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GUEST EDITORIAL

In this special issue of the Journal of CyberTherapy and Rehabilitation, you will find several papers that were selected from the more than one hundred submissions received by the Scientific Committee for the International Symposium on Neurorehabilitation.

Seeing the need to strengthen the collaboration between technical and health related disciplines, the International Symposium on Neurorehabilitation: from Basics to Future was held in Valencia, Spain on October 15-16, 2009. The main purpose of the Symposium was to bring together engineers, researchers and health care professionals to share ideas and experiences with the aim of creating a "common language" that will help to increase the efficacy of the neurorehabilitation process and to improve the quality of life of patients. World-renowned researchers in cognitive and motor rehabilitation, virtual reality, telerehabilitation, brain-machine interfaces, patient assessment, behavioral science, neuroplasticity, neuroimaging, neuropharmacology and rehabilitation robotics updated participants on the current state of their respective research areas during the Symposium. Similarly, more than 350 delegates from around the world participated in this event and provided examples of their current work.

In the coming years, the incidence of diseases and afflictions with a neurological origin will increase to–what some have ventured to call–epidemic proportions. Among the main reasons behind this "coming epidemic" is the shift that the world's population will experience, according to several forecasts, towards an increasingly older population as a result of improvements in medicine and standards of living. According to the United Nations, more than 20 percent of the world's population will be over 60 years old by the year 2050, more than doubling the current size of this population segment. This shift towards an older population will not be limited to the developed world; most of the developing world will experience a similar population shift in the coming decades. Unfortunately, an aging population increases exponentially the risk of suffering from afflictions affecting the central nervous system, which could lead to a lower quality of life for these individuals, or even death. Among these afflictions one can find multiple sclerosis, Parkinson's disease, Alzheimer's disease, stroke, among many others. Recent advances in neurorehabilitation, the specialized and interdisciplinary treatment of individuals suffering from neurological afflictions, can prove to be extremely important to ameliorate the suffering experienced by these individuals and to help them to return to a normal life. At the same time, we are seeing the increasing importance of technology in our everyday lives. As a result, technology is also playing an important role in the improvement of neurorehabilitation, and we feel that its importance will only increase over time. Applying technology to the neurorehabilitation process can not only assist us in obtaining more precise diagnostics and in improving the flow of information between health care professionals but it can also help us to develop more effective and efficient rehabilitation-specific clinical pathways. Similarly, the increasing bandwidth capacity of our telecommunication networks could bring hope to individuals that do not have access to rehabilitation facilities by making possible the implementation of telerehabilitation-based treatments. Furthermore, the increasing importance of assistive technology and orthetics also shows how technology can have a great impact on the quality of life of our patients long after the rehabilitation process has finalized.

In this symposium, several sessions have been centered in virtual rehabilitation and related fields. Virtual Rehabilitation is a recent scientific and technological area that investigates the use of interactive graphics technologies and telecommunications to provide rehabilitation and clinical services in a more effective and efficient way. It is a multidisciplinary field that combines technologies such as virtual reality, augmented reality, bioelectronics, medical imaging, ambient intelligence, natural man-machine interfaces, all aimed at achieving better therapies for patients and more sustainable services health.

At this moment, we are experiencing the emergence of an information society increasingly based on the production and exchange of information. New information and computer technologies (ICT's) are having an impact in the field of rehabilitation of motor and cognitive functions. Over the past twenty years this progress in technology has provided clinicians with new opportunities for evaluation and treatment of cognitive disorders, which were not available with traditional methods. Several tools have been created in order to evaluate and train the

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ANALYSIS OF MULTITOUCH TECHNOLOGY FOR NEUROREHABILITATION

Mariano Alcañiz[1], Vicente Abarca[1], Jose A. Lozano[1] and Neus Herrero[1]

The technology for supporting user friendly and intelligent interaction becomes very important for technology applied to rehabilitation. In this paper we review state of the art information and communication technologies (ICT) applied to cognitive and motor rehabilitation in order to discuss the advantages of multitouch technologies over other technologies. We describe a multitouch system specifically developed for use in clinical rehabilitation. The ergonomic analysis and user acceptance results are described.

A multitouch tabletop display system based on Frustrated Total Internal Reflection (FTIR) has been developed using user centered design principles in order to adapt the technology to patients with acquired TBI. We also described the classification of hand gesture commands for interacting with the system developed using the library Human-Touch. Several software applications have been developed both for usability tests and for cognitive rehabilitation tasks.

