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# Cybertherapy

Internet and Virtual Reality as Assessment and  
Rehabilitation Tools for Clinical Psychology and  
Neuroscience

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# PREFACE

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*A Japanese warrior was captured by his enemies and thrown into prison. That night he was unable to sleep because he feared that the next day he would be interrogated, tortured, and executed. Then the words of his Zen master came to him, "Tomorrow is not real. It is an illusion. The only reality is now." Heeding these words, the warrior became peaceful and fell asleep.*

*Suler, 1997,  
<http://www.rider.edu/suler/zenstory/present.html>*

The "Psychology of Cyberspace" [1, 2] and related fields, such as the "Psychology of the Internet" [3] and the "Psychology of Internet Behavior" [4], are new areas of study that have attracted psychologists in various specializations—clinical, counseling, educational, organizational, cognitive, social, and more—as well as researchers in other disciplines, among them communication, medicine, sociology, education, psychiatry, social work, and nursing.

These new areas have developed rapidly, accumulating knowledge and making innovative assertions and propositions that can generally be divided into two major directions: understanding the influence and impact of human experience with computers in cyberspace, on the one hand, and applying psychological procedures through (or with the help of) computers and the Net, on the other [5]. A vast majority of the psychological applications have been clinical and clinical-related and are considered a significant advancement in this field [6].

In being an extremely interdisciplinary field of study, psychology of cyberspace exemplifies unique cooperation among various distinctive professions: software programmers, computer and Web designers, and computer engineers at one end, and psychologists of different specialties at the other. The results of this collaboration have created exemplary works, represented by the VEPSY Updated (<http://www.cybertherapy.info>) project collaborators in the present collection of chapters.

The combination of ergonomics (human engineering), software engineering and programming, and computer design and graphics, on the one hand, and psychological and medical interventions, on the other, brings about innovative perspectives and effective implementations, whose aim is to serve humanity by offering better vehicles with which to heal physical and emotional deficiencies and injuries.

Although the projects presented in this volume represent significant breakthroughs, in the sense of creatively exploiting new technologies to attend to human miseries, further work is still required to fill the gap existing between the conceptualization of the cybertherapy experience and the actual implementations. As conceptualized and well presented by Mantovani [7] and Riva [8], interpersonal communication in virtual

environments, though problematic and often erroneous, constitutes an efficient basis for interpersonal relationship. In Riva's [9] words, "Communication is as the outcome of a complex coordinated activity, an event that generates conversational space within the weave of personal and social relationships. Thus, communication is not only—or not so much—a transfer of information, but also the activation of a psychosocial relationship, the process by which interlocutors co-construct an area of reality. In CMC this happens inside a rather special kind of container – cyberspace - that tends to rarefy the structural and process features of communication" (pp. 595-596).

This interpersonal relational basis - so central to human existence and functioning - seems to be missing from some of the actual cybertherapy applications, thus potentially limiting the implementation of more effective interventions. As criticized by Jacobson [10] in the context of the concept of "presence", human experience consists qualitatively of more than a physical environment, information received by the senses, and information processed by the brain; it includes, too, psychologically based dynamics, as evident in textual communications in virtual environments. In other words, as a clear touching point between body and mind, it seems that the "mind" aspect has been downplayed, compared with the "bodily" aspects. Thus, a further development of the current cybertherapy position will be an increased focus on the *relational factor* between therapists and patients as a significant therapeutic element of the clinical process. A better focus on this issue, as advocated by Riva and Galimberti [11, 12] in relation to conceptualizing cyberspace in general, will probably produce more targeted interventions.

