This program includes psycho-educational elements, especially information about adaptive the difference between adaptive and maladaptive coping techniques in traumatic situations, especially disaster and mass violence (e.g., posttraumatic stress, anxiety, depressed mood, alcohol and drug use).

This program proved to be extremely efficient in enhancing the patients' knowledge regarding posttraumatic reactions in general. This far, no rigorous efficacy study has been conducted to invest its long-term effects on symptom severity (Klein et al., 2010).

This far, we have presented interventions targeting the alleviation of specific PTSD symptoms (of both clinical and sub-clinical intensity). However, literature abounds in research investigating the efficacy of treatments targeting the amelioration of wider clusters of symptoms which may be due to traumatic encounters. Most of these studies sustain that CMP is "as effective as best

practice face-to-face therapy" (Carlbring, Nilsson-Ihrefelt, Waara, Kollenstam, Burman, Kaldo, et al., 2005, p. 1331).

In Table 2 we will present the most important computer-based interventions with corresponding effect sizes.

Table 2.
Computer-mediated interventions for trauma-related symptoms with effect sizes [based on Barak et al. (2008) meta-analysis]

Symptom	Authors	Effect size
Depression	Andersson, Bergström, Holländare, Carlbring, Kaldo, & Ekselius, 2005	.67 (±.43)
Panic disorder	Carlbring, et al., 2005;	.81 (±.55)
	Kenwright, Marks, Gega, & Mataix, 2004;	1.09 (±.88)
	Klein, Richards, & Austin, 2006	1.13 (±.64)
Smoking cessation	Strecher, Shiffman, & West, 2005	1.68 (±.13)

Summary and Conclusions

The demands for alternative psychotherapeutic interventions are constantly increasing. Mental care health services delivered via computer-supported devices entail significant benefits both for individuals and communities (Proudfoot, 2004).

Meta-analysis, outcome studies, reviews sustain that computer-mediated therapies are quite effective, and may be a valuable alternative to those who cannot afford (due to financial costs, pressure of a busy schedule, distance, etc.) or do not want to turn (e.g., social stigma) to traditional, face-to-face interventions.

Another, as important benefit of computer-mediated therapies refers to the fact that such interventions may be tailored to the case of those persons who do not meet all the necessary criteria to be diagnosed with a specific mental disorder, but present impaired functioning, and who can still benefit from mental-health care, by improving the quality of their lives.

As any new form of intervention, CMP has both advantages and disadvantages. Presently, intensified research attempts to address these limitations in order to enhance the quality of computer-assisted interventions, and give it a form that would enhance larger accessibility and acceptance in the general population (Proudfoot, 2004).

Echoing the tendencies of present demands, and regarding the future of computer-mediated psychotherapies for anxiety disorders, we would like to end this chapter by quoting Anderson and Cujpers (2008), regarding its long-

term effects and the future "we would definitely be in a position to consider not if, but how soon, we should implement this treatment on a wide scale" (p. 271).

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Chapter five

Computer-supported psychotherapy should pay attention to e-learning

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Introduction

The psychotherapy of emotional disorders is presently forced to reconsider its basic principles and forms of delivery. At least two high-pressure factors may be mentioned in this context. First of all, the incidence of mental disorders has dramatically increased in the last decades. The present data show, for example, that approximately 29% of the adult population has had an anxiety disorder over his/her lifetime, while in the case of adolescents the threshold has exceeded 10% (European Commission, 2005; Cunningham, Rapee, & Lyneham, 2006). On the other hand, the limited number of certified therapists, as well as the traditional format of therapy (face-to-face encounters, approximately once a week), have created a huge imbalance between the need to psychotherapeutical services and the available offer. In Great Britain or USA, for instance, 84% of the individuals with anxiety disorders or depression remain untreated, while the waiting lists are for 1-2 years (Marks, 2004). Secondly, because of the impact of information technology, the attitudes of those who seek information and/or help for their mental health problems has substantially changed.

Recent surveys show that internet search for self help resources has become a typical behavior for approximately 50% of internet users; moreover, 91% of the respondents have stated that the internet is their first option when they search for information and help regarding their health problems (Risk & Petusen, 2002; Bessell, Anderson, Sansom, & Hiller, 2003).

Information regarding mental health is the most demanded, and 42% of these searches refer to anxiety problems, depression, and bipolar neurosis (Proudfoot, 2004). The generation of digital natives (i.e., people who grew up interacting daily with digital technology) is just reaching the age of maturity, meaning that in the future, the use of digital, multimedia devices for solving mental health problems will exponentially increase.

In sum, the actual form of psychotherapy is outdated both by the demands of the market, as well as by the new expectancies and attitudes induced by the information and communication technology (ICT).

Computer-supported psychotherapy is a recent tentative to innovate the psychotherapeutic process and match both the existent demands of the market and the new attitudes of those who seek help in the digital era. Computer-supported psychotherapy (CSP) consists of a combination of ICT and human capabilities aiming to alleviate emotional disorders and provide opportunities for personal growth. It is ranging on a continuum, from a completely computerized therapy (e.g., CD-Rom or client-administered psychological software) to the use of psychotherapeutic software and platforms solely as an extension for the work of the psychotherapist. In one form or another CSP has come closer to e-learning or blended learning, and could benefit from conceptual and methodological transfer originating in these more mature disciplines.

There are at least two domains where the theories and data already accumulated in e-learning may enrich e-mental health and CSP in particular: instructional design and the use of multimedia.

Instructional design and CSP

Fundamentally, psychotherapy is a design: an artifact aiming to solve particular mental health problems, relying on evidence-based general principles. It is a co-construction of the psychotherapist and patient working together in a therapeutic alliance, rather than a mechanical application of a particular technique.

In fact, repeated meta-analyses have emphasized that a specific psychotherapeutic technique accounts for 15-30% of the effect size in psychotherapy, the largest part of the cure being determined rather by non-specific factors than by the technique itself (Richardson & Richard, 2006). Moreover, the psychotherapeutic process proceeds by eliciting a series of learning experiences aiming the alleviation of symptomatology. Our clients learn how to conceptualize their symptoms, how to identify dysfunctional cognitions and to challenge irrational thoughts, how to expose to fearful situations, how to acquire new coping skills, etc. Any successful psychotherapy relies on successful learning occurring during therapeutic encounters. The

consideration exposed above provides sufficient reasons to consider the instructional design as a promising source of enhancing the offer of psychotherapeutic approaches in the digital age.

Instructional design refers to the analysis of learning (and performance) problems, and the design, development, implementation, evaluation and management of instructional and non-instructional process and resources aiming to improve learning (Reiser & Dempsey, 2007). Due to the thorough scrutiny of the instructional design in educational psychology and the psychology of learning, a burgeoning terminology and models have emerged in the existing literature (Gagné, Wager, Golas, & Keller, 2005; Kauffman, 2000; Smith & Ragan, 2005).

However, beyond various terminologies and models, the large majority of the researchers agree that instructional design is an empirical, iterative and self-correcting process consisting of six elements or phases.

We are claiming that these elements are highly relevant to the development of a computer-supported psychotherapy as we shall illustrate below. Thus, any CSP should consider, iteratively, the components mentioned below as evidence-based suggestions that could maximize its effectiveness.

(1) ***Analysis***.

Any design relies on a more or less extensive analysis of the needs and characteristics of the users. Traditional psychotherapy undertakes such an analysis almost exclusively focused on the patient's symptoms and the context (internal and external) of their occurrence as the basis for any therapeutic plan and its implementation. However, we think that this analysis has two limitations.

First, it is concerned only with those clients who afford themselves to come to the psychotherapist's office; the design of psychotherapeutic process is focused exclusively on their needs and characteristics. But, what about those who cannot afford a psychotherapeutic session due to their work schedule or because they are living in remote areas? What about those who are at the beginning at their emotional problems and they need rather psychological education, resilience enhancement or preventive measures than psychotherapy? We must recognize that the traditional design of psychotherapy is a face-to-face process of reparatory nature for those already disturbed, who afford entering the therapist's office; thus, a large number of people with specific needs, as mentioned above, may not receive psychotherapeutic assistance.

Second, the analysis in the framework of traditional psychotherapy is psychotherapist-centered rather than *process-centered*. It assumes that the alleviation of symptoms occurs only with the critical involvement of the psychotherapist, and the whole design of psychotherapy undertaken by the therapist puts him/her in the center; in other words, the design is self-serving.