The different natural man-machine interface technologies are analyzed for their use in neurorrehabilitation and the possibilities of the multi-touch technology are analyzed. The implementation of a prototype specially adapted for its use in neurorrehabilitation is described and the ergonomic analysis and user satisfaction results are described.

Keywords: Multitouch, Cognitive Rehabilitation, Tabletop, Natural Interface, Virtual Rehabilitation

Introduction

The technology for supporting user friendly and intelligent interactions becomes important for technology applied to rehabilitation. Specifically, many researchers worldwide have focused on the input technology using hands and gestures, which are the most intuitive tools for humans. This technology becomes a core component of the information devices adopting dynamic touch interfaces. This paper will describe a hardware platform and its component technologies that are used to manipulate the contents naturally by recognizing the motion of the user's hands and the contact between the hands and display. This technology enhances the availability of next generation multimedia contents utilizing the interaction between the user and information system for rehabilitation purposes.

One of the benefits of the tabletop display is the natural direct manipulation experience they provide, as well as their potential for more complicated interactions using multiple fingers. It would be desirable to allow more than one user to access the display without affecting the work of others. The users of a tabletop display could randomly access any point on the display by simply touching the desired location. Also, physical objects could be used for augmented reality. Lastly, the expense of developing the system is not expensive. Ultimately, the system developed pursues interaction of four components–human, computer, physical objects and displayed objects. Additionally, tabletop displays can help cooperative interaction of multiusers as a medium of communication. The ability to directly touch and manipulate data on the screen without using any intermediary devices has a very strong appeal to users. In particular, novices benefit most from the directness of touch screen displays. A fast learning curve and inherent robustness, meaning it contains no movable parts, makes touch screens an ideal medium for interacting with interactive graphic based applications. While touch screen use is widespread in special purpose applications, the slow adoption of touch screens into more general computing devices has be attributed to known issues of relatively high error rates, arm fatigue, and lack of precision (Armstrong, C., 1989.) Due to technical restrictions, most commercially available touch screen devices in use today are only capable of tracking a single point on the surface

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IMPROVING GAIT AFTER STROKE – TREADMILL OR WALKING; QUANTITY OR QUALITY

Birgitta Langhammer[1] and Johan K. Stanghelle[1]

The main aim of the present study was to evaluate treadmill training versus walking outdoors in order to improve quality aspects like step length, step width, cadence and quantitative aspects like endurance, walking speed and distance in walking. A secondary aim was to evaluate factors that might be influential in retrieving walking capacity.

The results indicate that treadmill walking achieved improved function, such as an increase in walking speed and distance, in less time than walking outdoors and in regard to bilateral step length with higher degree of symmetrical use. This observation supports the notion that walking exercises on a treadmill are an effective and important tool in rehabilitation. The patients studied were well past the acute period of time after stroke. The fact that both treadmill walking and walking outdoors did improve functional activities supports the importance of "booster doses" of rehabilitation in order to maintain physical function levels.

Keywords: Physiotherapy, Rehabilitation, Stroke, Treadmill, Walking

Introduction

Walking capacity is an important aspect of stroke rehabilitation regarding endurance, functional activities like ADL and as a primary goal expressed by the patient (Globas, Macko & Luft, 2009.) Different approaches are used in the rehabilitation of stroke patients in order to enhance and improve walking capacity and there are different options depending on which aspect of walking is being considered (States, Pappas & Salem, 2009, Tang et al., 2009, Moseley, Stark, Cameron & Pollock, 2005.) In order to enhance walking in the acute stage, the therapist often focuses on stability, balance and quality of movement. In the chronic stage functional aspects, such as endurance and quantity and how long and how fast walking is possible, become more important during rehabilitation (Peurala, Airaksinen, Jäkälä , Tarkka & Sivenius, 2007, van de Port, Kwakkel & Lindeman 2008.)