Another point, related somewhat to the previous one, refers to the nature of the clinical interventions presented in this collection. Not surprisingly, three out of four of the therapeutic techniques discussed here are based on, or related to, the Cognitive-Behavioral Model (CBM). In fact, this approach has not only been found to be effective in treating numerous behavioral problems [13], but also can be translated relatively easily into computerized intervention programs. Notwithstanding the relevancy, effectiveness, and legitimacy of CBM to treat psychological problems, the understanding and exploiting of the client's personal dynamics - consisting of needs, desires, frustrations, conflicts, daydreams, emotions, and so on – are critical issues for an effective therapy. Thus, a more flexible, open, comprehensive, and eclectic approach might produce more effective cybertherapy tools. Some processes that are typical of and unique to human experience in synthetic environments, such as the powerful impact of the online disinhibition effect [14] and the process of transference in cyberspace [15], actually call for differently oriented therapeutic procedures to complement cognitive-behavioral interventions.

All in all, the current volume contributes significantly to the cumulative knowledge of emerging psychotherapy and the psychology of virtual environments. The writings in this book are evidence of apparent science fiction just two decades ago becoming scientific reality today. Specifically, what many psychologists once considered futuristic therapy is now a clinical actuality. Though paradoxical, and perhaps clichéd, the future is present, at least in the human mind. Like the Japanese warrior, we might profit tremendously from the gifts of the future by concentrating on and experiencing the state-of-the-art present—and thereby avert professional avoidance caused by fear of the unknown future.

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# INTRODUCTION

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*Our observations suggest that working online is only suitable for therapists who have been specifically trained in the use of the powerful and yet challenging medium. As Internet usage continues to grow, and becomes integrated into our daily lives, newly trained therapists as well as experienced (f2f) therapists will increasingly seek to develop online practices. They will need to concentrate—through graduate training and also continuing education—on developing the skills and understanding which will promote “best practice” when engaging in online clinical work as a mental health professional.*

*Fenichel, Suler, Barak et al., 2002*

Telehealth means “medicine at distance” where “medicine” includes not only medical activities - involving ill patients - but also public health activities - involving well people. In other words telehealth is a process and not a technology, including many different health care activities carried out at distance.

Since the development of methods of electronic communication clinicians have been using information and communication technologies for the exchange of health-related information: Telegraphy - signaling by wires - telephony, radio and television has been used for distance medicine since mid 19th century. However, rapid and far-reaching technological advances are changing the ways in which people relate, communicate, and live. Technologies that were hardly used a few years ago, such as the Internet, e-mail, video teleconferencing and shared virtual reality are becoming familiar methods for modern communication.

Health care is one of the areas that could be most dramatically reshaped by these new technologies. Distributed communication media could become a significant enabler of consumer health initiatives. In fact they provide an increasingly accessible communications channel for a growing segment of the population. Moreover, in comparison to traditional communication technologies, shared media offer greater interactivity and better tailoring of information to individual needs.

Cybertherapy, the integration of and telehealth technologies with the Internet and shared virtual reality, is the next logical step. Although cybertherapy is a branch of telehealth, it is differentiated in several important ways: telehealth to date has been largely non-Internet based and has been characterized by point-to-point (e.g., T1) and dial-up (e.g., telephone, ISDN) information exchange. Cybertherapy, on the other hand, is more accessible due to its increasingly affordable ability to communicate through a common set of standards and across operating systems.

In general, there are two reasons why cybertherapy is used: either because there is no alternative, or because it is in some sense better than traditional medicine. In this sense

telehealth has been used very successfully for optimizing health services delivery to people who are isolated due to social and physical boundaries and limitations. Nevertheless, the benefits of cybertherapy, due to the variety of its applications and their uneven development, are not self-evident. However, the emergence of cybertherapy is supporting the cost-effectiveness of certain applications, such as assessment, rehabilitation and therapy in clinical psychology and neuroscience. Its key advantage is the possibility of share different media and different health care tools in a simple to use and easily accessible interface.

To date, some cybertherapy applications have improved the quality of health care, and later they will probably lead to substantial cost savings. However, cybertherapy is not simply a technology but a complex technological and relational process. In this sense, clinicians and health care providers that want to successfully exploit cybertherapy need a significant attention to clinical issues, technology, ergonomics, human factors and organizational changes in the structure of the relevant health service.