However, compelling data from the self-help literature have testified the existence and robustness of patient-directed psychotherapy and, on the otherhand, about 90% of those seeking help for mental health problems stop at the level of the general practitioner's intervention (Williams & Whitfield, 2001; Kaltenhaler, Brazier, De Nigris, Tumur, Ferriter, Beverley, & et al., 2006).

This means that the therapeutic process may occur in many places, with many actors and various resources. We should rather create therapeutic designs that enhance the therapeutic *process* wherever it occurs: at the patient's home, in the therapist's office, or at the general practitioner's premises.

Overall, the design of the computer-supported psychotherapy should rely on the analysis of the characteristics and needs of several "users": clients, psychotherapists, and general practitioners. Therefore, it should be process centered rather than psychotherapist-centered, aiming to enhance the psychotherapeutic process and not only the psychotherapist's professional power.

(2) ***Design and development.***

In the theory and practice of instructional design, the analysis of learning needs and the characteristics of the learner constitutes the premise for establishing learning goals, learning strategies and the elaboration of materials necessary for learning, namely the design and development of learning experiences (Morrison, Ross, & Kerp, 2004). By analogy, a similar process could be enacted in the process of elaborating computer-supported psychotherapy.

First, we have to decide the appropriate contents offered for each actor (user) involved in the psychotherapeutic process: client – therapist – general practitioner. In other words, the problem we must solve is the following: what contents, available for which actor, will maximize the probability to achieve the therapeutic goal. Some of these contents will be specific, whereas others will be shared among the actors.

Second, for each content, we have to specify the most effective method(s) of delivery, such as:

- exposure,
- demonstration,
- exemplification,
- problem-solving,
- use of models,
- graded task assignments, etc.

We should also specify how these contents will be organized (i.e., "curriculum"), as well as the optimal size of each module. Third, we have to decide what kind of media will be used: text, audio-video, graphs animation, or any appropriate combination of them. Forth, we need to set-up a feed-back system allowing any patient to become aware of his/her progress in therapy, and to benefit from the methods available to overcome the difficulties

encountered. If possible, explanatory feedback (correction + explanation) should prevail upon simple corrective feedback.

(3) ***Implementation***.

In the instructional design, implementation refers to the delivery of courses to the target population. In computer-supported psychotherapy, the problems of implementation are related to the effective use of the therapeutic program and of the resources by those involved in thetherapeutic process, be they patients, therapists or general practitioners.

Usability becomes here a critical factor; any module of CSP which is not user-friendly has a reduced therapeutic impact. We should also consider the daily routines of those involved; any product that cannot be assimilated into their usual practices will be more or less rejected by any user.

(4) ***Evaluation***.

Relying on the conceptual transfer from the instructional design theory to CSP, we underline that any CSP should be the object of two types of evaluation: formative and summative. Formative evaluation is undertaken during the process of construing CSP modules and consists of continuous, iterative recalibration of therapeutic modules relying on the feed-back of the users. Summative evaluation is aiming to reveal the effectiveness and efficacy of CSP.

Effectiveness is operationalized by the effect size of CSP modules upon dependent variables such as the client's symptomatology, relationship, performances, and satisfaction. On the other hand, the economic costs and efficacy of CSP compared to other kinds of intervention (e.g., traditional psychotherapy, bibliotherapy) are also integrative parts of summative evaluation.

(5) ***Management***.

In the terminology of instructional design, management refers especially to the institutional integration of instructional solutions. By analogy, we should figure out how CSP is integrated in mental health services (primary, secondary, and tertiary), how psychotherapists interact with general practitioners via CSP modules and resources, how one undertakes client management, database-management, and the management of software application.

To summarize, instructional design may be considered an "illuminating metaphor" for CSP. Many procedures and concepts from instructional design can be transferred to improve the process of creating CSP. As far as successful psychotherapy consists mainly of learning (i.e., a persistent change in client's cognitions and behaviors), theories and data from instructional design can inspire and enhance the development of computer-supported psychotherapies.

The comparison of CSP with instructional design has also revealed critical limitations of traditional psychotherapy, as:

a) its excessive focus on the therapist rather than on the therapeutic process, as an emergence of interactive contributions from clients, general practitioners and psychotherapists;
b) its discrimination of those who, for various reasons, cannot afford to approach the psychotherapist's office;
c)its lack of interest for the methods and media that may enhance learning in, psychotherapy.

Furthermore, we think that the time is ripe to reconsider psychotherapy. It is rather a process which takes place in the client's mind (the psychotherapist being only one of the several possible resources), and not an event exclusively occurring in the therapist's office, mediated by the therapeutic alliance.

Psychotherapeutic outcomes may be improved and even generated by relevant learning experiences, elaborated by analogy upon the general principles of instructional design and mediated by the digital technologies.

Multimedia learning and CSP

Multimedia learning refers to the use of media aiming to generate or enhance learning. Any multimedia application integrates at least three of the following types of presentation: text, data, graphics, audio, photographic images, animation or moving pictures (Shavinia & Loarer, 1999). The impact of media upon learning has become, during the last three decades, object of intense scrutiny and theoretical disputes (Clark, 2001; Mayer & Moreno, 2003). On the one side, Richard E. Clark strongly claimed that media is a "*mere vehicle*", stating that: "Computers make no more contribution to learning than the truck which delivers groceries to the market contributes to improved nutrition in a community" (Clark, 2001, p. 29). He has offered compelling evidence that the achievement gains attributed to the computer mode of delivery are probably due to the instructional methods (instructional designs) embedded in their software than to the media involved. On the other side, relying on an elaborated analysis of media capabilities and on a constructivist approach to learning, R. Kozma has argued that "medium and method have a more integral relationship; both are parts of the design. Within a particular design, the medium enables and constrains the method; the method draws on and instantiates the capabilities of the medium" (Kozma, 2001, p. 171).

Fortunately, the theoretical disputes have produced a substantial amount of empirical evidence that now permit the creation of a set of recommendations about what kind of media in which context *may* enhance learning.

As far as the multimedia presentation of psychotherapeutic contents is considered a critical strength of CSP, the transfer of empirically-based recommendations from e-learning to computer-supported psychotherapy has high heuristic value. Consequently, it is much better to capitalize on the knowledge accumulated across the boundaries of one's own discipline than to reinvent periodically the wheel.

The most salient results accumulated in multimedia learning relevant for the development of CSP are presented below:

a. ***Different media can be functionally equivalent.*** In other words, one can obtain the same cognitive effect with one media or another. For example, the available data show that for understanding a process, a simple animation is as effective as a complex video picture but, of course, it is much cheaper (Clark & Salomon, 2001). Thus, not the shallow aspects of the media, but their cognitive impact are of critical relevance for learning outcomes.

b. ***The use of picture with text increases recall only if the picture illustrates information related to the text*** (Dembo & Junge, 2003). The effect of combining picture + text is higher for poor readers and/or complex texts, but is very low or even disappears for simple text or expert readers.

c. ***The combined presentation (visual and auditory) results in better recall than visual-only or audio-only presentation*** (Kozma, 2001). The auditory presentation (i.e., narration) is more successful when associated with animation than with graphics or on-screen text (Mayer & Moreno, 2003).

d. ***Learning is improved when separate multimedia units are used proximally.***
For example, people learn better when graphics and corresponding words are placed near rather than *far* from each other on the screen. Similarly, learning is improved when animation and narration are presented *simultaneously* rather than delayed (Mayer & Moreno, 2003).

e. ***Learning is improved when "the narrator" has a human voice with standard accent, rather than a machine voice.***
Even when the software uses animated pedagogical agents (i.e., onscreen characters designed to offer feedback, assistance, and promote learning), their effectiveness is increased when they present guidance via a natural voice rather than via text.

f. ***Learning is improved when extraneous, non-necessary words, sounds or pictures are excluded from the message.***
Any irrelevant details, even those of positive emotional valence, overload the working memory and, therefore, reduce the learning performance. Thus, seductive details can make the context more interesting but dramatically

decrease learning. As Harp and Mayer (1997) have stated: "the best way to help learners enjoy a passage is to help them understand it" (p. 100).

g. *Characteristics of the media interact with the characteristics of the learner and the learning task*.