There are very few studies on walking exercises outdoors compared to walking indoors despite the advantages considering that fact that most patients suffering from the complications related to stroke return home. One of the options for an independent living and domestic life is that you can walk indoors and outdoors. Task-oriented training is recommended in the acute rehabilitation to gain skills for patients with stroke (Langhammer & Stanghelle 2000, Pollock, Bær, Pomeroy & Langhorne 2007.) It is safe to assume that walking outdoors is beneficial training for a patient who wanted to improve this skill. Walking outdoors is not a goal in itself but rather improvement in rehabilitation. If the patient's goal is to walk to the grocery store two kilometers down the road or to walk quickly across a street, there is probably a need for endurance, power and strength. On the other hand, reducing pain or economizing walking because of asymmetry calls for another approach. Walking parameters like bilateral stride length, step width and cadence are part of a qualitative aspect of gait where one would assume a symmetrical stride length, narrow step width and a reasonably low cadence would indicate a better performance.

Treadmill walking has been shown to be a valuable therapeutic tool for improving walking patterns post-stroke (Ada, Dean, Hall, Bampton & Crompton, 2003.) It is also effective in enhancing endurance (Macko et al., 2005.) Although treadmill training does not seem to enhance performance more than ordinary walking exercises in the acute stage (Nilsson et al.,2001, Moseley, Stark, Cameron & Pollock, 2005, Dickstein, 2008), it might be beneficial in improving gait in the chronic stage. A question posed, then, is will exercise gain transfer from a treadmill to walking over ground?

The main aim of the present study was to evaluate treadmill training versus walking outdoor in order to improve quality aspects

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PRELIMINARY VALIDATION OF ECOTRAIN-COGNITIVE: A VIRTUAL ENVIRONMENT TASK FOR SAFE STREET CROSSING IN ACQUIRED BRAIN INJURY PATIENTS WITH AND WITHOUT UNILATERAL SPATIAL NEGLECT

Maria Dolores Navarro[1], Mariano Alcañiz[2], Joan Ferri[1], Jose A. Lozano[2], Neus Herrero[2] and Javier Chirivella[1]

The objective of the study was to determine the clinical utility and the convergent validity of a computer desktop-based virtual reality (VR) street crossing task.

Twenty patients who had sustained either a right (n = 13) or a left (n = 7) hemispheric brain lesion due to an acquired brain injury participated in this study. All subjects were assessed with a neuropsychological battery including measures of attention (Color Trail-making Test, CPT) and measures of unilateral spatial neglect (Behavioral Inattention Test.) A standard VR street crossing test was performed within a week after completion of a neuropsycological assessment. Variables measured in the VR task included number of times the participant looked to the left, the total time it took to complete the task and the number of accidents. A Feedback Questionnaire was used to obtain information about the subjective responses of the participants to the VR experience.

The results were as follows–four patients in the study showed signs of persistent unilateral spatial neglect (USN =BIT cut-off store < 129.) Two of the four patients with USN and only one of the 16 without USN were unable to complete the task due to four or more accidents (Fisher's exact test, $p = 0.08$.) The number of accidents and the time taken to complete the virtual task were significantly correlated to the BIT score ($r = -0.5$, $p < 0.05$) and time to complete the Color Trail Making Test part A and B ($r = 0.7$ and $r = 0.8$ respectively, $p < 0.01$.) The participants' overall feedback on the VR experience was positive. In conclusion, the results achieved by this VR street crossing intervention correlate with those achieved by conventional neuropsychological tests measuring USN and attentional resources. Further studies should address its clinical validity as an effective instrument for training individuals who suffer from USN.

Keywords: Ecotrain, Brain Injury, Neglect, Cognitive Rehabilitation, Virtual Reality

Introduction

Unilateral Spatial Neglect (USN) is a disorder frequently observed after unilateral brain damage. It is defined as the inability to respond to or to orient toward stimuli located in the hemispace contralateral to the lesion of one of the cerebral hemispheres (usually the right), and which is not attributable to primary sensory or motor deficits (Heilman et al., 1987.) So, USN is an attentional or representational deficit, not a visual field deficit. This disabling condition is found in almost 50 percent of people with right-hemisphere stroke, and the presence of left USN in these patients has a well-established negative impact on functional recovery (Buxbaum et al., 2004.) Behaviorally, USN patients display a wide range of functional spatial deficits, such as bumping into objects when walking, shaving only one side of their face and eating food from only one side of the plate.

The complexity of USN makes it a difficult condition to diagnose and treat. While many rehabilitation methods have been proposed and applied with various degrees of success (Chokron et al., 2007), there is still a great need for effective treatment. Diagnostic techniques could also be improved and extended. In the last decade, promising new methods using virtual reality (VR) technologies have emerged (Tsirlin et al., 2009.)