The goal of this volume is to analyze the processes by which cybertherapy applications will contribute to the delivery of state-of-the-art health services. Particular attention is given to the clinical use of virtual reality technology. The starting point of this overview are the clinical results coming from the European Union VEPSY Updated - Telemedicine and Portable Virtual Environments for Clinical Psychology - research project (<http://www.cybertherapy.info>).

More specifically, this volume aims at supporting clinicians and scientists, interested in the innovative approach of cybertherapy.

Because of the complexity of this topic, we have put a great deal of effort into defining the structure of the book and the sequence of the contributions, so that those in search of a specific reading path will be rewarded. To this end we have divided the book into five main sections comprising 14 chapters overall:

1. *Cybertherapy rationale: advantages of new technologies for Clinical Psychology*
2. *Cybertherapy experiences: clinical trials in the treatment of mental disorders*
3. *Cybertherapy technology: advanced tools for Clinical Psychology*
4. *Cybertherapy ergonomics: how to design effective Cybertherapy tools*
5. *The future of Cybertherapy: new scenarios and applications*

Each section begins with a brief abstract, helping the readers in identifying the relationships among its chapters.

### ***Section I - Cybertherapy rationale: advantages of new technologies for Clinical Psychology***

In Chapter 1, **Riva and colleagues** present the VEPSY UPDATED Project, whose aim is to understand and to exploit the potential offered by an emerging field – *cybertherapy* – whose focus is the use of communication and information technologies to improve the health care processes. The chapter provides the clinical and technical rationale behind the cybertherapy applications, focusing on the advantages of the three different faces of virtual reality in the cybertherapy field: technological, experiential and communicative.

An integration of different Internet-based tools developed within the VEPSY UPDATED Project - the VEPSY website - is presented in Chapter 2, by **Castellnuovo and colleagues**. It is an example of clinical application, matching traditional practices with

innovative media for the treatment of different mental disorders. With the aim of giving a framework for the integration of old and new tools in mental health care, the rationale of the chapter consists on providing the possible scenarios for the use of the VEPSY website in the clinical process.

**Botella and colleagues** in Chapter 3 provide an historical review of Virtual Reality (VR) as therapeutic tool in clinical psychology. The authors present a comparison between the “traditional” VR-based treatments and the innovative ones. Moreover, data on the effectiveness of this technology application in the treatment of different psychological disorders, such as anxiety, eating and sexual disorders are presented with a particular attention to the actual limitations of VR and to the future perspectives.

**Morganti** in Chapter 4, starting from the analysis of existing VR-based applications, outlines the possibility of developing virtual reality tools for the assessment and treatment of neuropsychological diseases. The investigation on the possibilities and challenges related to the virtual-reality-based neuropsychological application is focused both on patient’s and therapist’s point of view. More in detail, an explanation of neuropsychological-oriented VR applications is discussed in order to highlight their usefulness and effectiveness in clinical treatments of memory, motor abilities, executive functions and spatial representation impairments.

### *Session II - Cybertherapy experiences: clinical trials in the treatment of mental disorders*

Chapter 5 by **Botella and colleagues** shows one of the possible applications of virtual reality in the treatment of mental disorders: the treatment of Panic Disorder with Agoraphobia (PDA). Furthermore the chapter discusses how Virtual Reality treatments could help to achieve specific therapeutic goals. The clinical program developed for the treatment of PDA is described together with the efficacy and effectiveness of this particular treatment. The chapter presents the data of a study where a cognitive-behavioral program including VR for the exposure component is compared with a standard cognitive-behavioral program including *in vivo* exposure and with a waiting list control condition.

The chapter by **Klinger and colleagues** (Chapter 6), presents a VR-based clinical protocol to treat social phobia. The novelty of this work is to address a larger group of situations that the phobic patients experience with high anxiety. In the presented protocol, the efficacy of the virtual reality treatment is compared to the established and well validated group cognitive-behavioral treatment.