Prior knowledge, for example, may represent a critical individual difference influencing the efficiency of the learning process. Novices (i.e., learners with low prior knowledge) benefit more from multimedia presentations than experts (i.e., learners with high prior knowledge) do. Thus, integrating text and diagrams help novices but not experts; in other words, instructional guidance is more effective for novices but may interfere with the performance of the experts. In general, high knowledge learners are able to compensate for poor media, whereas low-knowledge learners are not (Reiser & Dempsey, 2007).

Shortly speaking, the research to date suggests that it is not the surface features of the media (e.g., whether it is a moving picture or a graph) that determine its effectiveness. Rather it is the functional features: how will a media (or multimedia combination) convey the intended message for a specific learner involved in a specific learning task.

CONCLUDING REMARKS

The basic assumption of our paper is that any successful psychotherapy is merely learning; namely, enduring changes in the behaviors and cognitions of our clients may be enhanced by several resources. Computer-supported psychotherapy is integrating human and technological resources with the explicit goal to provide salient learning experiences for symptom alleviation and personal growth. If our assumption is correct, then a conceptual and procedural transfer from e-learning to mental e-health is not only desirable but also scientifically valid. Sound knowledge regarding instructional design and multimedia user, accumulated from theoretical debates and empirical research, may facilitate the construction of multi-user psychotherapeutic platforms and enhance the effectiveness of CSP in general. The methods and multimedia which proved to be useful in e-learning are the best candidates for the challenging endeavor of creating computer-supported psychotherapy. Analogical thinking is, by the end, an essential tool for innovation and discovery.

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Chapter six

How to produce e-content for e-mental health solutions. Basic guidelines

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1. INTRODUCTION

The revolution of information and communication technologies (ICT) has already changed many of our work practices and daily routines. Entire areas of activity, from commerce and banking, to architecture or learning have been deeply penetrated by ICT and forced to change their faces. Moreover, the ubiquitous interaction with the digital world is beginning to change many attitudes and habits of the people. Mental health cannot escape these changes which represent a rather big opportunity than a threat.

Recent surveys show that 91% of the respondents had used the internet as their first choice when searching for information and help for their health problems (Risk & Petersen, 2002; Bessell, Anandarajan, & Umar, 2003) and the figures are even higher when talking about mental health problems, still associated with a substantial stigma in social mentality. Note also that the upcoming generation of digital natives (i.e., people who grew up interacting daily with digital technologies) is just reaching the age of maturity, meaning that the use of ICT for solving mental health problems will increase exponentially in the foreseen future.

In this context, the task to produce adequate e-contents for psychotherapeutic and counseling purposes has become very pressing for professional psychologists. The time is ripe for their therapeutic skills and

knowledge to be transferred and embedded in mental health soft-wares and e-contents, with maximum benefits for their patients. The traditional "talkative" psychotherapy – verbal intercourse in weekly face-to-face therapeutic sessions – should make more room for computer-assisted psychotherapy, with non-traditional patients (Goss & Anthony, 2003). The logic is simple: if the demand for mental health services is placed rather on the net, our offer of services should also be placed there, and the delivery processes should also take place in that medium.

2. THE CHALLENGE

Although we already have several clinical guidelines on how to use e-mental health solutions (NICE, 2006; ACA, 1999), there is no reference in the literature on how to produce adequate e-contents for those solutions. Most of the existent products on the market are mere digital projections of the classical self-help books, using a similar writing style. We claim that the digital medium and hypertexts are far different than the linear written text: they offer different opportunities, require new writing skills and afford different behaviors from both the producer and the receiver, thus a set of guidelines on e-content creation for e-mental health solutions is critically needed.

In our opinion, the guidelines for writing useful e-contents in psychotherapy or counseling are strongly determined by our answers to four types of questions:

(1) The user

a. What kind of users do you expect for your e-health solution?
   What characteristics and goals do they have?
b. What is their expected online behavior?

(2) The relationship

a. What kind of relationships should you develop with your users?
b. How do you build these relationships?
c. What is your role as a psychotherapist and e-content producer at the same time?

(3) The content and format

a. What content is the most effective?
b. What is the most adequate format to communicate the content?

(4) The environment

a. How to create the optimum digital environment in order to support user's goals?

Briefly put, the biggest challenge of the e-content writer for e-mental health solution is the following:

> *What kind of content, in what format and what environment are needed in order to provide the optimal support for the goals of the user?*

This conundrum must be addressed beginning with the design phase.

However, this should be the reference framework also during implementation, formative evaluation and testing of any e-mental health solution.

Unfortunately, the research on e-mental health solutions is yet in its infancy and unable to provide a sound answer for the stated problem. The guidelines already elaborated are rather general, addressing ethical or clinical standards, with no reference to the design of e-content.

In this context, we claim that a better starting point in answering the questions mentioned above is to capitalize on the know-how already accumulated in e-learning (Miclea, Ciuca, & Miclea, 2008). Our knowledge on e-learning is far more advanced than about e-mental health solutions, due to an earlier start of ICT use in education, especially as a critical tool for the development of distance learning (Mayer & Moreno, 2003; Clark & Mayer, 2003, Kozma, 2001). It is not the first time when progress in a specific area of psychology is promoted by methodological and conceptual transfer from other disciplines. Cognitive psychology, for example, has substantially capitalized on the "computer metaphor" and evolutionary psychology is heavily relying on a range of theoretical and methodological transfers from evolutionary biology. Therefore, we assume that putting together our knowledge about the traditional process of psychotherapy on the one hand, and about e-learning solutions on the other, we may have better chances to generate meaningful guidelines for writing adequate e-contents for e-mental health solutions. The outcome of our efforts to synthesize e-learning with classical psychotherapy is expressed in the guidelines presented bellow.

3. THE GUIDELINES

3.1. Enhance scanning

The users of e-contents are much more active than traditional readers.

Recent data emphasize that 79% of them rather scan the page than read it word by word (Campbell, 2004). We also know that reading from the computer screen is 35% slower than from paper and that the screen resolution is usually only 10-20% of a printed paper resolution (McMullin, Varnhagen, Pheng Heng, & Apedoe, 2002). Moreover, screens constantly refresh, causing eyestrains for e-readers who use to take frequent brakes and are constantly looking for clues about where most important ideas are located and how are they related to each other.

Thus, to enhance scanning and to facilitate user's detection of the structure and importance of information when writing e-texts, we need:

(1) to use short phrases, with simple sentence structure, organized in short paragraphs;
(2) to use short, informative headings, with names that conceptually relate to the relevant information;
(3) to use a variety of forms and levels of headings (font size, position, style, etc.) as a mean to emphasize information hierarchy (Kilian, 2001);
(4) to increase the font size and to use familiar fonts, usually *sans serifs* (Korolenko, 1997). The fonts should also be used consistently to convey the same function in various contexts; the typically recommended font size is 12 points (Tullis, Boynton, & Hersh, 1995);
(5) to use bright colors to attract the eyes.

3.2. Organize the information and knowledge in learning objects

In order to be learning-effective, information must be organized. In traditional texts, these organizers are lessons, chapters or paragraphs in a book. In a digital world, e-texts require another type of organization, called *learning object*. A learning object is a chunk of information which is confined to a single learning objective, allows specific assessment, its content is organized to match the specified objective, it is non-sequential (i.e., makes no reference to prior or future learning objects) and adaptable to fit a variety of learning situations and types of users. A relaxation technique that must be learned by a patient, for example, could be constructed as a learning object. It has a title, an expected result (i.e., learning goal) and several categories of information subordinated to the learning goal:

- scientific background,
- description,
- troubleshooting,

- assessment, and
- homework.

It is modular or non-sequential, because it can be learned directly, without other prerequisites. A well designed learning object also has the advantage to be reusable; it can be combined with other learning objects to create a learning environment or it can be adaptable to a broad cross-section of users. A specific relaxation technique, for example, can be combined with progressive desensitization, to create a therapeutic environment or it should be adjustable for the patients' comorbidities. It can also be used by the patient, to reduce his/her anxiety, as well as in a training course aiming to develop the know-how of the psychotherapists.