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INAPPROPRIATE SEXUAL BEHAVIOR AND AGGRESSION OBSERVED WITHIN A NEUROBEHAVIORAL REHABILITATION SERVICE: SASBA AND OAS-MNR OUTCOMES OVER A THREE-MONTH PERIOD

Nick Alderman[1], Caroline Knight[1] and Louise Birkett-Swan[1]

The St Andrew's Sexual Behavior Assessment (SASBA) scale has recently been proposed as providing a valid, reliable means of recording inappropriate sexual behavior (ISB) exhibited by people with acquired or progressive neurological impairment. ISB amongst these populations has not previously been studied in detail, consequently, little is known about its prevalence or characteristics. In this study, SASBA data collected over a three-month period in a neurobehavioral service was examined to begin ascertaining the extent of ISB amongst people with acquired brain injury (ABI.) Overall, 699 incidents were recorded among 91 patients–most were verbal comments of a sexual nature. Comparable measures of aggression made over the same period suggested ISB was relatively infrequent, accounting for seven percent of all events. Aggression was characteristic of most patients, whereas ISB was exhibited by less than half. Two patients accounted for nearly half the SASBA recordings. Data suggested aggression primarily served an escape or avoidance function while ISB was mostly concerned with social distance reduction. Benefits of encouraging services to utilize the SASBA to ascertain prevalence and characteristics of ISB in other ABI contexts and suggestions for future research are discussed.

Keywords: SASBA, ISB, Neurobehavioral Rehabilitation, Outcome, Aggression, OAS-MNR

Introduction

A recent review by Johnson and colleagues (Johnson, Knight and Alderman, 2006) highlighted that in comparison to other behavioral consequences of acquired and progressive neurological impairment, inappropriate sexual behavior (ISB) has been relatively neglected in the literature. For example, increasingly more is known about the characteristics and causes of aggressive behavior secondary to acquired brain injury (ABI) and its management (Miller, 1994; Alderman, Knight and Henman, 2002; Tateno, Jage and Robinson, 2003; Alderman, 2003; Baguley, Cooper and Felmingham, 2006; Alderman, 2007.) However, a compatible level of knowledge about ISB has yet to evolve.

Johnson and colleagues (2006) suggested that one reason ISB has not been investigated thoroughly reflected uncertainty regarding what this comprises. They presented evidence that suggested there was no single accepted conceptual understanding or description of ISB. Accounts of ISB were frequently ill-defined, leading to variance and inconsistencies between studies regarding measurement of behaviors, and as a consequence, disagreement amongst investigators regarding its prevalence. The point was made that availability and acceptance of clear operational definitions of ISB would facilitate creation of standardized, structured assessment tools which would increase understanding of these behaviors.

More recently, Knight, Alderman, Johnson, Green, Birkett-Swan and Yorston (2008) proposed ISB might occur infrequently among people with acquired or progressive neurological impairment. This may be why it has received less attention in literature from researchers. For example, a retrospective file review of ABI inpatient and outpatient rehabilitation services identified 6.5 percent of clients as having committed some form of sexual offense, such as touching, exhibitionism or overt sexual aggression (Simpson, Tate, Ferry, Hodgkinson and Blaszczynski, 2001.) However, while this study suggests the prevalence of ISB is low, other investigations contradict this finding. For instance, in a staff survey among traumatic brain injury rehabilitation professionals, it was found that 70 percent of clinicians reported that ABI patients frequently en-

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EFFECTS OF VIRTUAL AVATAR CHARACTERISTICS ON PERFORMANCE OF HEALTHY SUBJECTS' TRAINING TASKS