**Riva and colleagues** in Chapter 7 present a new Virtual Reality-enhanced treatment, named Experiential Cognitive Therapy (ECT), detailing its rationale and therapeutical protocols for the treatment of obesity and eating disorders. Moreover, the chapter presents the data from a clinical trial where the results of this treatment are compared with the mostly used approaches in the treatment of these disturbances (cognitive-behavioral therapy and the nutritional therapy).

Finally, the chapter by **Optale and colleagues** (Chapter 8) describes a therapeutic approach in which psycho-dynamic psychotherapy is integrated with Virtual Environments (VEs) to treat male sexual dysfunctions of presumably psychological or mixed origin. The presented data show that the particular way in which full-immersion VR involves the patient, is able to speed up the therapeutic psycho-dynamic process and produces better results than traditional treatments.

### *Section III - Cybertherapy technology: advanced tools for Clinical Psychology*

Chapter 9 by **Rey and colleagues** presents new technologies that will provide

psychological treatment and help at any place and any time. Examples of this scenario are dynamic web pages, that include information prepared by the therapist for different patients and that receive information from them. These pages can be linked with other tools such as e-mail or chats, offering a direct patient-therapist communication. According to this view Virtual Environments can also be integrated in web pages to deliver advanced therapy support.

**Alcañiz and colleagues** in Chapter 10 focus on user interface design as a critical component of any Virtual Environment application, and especially for VEs applied to health care. The authors show how non-traditional devices and interface components are quickly proliferating and how three-dimensional, multisensory output technologies are also becoming more common. These considerations are supported by an overview of 3-D interaction and user interfaces technologies for VEs.

#### *Section IV - Cybertherapy ergonomics: how to design effective Cybertherapy tools*

In Chapter 11, **Spagnoli and colleagues** describe the usability evaluation of the Virtual Environment for the treatment of male sexual dysfunctions presented in Chapter 8. After the description of the conceptual framework adopted, the chapter dwell on one method among those deployed for the evaluation, namely the analysis of “situated actions”. The main parameters used for the evaluation are the goals and the intended meanings of the simulation as set by the designers.

The identification of the usability requirements of specific community of practices is discussed in Chapter 12, by **Galimberti and colleagues**. Two of the four VR modules in the framework of the VEPSY project are considered: Panic Disorders – Agoraphobia and Eating Disorders, described in Chapter 5 and Chapter 7. The theoretical background used in this analysis is based upon an ethnomethodological approach, a perspective that gives evidence of how people, in specific social situations, are able to solve complex tasks producing shared meanings and achieving their goals during interaction.

#### *Section V - The future of Cybertherapy: new scenarios and applications*

In this section, which tries to outline the current state of research and technology that will be relevant to the development of innovative communication interfaces in health care, **Riva and colleagues** (Chapter 13) describe the Immersive Virtual Telepresence (IVT) technology. This innovative tool merges virtual reality environments with wireless multimedia facilities and advanced input devices, including biosensors and brain-computer interfaces. The authors discuss the clinical principles and possible advantages associated with the use of IVT in cybertherapy.

Chapter 14 by **Wiederhold B. and Wiederhold M.** deals with the novel applications of VR-Based technologies, highlighting both the advantages over traditional treatment modalities, and the problems experienced by the first clinical trials using these tools. Future directions for research are given, including improvements of objective measures of efficacy as fMRI and physiological monitoring devices. Finally, suggestions are provided to verify if VR and advanced technologies can be used in the treatment of many disorders, including depression, schizophrenia, drug addiction, and autism.

The wide array of perspectives described in the five Sections strengthens the importance of cybertherapy in health care. As this approach continues to develop, it will be compared more and more with existing methods. In order to achieve this goal, an interdisciplinary approach is essential. Moreover, the integration of knowledge coming from different disciplines, such as clinical, social and cognitive psychology, neuroscience,

ergonomics, multimedia development, or communication engineering, and the incorporation of the insights from these fields will lead to the development of a powerful clinical application in the future.

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In conclusion, we expect that the contents of this book will stimulate more clinicians and professionals in finding new solutions both to expand their intervention interests and in making better use of traditional and innovative cybertherapy tools.

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