The learning object is the main organizer which guides the production and the use of e-contents. However, from a broader perspective, the learning object is just a particular case of chunking the information to make learning more effective and efficient. Several additional recommendations for effective chunking should be considered when elaborating e-text:

(1) Reduce text to a maximum 50% of the wording used for printed version.
(2) Archive long, academic-like documents in "Resources" or "Portfolios", but offer some hints or summaries about them in the main text.
(3) Avoid excessive details.
(4) Replace complex sentences with shorter sentences, using a simple structure. Try to use sentences no longer than 20 words, and paragraphs no longer than five sentences (Campbell, 2004).
(5) Use graphical signs to underline chunking. A vertical white space, for example, let the reader breathe, whereas horizontal white spaces provide a feeling of relief, by reducing text density. Thus, the vertical and horizontal white spaces increase readability of an e-text.

3.3. Enhance relationship

In traditional face-to-face psychotherapy, therapeutic relationship accounts for 30-45% of the effect size (Richardson & Richard, 2006), much more than the impact of a specific technique, which varies between 10-15% of the effect size (Bohart, 2000). The e-mental health solutions provide a therapist-patient relationship mediated by the computer, either by e-mail, messenger or video chat.

Of course, none of these exclude the possibility of face-to-face (traditional) psychotherapy, but this is rather the exception, not the rule.

The role of the psychotherapist in e-psychotherapy is different than his role in traditional psychotherapy: one is rather a *facilitator* than a provider of psychotherapy. The therapeutic process is taking place inside the mind of the

patient and the therapist's role is rather to facilitate this process by offering adequate resources and assistance during the process. It is patient's self-healing capacities which make therapy work (Bohart, 2000). The psychotherapist is a designer, one who diagnoses the problem, creates adequate resources and offers assistance for the patient.

The patient is the healing agent: he/she actively uses the resources and guidance provided by the psychotherapist via e-technologies to alleviate the symptoms and to promote personal development. Therefore, the e-psychotherapy should improve the patient's control over the psychotherapeutic resources and their use. It can be done by considering the following guidelines:

(1) *Use three layers of information.*

The research conducted in e-learning show that the essential information should be contained in maximum three screens (Horton, 2000; Clark, 2001).

First click must provide the framework and the essential information; the second click makes extensive information available, gives access to various tools and exercises, and more sophisticated information; the third click offers an extension to further details.

If the patient's needs are not satisfied by the information offered after these three clicks, he/she will, very likely, quit. Inside one screen, the reader uses preeminently the information located in top-central position. Usually, the reader looks first at top-center, than left and right, and then scrolls down, a behavior called in e-learning "the inverted pyramid reading style" (Kilian, 2001).

Layered information increases the reader's control. It is his/her decision when and for what topics extensive information is useful and is worth to be accessed. The patients are actively involved and responsible for the construction of their mental representations about a given topic whereas the guidance offered by the psychotherapist is inherent in the design of layered information.

(2) *Use side heads, sidebars and keywords* in the margin, to provide hints and context.
The "hit and run" behavior of the e-readers will take benefits from any clue.

(3) *The interfaces must enable users' interaction.*
The design of the interfaces is relying on a prior identification of the users' goals; therefore, a well designed interface provides the means to achieve them.

For example, in any kind of psychotherapy, the patient has several specific goals:

a) to receive an accurate diagnosis;
b) to have an explanatory model about the experienced symptomatology, the meaning and functions of experienced symptoms;
c) to have a prognosis about the evolution of symptomatology and the effectiveness of treatments;
d) to be informed about various treatment choices in order to have an informed decision;
e) to follow an effective treatment program;
f) to have periodical feedbacks about the efficacy and effectiveness of the selected treatment;
g) to have assistance and support from psychotherapist during the psychotherapeutic process;
h) to communicate with people experiencing similar symptoms.

Consequently, as a user-centered design, any e-psychotherapy solution must address all these goals and provide a friendly and transparent interface, able to satisfy them. Patient's goals also became the reference framework for the evaluation of the design solution.

(4) *The interactions with multimedia content (audio, video, animation) must be designed for the user's control.*

The user, not the designer, is to decide whether to start, stop, replay, use or re-use multimedia materials.

3.4. Use multi-media formats efficiently

The information and communication technologies offer the possibility of an extensive use of multimedia content for e-mental health solutions. One may offer an animation about the neuropsychological process underlying a specific symptomatology, a video case presentation or a therapeutic technique, difficult or impossible to conceive without digital technologies. However, any images, audio, animation or video comes with significant overhead for the user:

- installing plugins,
- enduring delays,
- downloading files, etc.

An efficient use of multimedia should consider the following guidelines, supported by the recent research in e-learning (Mayer & Moreno, 2003; Kozma, 2001):

(1) Break complex video/animation into smaller units (chunking).
(2) Provide a balance between verbal and visual elements.
(3) Present an image, video, animation or graphs in close proximity to related text.
(4) Audio should support other texts.
(5) Redundancy is critical. The visual media should not present a different concept than the adjacent text (Hannafin & Hooper, 1989).
(6) Provide information about the media in use (e.g., previews, descriptions, summaries, thumbnails) so that each user can take informed decisions.

3.5. Create a psychotherapeutic environment

The idea of psychotherapeutic environment is similar to what is called in socio-constructivist theory of learning – learning environment. A psychotherapeutic environment refers to a deliberate digital arrangement of e-contents, formats, users (with their goals), and relationships among them aiming to catalyze the existent healing forces inside the patient.

The best implementation of a psychotherapeutic environment can be provided, in our opinion, by a multi-user platform. For example, *PAXonline,* a multi-user platform dedicated to the prevention and psychotherapy of anxiety disorders is aiming to provide such a psychotherapeutic environment. Through the platform, the patients interact with their general practitioner and with psychotherapists. On the platform, they find assessment tools, communication tools and e-contents in various formats to help them explain and understand their symptomatology. They may enroll in specific therapeutic programs and benefit, at their choice, by the virtual assistance of a certified psychotherapist. They may communicate with other patients via forums and receive constant feedbacks about the outcomes of the treatments. All guidelines we have mentioned above have been taken into consideration in the design of our solution. Still in the beta phase, *PAXonline* is very promising as a psychotherapeutic environment in facilitating the inner psychotherapeutic process, taking place in the mind of the patient (see www.paxonline.ro).

4. CONCLUSIONS

The guidelines presented in prior paragraphs should be considered as heuristics, not as normative rules. As any heuristics, they reduce the problem space and improve the problem-solving process, but they do not guarantee the optimal solution. No doubt, producing e-content is a permanent learning process: one elaborates some contents; these contents are evaluated through a peer-review process, than recalibrated and tested again with real users until a satisfactory solution is achieved. Any e-content should be revisited and upgraded periodically.

However, as we have underlined in our paper, writing e-content for e-mental health solution can benefit from cognitive transfer of the knowledge accumulated in e-learning. Moreover, we can enrich the basic guidelines presented here with additional heuristics, for specific types of solutions, used in specific contexts.

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Chapter seven

Computer-mediated psychotherapy. Present and prospects. A developer perspective.

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1. CONCEPTUAL CLARIFICATIONS

There is a burgeoning terminology related to the use of computers in providing psychotherapy services. Terms like "computerized psychotherapy", "computer-aided psychotherapy", "e-therapy", "computer-supported psychotherapy", "web-based or internet-based psychotherapeutic interventions", "computer treatments", "computerized cognitive-behavior therapy" are often used interchangeable, covering large arrays of somehow different realities (Marks, Cavanagh, & Gega, 2007; Titov, 2007).

Such terminological disarray is rather typical for any young and emerging field of research and practice, in any research or technology domain when at the beginning it is difficult to see the forest beyond the trees. However, at least for pragmatic reasons, we consider that any computer application which aspires to be a psychotherapeutic tool must satisfy concurrently at least the following three constraints:

(1) it is explicitly created to serve a psychotherapeutic purpose;
(2) it implements the principles and methods of a bona fide psychotherapy (i.e., a psychotherapy pretending to be therapeutic, offering viable treatments);
(3) it involves the beneficiary (the client) into a range of psychotherapeutic activities.

Relying on these constraints, we shall not consider blogs, podcasts, online support groups, online assessment or therapeutic video presentations as computer-mediated psychotherapy. They may have psychotherapeutic valence, but they have not explicit psychotherapeutic purpose, they do not implement the principles and methods of a specific psychotherapy (e.g., cognitive-behavioral therapy, problem focused therapy, psychodynamic, experiential therapy, etc.), and they do not require an active involvement of the recipient clients. By the same token, the websites which are created for educational or informative purposes, although they may have incidental psychotherapeutic effects, should not be considered computer-supported or computer-aided psychotherapy.