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In the application of training for virtual rehabilitation, virtual avatars are used to help subjects performing exercises in a virtual environment. Effectively, the representative characteristics of virtual avatars have a strong impact on subjects when performing their exercises. Therefore, the selection of a suitable avatar is important. Our work aims to analyze the effects of virtual avatar representative characteristics on the performance of a training task done by healthy subjects. The system used consisted of a Cave Automatic Virtual Environment, a motion capture system and an avatar rendering library called Cal3D. The developed system also captures the gesture of subjects, renders it by virtual avatars and supports a simple game of "Ball Reaching." By changing the representative characteristics of virtual avatars, our scenarios enable the experimentation of two approaches. The first analyzes the effects of virtual avatar representative characteristics on the performances of the subject playing the game "Ball Reaching." The second measures the effect of virtual avatar representative characteristics on the performance of the subject replicating a motion which is represented by a virtual avatar. Based on our proposed real-time weighted Longest Common Sub-Sequence algorithm, the effect measured here is the similarity between represented motion of a virtual avatar and motion replicated by the subject. Our experiment shows that, for doing simple tasks, performance deviation of healthy subjects between the different types of representative avatars isn't considerable. However, when the tasks are complicated, types of representative avatars have a strong impact on the performance of tasks performed by healthy subjects.

Keywords: Virtual human, Third-person View Virtual Environment, Motion Evaluation, Motor Rehabilitation, Virtual Rehabilitation

Introduction

Many current and potential applications for human activities are developed through virtual reality (VR) systems involving virtual humans or virtual avatars (VA.) Several popular applications include computer games, simulation-based training and learning, surgery and plastic surgery performed on virtual patients and virtual psychotherapies. Effectively, the use of VA not only increases the natural interaction within a virtual environment but also increases the sense of presence. The user experiences a more natural perception of autonomous actors, increases their sense of being together and thus enhances the overall sense of shared presence in the environment (Thalmann, 1999.) Training applications for virtual rehabilitation using virtual avatars are increasingly being used. Actually, the purpose of using a VA in a functional rehabilitation application is to better guide patients performing therapeutic training tasks. In this way, the considered tasks are physical activities aiming to rescue dysfunctional muscle. For example, video games are played and human gestures are replicated and represented by a virtual avatar. Effectively, the representative characteristics of avatars, such as a skeleton, 2D virtual avatar, 3D virtual avatar, viewpoint of the represented avatar (face to face or face to back with the subject) have a strong impact on the performance of those tasks. In this paper, the aim is to analyze those effects in choosing the most suitable avatar. It is assumed that a VA performing well with healthy subjects will perform well with rehabilitated subjects as well. Hence, the experimentation could be performed with healthy subjects.

The remainder of this paper is organized as follows. Section 2 gives an overall configuration of the training-based system, materials used as well as approached method. Section 3 de-

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ELECTRONIC PDA DIETARY AND PHYSICAL ACTIVITY REGISTERS IN A WEIGHT LOSS TREATMENT PROGRAM FOR CHILDREN: A DESCRIPTION OF THE ETIOBE PERSONAL DIGITAL ASSISTANT SYSTEM

Rosa M. Baños [1,4], Ausias Cebolla [2,4], Irene Zaragoza [3,4], Cristina Botella [2,4] and Mariano Alcañiz[3,4]

Childhood obesity is a significant health problem in western societies. Self-monitoring techniques, such as the use of dietary and physical activity registers, are considered to be central to cognitive-behavioral weight control programs. Traditionally, these conventional diaries have been created using pen and paper, however, this technique has several limitations. The objective of this paper is to describe an electronic Personal Digital Assistant (PDA) system for recording food and physical activity for the treatment of childhood obesity. The authors review the benefits and limitations of such electronic diaries.

Keywords: Personal Digital Assistant, Ecological Momentary Assessment, Obesity, Self-report, E-Health

Introduction

Children suffering from weight-control issues and obesity are increasingly common public health problems, and are the most common childhood disorders in Europe (European Association for the Study of Obesity, EASO; 2002.) According to a report from the International Obesity Task Force (IOTF) published in March 2005, this problem is rapidly worsening in some European countries, particularly in recent years. The treatment of childhood obesity must be multidisciplinary, taking both medical and psychological factors into account. As for psychological interventions, Cognitive-Behavioral Treatments (CBT) are currently considered the treatment of choice (Gilles et al. 2008.) CBT programs for obesity are based on the theory that instead of forcing a patient to follow a diet forever–a therapeutic target that is very difficult to achieve–it is more effective to attempt to change the user's habits, such as learning how to achieve balance in consumption. To this end, CBT programs designed to treat obesity include components designed to promote changes in behavioral, cognitive and emotional patterns that contribute to obesity (Sarwer, Foster, & Wadden, 2004.) These programs focus on modifying patients' eating habits and physical activity levels (Wilson & Brownell, 2002.) The guidelines that have proven to be the most useful from this point of view are the following–the use of self-register for self-evaluation and self-control (recording information about eating and physical activity), stimulus control, psychoeducation, cognitive techniques for changing thoughts and dysfunctional attitudes, interpersonal relationships and relapse prevention.