In other words, we apply at the digital world the same logic as for the real world: although there are many social endeavors that could have psychotherapeutic impact, they do not qualify for the specific category of activities called psychotherapy.

In short, computer-mediated or computer-aided psychotherapy – we use these terms as equivalents – should be reserved only for those computer applications that have an explicit psychotherapeutic purpose, that implement the principles and methods of bona fide psychotherapy and that involve the recipient into psychotherapeutic activities. A large range of problems concerning the effectiveness, efficiency or feasibility of computer-mediated psychotherapy, its place in the mental-health care system, or the relationship with other e-health solutions become more manageable when operating with a restricted category as we have proposed above than with an omnibus concept. As we know, those categories which are very inclusive automatically lose their epistemic power; or, in the words of Spinoza: "*Omnis determinatio negatio est*".

Another aspect that should be clarified refers to the fact that computer-mediated psychotherapy (CMP) covers a large range of possible psychotherapist's involvement in psychotherapy carried-out by computer applications. It varies from none involvement, as in self-help web-based interventions (Panic Centre, http://www.paniccenter.net, Overcoming Depression on the Internet – ODIN, http://www.kpchr.org/feelbetter or CD-ROM software - Cool Teens CD-ROM) to minimal assistance and to weekly classical therapeutic sessions complemented with home assignments and resources from a computer application.

The client's modalities to access the psychotherapeutic software are also variable, from offline or stand-alone personal computer (e.g., Overcoming Depression, a Calipso product from Media Innovation Ltd) to internet websites (e.g., Beating the Blues, http://www.ultrasis.com, Panic Online, http://www.med.monash.edu.au), or both modalities for the same application (Standalone Fear Fighter and net Fear Fighter, http://www.fearfighter.com).

The range of mental disorders addressed by computer-mediated psychotherapy is rather limited, but quickly expanding, with anxiety disorders and depression ranking first, followed by web-based interventions for smoking

cessation, drinking, body-image, weight loss, tinnitus distress, insomnia, and sexual problems (Barak et al., 2008). Marks, Cavanagh, and Gega (2007) make references to 97 computer-aided psychotherapy sites and 175 published and unpublished randomized controlled trials, case reports, small pilot and large open studies. In terms of type of therapy implemented by computer applications, behavioral therapy is, by far, the most prevalent. In fact, computer-mediated psychotherapy is almost coextensive with so called cognitive computer-mediated psychotherapy (CMP = CCMP). The reasons are twofold: CBT is manualized and easier to implement on a computer application and its efficacy had been extensively validated (Westen, Novotny, & Brenner, 2004; Westen & Morrison, 2001).

2. The present status of computer-mediated psychotherapy

The present status of CMP is rather promising (Barak et al., 2007; Marks, Cavanagh, & Gega, 2007). Repeated meta-analyses of randomized clinical trials (RCT) studies where CMP was compared with various control groups emphasized an overall weightened effect size of medium intensity (Barak et al., 2008; Marks, Cavanagh, & Gega, 2007). For example, in a comprehensive review and a meta-analysis of 92 studies concerning internet-based psychotherapeutic interventions, Barak et al. (2008) reported an overall weightened effect size of 0.53. Similar conclusions are obtained by Titov (2007), Murray et al. (2005), Przeworski and Newman (2006). However, we should consider that the variation of effect size reported in these studies is very large, from a minimum effect size (ES) of -0.10 (Richards, Klein, & Austin, 2006) to 1.68 (Strecher, Shiffman, & West, 2005).

There are many explanations for this variability, from the type of outcome measures used to the type of control group or the methodological quality of the study (Marks et al., 2007, 2010; Titov, 2007). The efficacy and the effectiveness of CMP is easier to appreciate, if put in the context of the efficacy of face-to-face or medication therapy (see Table 1).

Table 1
Illustrative effect size from meta-analyses of treatment outcome studies

Nr.	Treatment type	Effect size	No. of studies or meta-analyses	Reference
1.	Various therapies and disorders	0.75	18 meta-analyses	Lipsey & Wilson, 1993
2.	CBT and behavior various disorders therapy,	0.62	23 meta-analyses	Lipsey & Wilson, 1993
3.	CMP, various disorders	0.53	92 studies	Barak et al., 2008
4.	Antidepressant (FDA registered studies 1987-2004)	0.31	74 studies	Turner et al., 2008

The median effect size presented by Lipsey and Wilson (1993) to general psychotherapy is congruent with those reported by Smith et al. (1980) – ES = 0.85 (465 studies), Robinson et al. (1990) – ES = 0.73 (37 studies), Wampold et al. (1997) – ES = 0.82 (comparing 277 effect sizes). Similarly, the median effect size of 0.62 for CBT is in the range of the results obtained by Őst (2008) – ES = 0.58 (13 studies), Haby et al. (2006) – ES = 0.68 (33 studies) or Cuijpers et al. (2007) – ES = 0.87 (16 studies). The effect size for CMP of 0.53, reported by Barak et al. (2008), are similar to the effects reported in many other reviews (Spek et al., 2007 – ES = 0.22 for depression, and ES = 0.96 for anxiety in 12 studies; Wantland et al., 2004 – ES varying from -0.01 to +0.75 in 22 studies).

The main conclusion we can draw from these data is that CMPs produce effects comparable with those reported for face-to-face therapy or medication. In fact, from 92 studies included in one meta-analysis (Barak et al., 2008), there are 14 that directly compared the internet-based (n = 940) with face-to-face (n = 593) treatments. The weightened ES for internet-based interventions was 0.39, whereas the ES for face-to-face treatment was 0.34, a difference statistically non-significant.

At least for a developer of CMP systems, the message provided by these data is optimistic; it says: "keep going, you are on the right track", which is a necessary and sufficient condition to promote further innovations.

The second lesson we can learn from reviewing meta-analyses dedicated to CMP is that the effectiveness and efficacy improve when computer applications are hybridized by a minimal contact with a therapist or other professional. We can read this impact on two variables: the attrition rate and the effect size. Although CMP could reduce therapist hours with more than 70% (NICE, 2006), for the computer applications which do not allow a minimum contact with a professional (by email, video telephone) we found a very large attrition rate and a reduced effect size (Titov et al., 2008). Barak et al. (2008) reported for therapies implemented by interactive sites the ES = 0.65, whereas the interventions supported by static sites have ES = 0.52, a difference statistically significant.

Moreover, Carlbring et al. (2005) found an ES = 0.78 for an internet application with no specialist contact and an ES = 1.10 when a minimal specialist contact by telephone was added.

Similarly, Anderson et al. (2006), using a Swedish-developed program for social phobia, obtained an ES = 0.80 and a completion rate of 3% at post-treatment. On the same program, when Carlbring et al. (2007) added a minimal therapist email contact, they obtained an ES = 0.95 and the treatment adherence raised to 93%. In a similar vein, Spek et al. (2007) found that computer-mediated interventions with therapist support have a large effect size, ES = 1.00, whereas interventions without therapist support had smaller effect size (ES = 0.24).

To summarize, there are now enough data to conclude that the most successful CMPs are relying on hybridized form. We find a similar pattern of

evolution in e-learning which has evolved toward **blended learning**, a mixture of pure e-learning and face-to-face learning. Which is the best possible blend of computer application and human support is still a question to be addressed by the research, but the superiority of blended solution over pure computerized solutions is an evidence-based conclusion.

The third critical aspect of CMPs refers to the feasibility/usability and costs. There are, no doubt, a series of advantages and costs of using computer-mediated psychotherapy. Table 2 summarizes the most relevant benefits and costs associated to the present CMPs (see also Marks et al., 2007; NICE, 2006).

Table 2
Benefits and costs of CMP

Nr.	Benefits/advantages	Costs/disadvantages
1.	Large dissemination of standardized yet individualized treatments	Process of communication is impaired (e.g., non-verbal hints about patient are difficult to detect)
2.	Inclusion of screening and diagnostic tools	High cost for development and accreditation of CMP
3.	Reduced costs for the client	Technophobia of the users (more present among therapists than among patients)
4.	Increased availability of intervention (spatial, temporal, financial)	One size does not fit all.
5.	Reduced stigma	Inability to detect and deal with complications of the patient's symptomatology
6.	Possibility to monitor self-progress and offers systematic feed-back for the users.	
7.	Can increase the treatment capacity of trained therapist, due to reduced time required/patient	

Besides costs and benefits, one of the basic things we must realize is that the use of computer/web-based applications to deliver psychological interventions is already a fact. Our clients put their demand for mental health information and help on the net. Proudfoot et al. (2007) reported, for example, that 80% of internet users in USA and 4 out of 5 in Australia, with internet access, actively seek healthcare information and help on the internet.

Information about mental health issues is most regularly sought, with depression, bipolar disorders and anxiety problems accounting for 42% of the information sought (Proudfoot, 2004; Taylor, 1999). A survey in UK, among potential users for self-help psychotherapies found that 91% of the respondents wanted to access self-help via a computer application (Graham et al., 2001).

These are clear indications that users of CMP report high satisfaction; the drop-out rate (when hybridized with minimal professional intervention) is similar to face-to-face psychotherapy and, sometimes, self-disclosure is easier on the internet than in the therapist's office (Proudfoot, 2004). It is also to

mention that, for the new generations, the so called "digital natives", interacting with the computer system will become a kind of "default value" for their daily behavior.

The logical conclusion from the aspects presented above is very simple: **if our clients put their demand on the internet, than we shall put our offer there too!**

This does not mean the end of face-to-face psychotherapy, but, we hope, it is the end of an overwhelming **reactive attitude** from the part of mental-health services and psychotherapy. Traditionally, psychotherapists do nothing to promote their services beyond the psychotherapeutic sessions. They are rather self-centered than proactive, waiting for patients to reach their offices than to make treatment more accessible for the clients. If we will continue to wait and offer our psychotherapies only for those who knock on our offices' doors, pretty soon we will be over-passed by the reality.

There are few studies about the cost-effectiveness of CMPs, but the fact that a public regulating body like NICE (National Institute for clinical Excellence), after a comprehensive analysis of efficiency and cost-effectiveness, has already recommended Beating the Blues (for depression and anxiety) and Fear Fighter (for panic and phobia) to the National Health Services, is very relevant. Of course, we need now a financial model, so that individuals can purchase treatment, insurance companies pay for treatments and providers charge for development and usage of treatments. As Ritterband et al. (2003) have put it: "Without some financial framework, these interventions will not survive, regardless of how effective they are found to be" (p. 532).

After this concise analysis of the present situation, shall we continue to develop computer-mediated psychotherapies? The answer is a qualified **Yes**.

Besides the methodological variations and theoretical idiosyncrasies, we can say that:

(1) the efficacy of CMPs is comparable with the traditional face-to-face psychotherapies;
(2) hybridized forms (computer application + minimal therapist involvement) clearly increase the effect size and have been proved to be superior to purely computerized psychotherapies;
(3) the benefits of CMP exceed the costs (at least for the patients and mental-health system, if not for the developer). Moreover, given enough time and resources, any technical problem or deficiency of a CMP system can be fixed;
(4) the people in need for assistance for mental health problems put their demand on the internet. We should put our offer there too, not only inside our own offices.

3. PAXONLINE – A CMP FOR ANXIETY DISORDERS

Relying on the comparative analysis of three existent CMP systems, we created a multi-user platform for the prevention and psychotherapy of anxiety disorders – PAXonline, which already passed the beta-testing phase.
The web-based platform is designed to be used by three categories of users: patients, psychotherapists, and family physicians, with the explicit purpose to integrate mental-health care efforts.

There are two levels of access: visitor level and user level. At the visitor level, which is free of charge, any visitor has access to a range of resources related to anxiety disorders. One can learn about the characteristics, etiology, prevalence or type of available treatment for anxiety disorders.

There are also two screening instruments available. After self-administration of the first screening, one can learn whether it is **possible** or not to have an anxiety problem. The second screening provides an automatic response in terms of which anxiety disorder is most likely for the respondent. There are also three short (7 minutes each) videos which show how to further use PAXonline, from the perspective of a patient, a family physician or a psychotherapist. Thus, after operating at the visitor-access level, one can know:

a) whether it is possible/probable to have an anxiety disorder,
b) what does it mean and which are the available treatments, and
c) what to expect from the further use of PAXonline.

The second level of access is protected and differentiated on the type of the user: patient, psychotherapist or family physician. After the filling of a registration form and paying an access fee, the patient receives a user name and a password via e-mail. From now, all the personal data are encrypted and confidentiality is guaranteed.

The patient accesses a personalized homepage, where one has available:

(1) advanced diagnostic tools, adapted for Romanian population;
(2) psychotherapeutic programs for each specific anxiety disorder;
(3) a personal portfolio where are saved personalized modules of psychotherapeutic treatment, assessment results, specific resources, and one can keep a personal diary;
(4) access to a psychotherapist, either asynchronous (via e-mail) or synchronous (via video-chat and a kind of messenger system);
(5) specific resources for prevention and psychotherapy of any anxiety disorder;
(6) a patient dedicated forum, moderated by a psychotherapist and a family physician.

The core of the platform – the psychotherapeutic programs for each anxiety disorder – consists of about 12 modules/program, aiming to produce and catalyze the psychotherapeutic process inside the patient's mind. The multimedia modules can be covered with or without psychotherapeutic assistance, upon the decision of the patient. If a patient chooses to be assisted by a psychotherapist, than his/her psychotherapist has access to his/her personal portfolio and can further personalize and make the treatment even more flexible.

A family physician using PAXonline, after filling the registration form, accesses his/her homepage, which allows him/her to:

(1) administer screening instruments for anxiety disorders;
(2) refer his/her patients to PAXonline, where one has access to psychotherapeutic programs and additional resources, with or without psychotherapeutic assistance;
(3) access psychotherapeutic programs and specific resources;
(4) use a digital patient register;
(5) access a professional forum on the topics of anxiety disorders, specially designed for family physicians.

The psychotherapists who use PAXonline must be certified by the Romanian College of Psychologists and have special credentials for computer-mediated psychotherapy. Using PAXonline, they can:

(1) access psychotherapeutic programs for anxiety disorders, which they can calibrate according to the specific characteristics of a specific patient;
(2) offer assistance to their virtual patients via video-chat or e-mail;
(3) use a digital patient register, for the management of patients, treatments, assessments and resources;
(4) supervising (or be supervised by) other psychotherapists;
(5) access to dedicated professional forum and advanced resources for psychotherapeutic approach of anxiety disorders.

PAXonline can be used by the psychotherapists either as a virtual clinic where one meets his/her patients or as a supplement for face-to-face psychotherapy.

A short comparison of PAXonline with other CMP systems is provided in Table 3.

Table 3
Comparison between PAXonline and other computer-mediated psychotherapies

CMP / Features	PAXonline	"Beating the Blues"	Fear Fighter (FF)	Panic Center	"Moodgym"
Whom does it apply to? The beneficiaries.	Patients Psychotherapists General Practitioners (GP)	Patients Experts can give the patients auxiliary support, but they don't benefit from any specific resources.	Patients (adults)	Patients (adults)	Patients (15-25 years old)
The approached problems	The prevention and psychotherapy of anxiety 7 programs – one general program and 6 specific programs, one for each type of anxiety disorder	Anxiety and depression	Panic disorder and specific phobias	Panic disorder and agoraphobia	Prevention of depression in adolescents
The time, no. of sessions	3 months for patients 1 year for psychotherapists Unrestricted time period for GP An introductive video session specific for each user 7 programs of 10-12 modules each	A 15 minutes introductive video session 8 sessions of 50 minutes each	10 weeks (3 months) 9 modules	16 weeks 9 main modules and other 7 additional modules	6 weeks 5 modules

Table 3
Comparison between PAXonline and other computer-mediated psychotherapies (cont.)