Self-register techniques are considered necessary for both assessment and treatment phases. The goal is to evaluate behaviors in a natural setting such as home or school. The patient is given a paper which explains the behavior to be recorded and the conditions under which it must be done. It is important that the behavior is recorded immediately, in order to minimize memory bias (Beasley, Riley, Davis & Singh, 2008.) The information obtained allows the clinic to identify the behavior cues and the thoughts and emotions associated with the behavior. A more accurate evaluation can therefore be made, and the treatment effects and the patient's evolution can be assessed.

For obesity, the most important targets to be self-monitored are: information about diet and physical activity. As assessment tool, a fundamental benefit of diary methods is that they permit the ex-

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DEPRESSION INFORMATION ON THE INTERNET FOR ASIAN AMERICANS

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The anonymity of the Internet may provide depression information to Asian Americans who often associate depression with shame and stigma beliefs and avoid treatment. We interviewed 20 Asian Americans regarding reasons for Internet depression information use, non-use, and relevant Web site topics. Thematic analysis was used to analyze the qualitative responses. Reasons for Internet use included difficulty talking face-to-face, confidential, useful information, and convenience. Reasons for non-Internet use included "not a good source" and denial concerning depression. The Internet can allow for depression information tailored to Asian Americans and this study suggests topics of interest to include on such a Web site.

Keywords: Asian Americans, Depression, Internet, Information Dissemination, Chinese

Introduction

In the United States, the Asian American population of 13.5 million individuals makes up of five percent of the United States population (United States Census Bureau, 2005.) Structured interviews from population-based epidemiologic studies report 12-month depression prevalence of 3.4 percent to 4.2 percent (Takeuchi, Chung, & Lin et al., 1998; Hasin, Goodwin, Stinson, & Grant, 2005.) Lifetime depression prevalence ranges from 4.3 percent to 8.8 percent (Iwamasa & Hilliard, 1999; Hasin et al., 2005.)

Treatment for depression and mental health concerns is affected by shame and stigma beliefs among Asian Americans (Root, 1985, Surgeon General, 2001.) Beliefs related to shame include that the presence of mental illness can affect the good name of a family for generations (Tabora & Flaskerud, 1994) and that a family "loses face" and is shamed by having a family member with mental illness (Tabora & Flaskerud, 1997.) Beliefs related to stigma include seeking professional help for mental health concerns indicates personal weakness, immaturity, and a lack of self-discipline (Uba, 1994.)

There are a number of variables associated with stigma beliefs for depression and mental health concerns among Asian Americans. Lower acculturation levels are associated with greater stigma levels (Atkinson & Gim, 1989; Leong & Lau, 2001.) Men have greater stigma levels than women with regard to friends and employer while there are no differences with regard to family (Fogel & Ford, 2005.) With regard to age, those ages 46 to 60 years have lower stigma levels than younger age categories with regard to stigma for friends and employer. However, the converse is true with regard to family stigma where younger age is associated with higher stigma levels for family (Fogel & Ford, 2005.)

Besides stigma concerns, Asian Americans have lower levels of treatment seeking for mental health problems than whites and other racial/ethnic groups (Leong & Lau, 2001; Surgeon General, 1999; Zhang, Snowden, & Sue, 1998.) Even for Asian Americans who seek treatment, these Asian Americans are more likely to prematurely stop treatment at a higher rate than whites (Leong & Lau, 2001.)

The Internet is used by many Asian Americans with almost as high levels of use as among whites (U.S. Department of Commerce, 2004) and can be a venue for providing access to information that may not be easily accessible elsewhere. Also, the Internet can allow for anonymous access of information related to depression and an anonymous psychoeducation approach can possibly minimize the shame and stigma perceived by Asian Americans. One study among Asian American college students using an online support group found that these participants believed that the online support group offered support, discussed relevant concerns, and that participants were comfortable using this online support group (Chang, Yeh, & Krumboltz, 2001.) Another study among Asian American college students found that the participants preferred traditional face-to-face psychological treatment rather than online psychological treatment. There were also gender differences with

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