CMP / Features	PAXonline	"Beating the Blues"	Fear Fighter (FF)	Panic Center	"Moodgym"
Aspects of usage, locations, accessibility	Online Can be accessed directly from internet, through GP's referral or psychotherapist's referral	Organized setting: clinics, private offices; also online access. Flash technology GP's referral	Standalone FF Net FF FF education Only by GP's referral	Online	Online
Available human support/assistance	Psychotherapeutic assistance offered only by request, via mail, messenger or video chat.	5 minutes before each session and another 15 minutes top after each session (at the clinics)	5 minutes before each session and another 15 minutes top after each session (at the clinics) Helpline facilitators – via phone or mail (net FF) – maximum 1h	Support group on forum Further discussions with other patients or the forum moderator via instant messenger	None
Conducted evaluations/ assessments	Preliminary screening Advanced evaluations Evaluations conducted at the beginning and the end of each module	An evaluation is conducted, at the beginning, in order to rule out the people suffering from psychotic and bipolar disorders, drug addiction problems and the suicidal-prone persons. Initial and final evaluation conducted each session	An evaluation is conducted at the beginning in order to rule out the people suffering from psychotic and bipolar disorders, drug addiction problems and the suicidal-prone persons. Initial and final evaluation conducted each session	Initial and final evaluation conducted each session or by patient's request	There are 2 anxiety and depression questionnaires at the beginning of each module

Table 3
Comparison between PAXonline and other computer-mediated psychotherapies (cont.)

CMP / Features	PAXonline	"Beating the Blues"	Fear Fighter (FF)	Panic Center	"Moodgym"
Basic components	Psycho-education Cognitive-Behavioral Therapy Homework	Cognitive-behavioral therapy Homework	Cognitive-behavioral therapy Homework	Psycho-education; elaborated answers and questions Cognitive-behavioral therapy Homework	Online exercises Games Relaxation tapes Cognitive-behavioral therapy Homework
Additional options	Personal portfolio Forum–one for each type of user Basic and specific resources and information Advanced evaluation Rewards within the programs Real life stories Characters used to illustrate the whole process of treatment Audio versions Personal diary Dictionary Troubleshooting – support in case of difficulties	User's journal or notebook Goals setting 5 video case-studies are used as illustration	Goals setting Troubleshooting – support in case of problems, difficulties. Real life stories – short quotations, appraisals and opinions.	Drugs dictionary Panic dictionary Support group – expert mediated forum Instant messenger Mood Tracker – a type of journal where patients can write online daily about their mood, panic attacks. Goals setting; one can compare his/hers goals with the others' Other users' confessions	User's journal or notebook
The navigation pattern	Proposed navigation path, but the user can choose the navigation pattern by him/herself. The psychotherapists can adjust the intervention based on the patients' progress and needs	Compulsory navigation path 1 weekly session	Compulsory navigation path 1 weekly session	The first session is longer and compulsory. The other sessions are all available by choice	Compulsory navigation path

To summarize, PAXonline integrates the specific efforts of patients, psychotherapists and family physicians, in order to promote mental health and it is the cornerstone of a stepped-care approach in anxiety disorders. It is focused on catalyzing psychotherapeutic process inside the patient's mind and on optimizing his/her help-seeking behavior. All actors involved are empowered to contribute synergically to the psychotherapeutic process (see www.paxonline.ro for further details).

THE PROSPECTS

Three interrelated aspects we consider relevant for the future impact and development of CMP:

a) focus on help-seeking behaviors;
b) a reconceptualization of psychotherapy, and
c) the knowledge-transfer from e-learning.

1. Focus on help-seeking behavior not on symptom alleviation

The present situation in mental-health care is somehow paradoxical: on the one hand, we have a very high prevalence rate of mental disorders and a huge incumbent burden, and, on the other hand, we have an extremely reduced accessibility of psychotherapeutic services.

A large number of epidemiological studies show an increased prevalence of mental health problems. Depression, for example, is becoming the second leading cause of disability, worldwide, and about 29% of the population develop an anxiety disorder over lifetime (European Commision, 2005). In a review of 27 studies about the size and burden of mental disorders in Europe, Wittchen and Hoyer (2002) revealed that 17% of the European adults have experienced at least one mental illness. The overall prevalence rate of anxiety in children and adolescents has exceeded 10%, and about up to 30% of adolescents exceed the clinical cutoffs in self-reported indices of depression (Collins et al., 2004). Moreover, anxiety and depression tend to be chronic and recurrent. Only 39% of the patients with panic disorder show remission in 1 year follow-up (Keller et al., 1994), and between 50-85% of depressive patients experience multiple episodes (Coyne et al., 1999).

The economic, personal and social burden of anxiety and depression is huge. Only in the USA, anxiety disorders costs have been estimated to 42.3 billion of dollars/year and for depression they rise to about 44 billion dollars/year (Greenberg et al., 1999; Collins et al., 2004).

In Europe, the overall economic cost of mental illness is estimated to 3-4% of GDP and it represents the major cause for disability pensions and for early retirements.

On the other hand, only 14.3% of those with a 12 months psychiatric disorder and only 40% of those with a life-time disorder have obtained a professional treatment in the past year (Wang et al., 2000). Similar data on a community survey of major cities in Canada show that only 5% and only 1.4% of individuals with depressive and anxiety disorders, respectively, had ever consulted a psychiatrist. Overall, it has been estimated that only 15.3% of those with a serious mental illness have received adequate treatment (Wang et al., 2002, Collins et al., 2004) and fewer than 14% of people with a neurotic disorder were currently receiving any form of professional treatment (Bebbington et al., 2000).

A short analysis of the help-seeking behavior of a person with mental health problems could explain this rather paradoxical situation (see also Collins et al., 2004).

When facing a mental-health problem, the one's help-seeking behavior is confronting with a series of obstacles related to him/her, to the family physician, the psychotherapist, and mental-health system as a whole.

The barriers within refers to:

a) reduced perception of need for treatment, people being prone to perceive mental problems as transient and to deny or minimize their severity (Mojtabai, 2002);
b) desire to handle problems on his/her own and fear of stigma;
c) preference for informal helping support network, from friends or relatives (Barker et al., 1990; 2002). In fact, people are actually implementing a "stepped-care" procedure: they try to get help from everyday environment and only if they are failing, then, eventually, look for professional/formal help;
d) lack of awareness of available treatments and negative stereotypes about treatments (Christiana et al., 2000);
e) reduced readiness for change (O'Hare, 1996), according to Prochaska's stages;
f) costs (time, money etc.).

Once these obstacles are over passed, the typical behavior of the afflicted person is to seek help from the family physician (general practitioner). Indeed, the family physicians are real gatekeepers of the mental-health care system; about 83% of those with anxiety and depression paying visits to family physicians, and they usually stop there (Ohayon et al., 2000).

The main obstacles for a help seeker at this level refer mainly to:

a) lack of screening instruments and other adequate resources for mental health problems. This aspect is testified by a huge under detection, at this level, of mood and anxiety disorders, especially. For example, only 15% of anxieties and 36% of depressions are detected by the family physicians (Ustun & Sartorius, 2002);
b) reduced training of the general practitioners/family physicians for the management of mental-health care problems;
c) structure of practice (centered on treating organic pathologies and reduced willingness to approach mental health problems);
d) reduced or no connection with psychotherapeutic services.

Supposing now that a lucky person is among those 15% whose anxiety was detected by the family physician and has received adequate primary care, being afterwards referred to a psychotherapist. At this level, the person is confronted with other barriers, among which we mention:

a) difficulties in accessing psychotherapists (e.g., financial costs, time schedule, geographical obstacles);
b) insufficient training in evidence-based psychotherapy (and CMPs);
c) cultural and axiological differences between client and psychotherapist;
d) stigma associated to psychological treatment (e.g., very sensitive groups: policemen, military, etc.) and lack of compliance, which produce a drop-out rate of 35-47% (Marks, Cavanah, & Gega, 2007);
e) limited efficacy of face-to-face psychotherapy (e.g., around 50% for anxiety and depression treated by CBT – NICE, 2006; Butler, 2004).

Moreover, besides internal barriers and obstacles related to the general practitioner (family physician) and to the psychotherapist, the chances for an adequate treatment of mental disorders are further reduced by the lack of integration of mental services with primary care settings. In most countries, mental health care system is a **reactive system**; it waits for clients to be correctly identified and referred for treatment. It does not pay any attention to help-seeking behavior of the person in need. There are no pre-established shared responsibilities in mental health care management between the general practitioner and the specialists.

There are major difficulties in knowledge transfer (including lack of an adequate infrastructure) between specialists and family physicians and a reduced support for clinical innovation to supplement existing treatments and address the problem of reduced accessibility. With a specific reference to CMPs, professionals are more conservatives than clients in using this new technology. For example, more than 90% of British behavioral therapists answered that

they would consider using computer-based self-help applications in helping clients, but only 2% were actually using it (Whitfield & Williams, 2004).

To resume, the existent system of psychotherapy is focused on **symptom alleviation**, not on **help-seeking behavior of the person in need**. We have outlined above the consequences: a reactive system, able to offer health improvement only to that minority who overcome all the obstacles mentioned above.

The time is ripe now that CMP should focus on help-seeking behaviour for those confronted with mental health problems. We must facilitate clients' efforts to overcome internal barriers, enhance primary care with screening instruments and knowledge transfer, and improve accessibility and know-how of psychotherapists.

Compared to the traditional face-to-face psychotherapy, CMP can bring a substantial added value to the mental health care by actively matching the needs at any stage of help-seeking behavior and offering adequate solutions to remove obstacles. Not only symptoms alleviation, but the whole Odyssey of help-seeking should be the central focus of CMP.

2. Reconceptualization of psychotherapy

Despite an intensive use in the last one hundred years, the term "psychotherapy" is still ambiguous. It has two dominant meanings, denoting:

(1) a doctrine (theories, principles and methods) of the psychological treatment;
(2) a psychological treatment per se, for mental disorders.

The first meaning is used when we talk about "cognitive-behavior therapy", "client-centered psychotherapy", "analytic psychotherapy", "behavior therapy" etc.

The second meaning is prevalent when we refer to the set of activities and procedures used by the psychotherapist to improve the mental health of his/her client. Psychological treatment is very much conceived as a medical treatment: there, in the activities and procedures during psychotherapeutic sessions, we should find the "active substance", the factors responsible for symptom alleviation. The patient is the recipient of the psychological treatment (i.e., psychotherapy) that cures him/her, in a similar way as he/she is the recipient of the medication. And, because in any medication treatment there is one or more active substances that produce the change, we should look for the **active factors** in psychotherapy that can account for the client's improvement.

Unfortunately, despite the huge amount of research, we are still far from identifying the mechanisms of change in psychotherapy (Kazdin, 2007, 2008; Shedler, 2010) and this is because we look for them in the wrong place. The fact that the therapeutic alliance accounts for a large proportion (about 30%) of the outcome variance says nothing about the mechanisms of change.

The alliance itself could be an outcome of symptom change occurring before the alliance. Thus, we don't know whether alliance occurs before or after (partial) symptom alleviation and we have no hints about the unfolding process: how psychotherapeutic relationship unfolds to produce client's improvement (Kazdin, 2008, 2007). The very same considerations apply even more to those factors which account for even less of the outcome variance: psychotherapeutic technique (15%), characteristics of the client or characteristics of the therapist.

We think that computer-mediated psychotherapy must make a difference between **psychotherapy**, as a psychological treatment and **psychotherapeutic process**. The psychotherapeutic process is an internal process, not an external activity (or set of activities). It is an internal process taking place in the mind of the client; there we should look for the mechanisms of change, not in the psychological treatment.

The client is the active agent of change: one operates on the inputs provided by the therapist (techniques, relationship, etc.) or by other sanogenic sources (e.g., informal network of help) to produce mental health enhancement (Bohart, 2000). Just as learning could be promoted by a good teaching, yet learning is different that teaching and can take place without teaching, so the psychotherapeutic process could be facilitated, promoted, by a good psychotherapy, yet it is different than psychotherapy and it can be promoted by many other factors than psychological treatment.

Once considering that the client (i.e., the psychotherapeutic process) is critical, not the psychotherapy, the basic problem of CMP is stated as follow:

> *What kind of resources, in what type of format, provided for which actor involved, catalyze the psychotherapeutic process?*

Adequate resources (knowledge, procedures, feed-backs, interpretation, reinforcements etc.) provided for the appropriate actor (patient, psychotherapist, family physician), in an appropriate format, should be the main commitment of the CMP in the future. What our client does with what we offer is much important than what we offer. What happens in the head of our client, not what we, as therapists, do during the psychotherapeutic session, it is the critical factor for change. The failure to discover the mediators and mechanisms of change in psychotherapy (Kazdin, 2007, 2008; Shedler, 2010), the repeated findings that the efficacy of bona fide psychotherapies are roughly equivalent ("Dodo bird conjecture") (Wampold et al., 1997; Westen et al., 2004), the reduced importance of psychotherapeutic alliance in web-based interventions (Knaevelsrud & Maercker, 2007), the high satisfaction reported by patients who have used CMP and a drop-out rate equivalent to face-to-face therapy (Proudfoot, 2004) constitute additional arguments that we should put not the psychotherapy but the client in the center of our preoccupation.

To conclude, we should create therapeutic designs that enhance psychotherapeutic **process** wherever it occurs: at the patient's home, at the general practitioner premises or in the psychotherapist's office.

3. Capitalize on the knowledge accumulated in e-learning

Although we already have several clinical guidelines on how to use e-mental health solutions (NICE, 2006; ACA, 1999), there is no reference in the literature on how to produce adequate e-contents for those solutions. Most of the existent products on the market are mere digital projections of the classical self-help books, using a similar writing style. We claim that the digital medium and hypertexts are far different than the linear written text: they offer different opportunities, require new writing skills and afford different behaviors from both the producer and the receiver, thus a set of guidelines on e-content creation for e-mental health solutions is critically needed.

In our opinion, the guidelines for writing useful e-contents in psychotherapy or counseling are strongly determined by our answers to four types of questions:

(1) The users
a. What kind of users do you expect for your e-health solution? What characteristics and goals do they have? (What kind of daily routine they have?)
b. What is their expected online behavior?

(2) The relationships
a. What kind of relationships should you develop between your users?
b. How do you build these relationships?
c. What is your role as a psychotherapist and e-content producer at the same time?

(3) The content and format
a. What content is the most effective?
b. What is the most adequate format to communicate the content?

(4) The environment
a. How to create the optimum digital environment in order to support user's goals?

Briefly put, the biggest challenge of the e-content writer for e-mental health solution is the following: *What kind of content, in what format and what environment are needed in order to provide the optimal support for the goals of users?* This conundrum must be addressed beginning with the design phase.

However, this should be the reference framework also during implementation, formative evaluation and testing of any e-mental health solution.

Unfortunately, the research on e-mental health solutions is yet in its infancy and unable to provide a sound answer for the stated problem. The guidelines already elaborated are rather general, addressing ethical or clinical standards, with no reference to the design of e-content.

In this context, we claim that a better starting point in answering the questions mentioned above is to capitalize on the know-how already accumulated in e-learning (Miclea, Ciuca, & Miclea, 2008). Our knowledge on e-learning is far more advanced than on e-mental health solutions, due to an earlier start of ICT use in education, especially as a critical tool for the development of distance learning (Mayer & Moreno, 2003; Clark & Mayer, 2003; Kozma, 2001). It is not the first time when progress in a specific area of psychology is promoted by methodological and conceptual transfer from other disciplines. Cognitive psychology, for example, has substantially capitalized on the "computer metaphor" and evolutionary psychology is heavily relying on a range of theoretical and methodological transfers from evolutionary biology.

Therefore, we assume that putting together our knowledge about the traditional process of psychotherapy on the one hand, and about e-learning solutions on the other, we may have better chances to generate meaningful guidelines for writing adequate e-contents for e-mental health solutions.

The outcome of our efforts to synthesize e-learning with classical psychotherapy is expressed in the guidelines presented in another paper (Miclea, Miclea, & Ciuca, 2008).

CONCLUSIONS

We are at the end of the beginning. Computer-mediated psychotherapy is, overall, at least as effective as classical, face-to-face therapy. Its benefits overcome its costs and it better fits the mind of the coming digital native cohorts. We shortly presented a CMP system – Paxonline, able to promote a stepped-care model in anxiety disorders, and to integrate the efforts of all relevant actors (patient, psychotherapist, family physician) to contribute to the psychotherapeutic process.

Computer-mediated psychotherapy is not only a new tool in our therapeutic armamentarium, but it also has the potential to change our psychotherapeutic practices. It can refocus psychotherapy from symptom alleviation to the optimization of help-seeking behavior; it can produce a switch from the psychotherapeutic treatment to the psychotherapeutic process inside the patient's mind and it can transfer knowledge from e-learning to psychotherapy.

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