CYBERPSYCHOLOGY & BEHAVIOR
Volume 8, Number 4, 2005

Effects of Group Experiential Cognitive Therapy for the Treatment of Panic Disorder with Agoraphobia

YOUNG-HEE CHOI, M.D., Ph.D., ACT,[1] FRANCESCO VINCELLI, M.S.,[2] GIUSEPPE RIVA, Ph.D.,[2] BRENDA K. WIEDERHOLD, Ph.D., M.B.A.,[3] JUNG-HO LEE, M.D., Ph.D.,[4] and KEE-HWAN PARK, Ph.D.[5]

ABSTRACT

A treatment protocol, called experiential cognitive therapy (ExCT), was developed. It integrated traditional cognitive behavior therapy (CBT) with virtual reality exposure for the treatment of panic disorder with agoraphobia (PDA). The objective of this study was to test the efficacy of short-term (four sessions) ExCT compared with a traditional 12-session panic control program (PCP) for the treatment of PDA. Forty patients diagnosed as having PDA by the diagnostic criteria of DSM-IV were randomly assigned to ExCT and PCP groups of 20 patients each. The treatment effects were measured with self-report questionnaires, including the BDI, STAI, ASI, PBQ, ACQ, and BSQ. The authors also assessed high end-state functioning (HES), including the success rate of stopping or reducing medication at post-treatment and 6-month follow-up. In all ratings, both ExCT and PCP groups showed significant improvement post-treatment compared with pre-treatment scores. There were no significant differences between the two treatment groups in HES and medication discontinuation at post-treatment, but there was a significant difference in medication discontinuation at 6-month follow-up. These results suggested that although short-term effectiveness of ExCT might be comparable to the effectiveness of PCP, long-term effectiveness of ExCT might be relatively inferior to the effectiveness of PCP.

INTRODUCTION

ACCORDING TO meta-analytic studies of the effect of pharmacotherapy, cognitive behavior therapy (CBT), and the combined therapy for panic disorder, it has been shown that the efficiency of CBT is relatively higher than the other therapies.[1,2] Traditional CBT for panic disorder with agoraphobia (PDA), proposed by Barlow[3] and Clark et al.,[4,5] consists of various cognitive and behavioral techniques that are designed for the patient to discriminate and correct dysfunctional thoughts, core beliefs, and behavior related with his/her own anxiety. These cognitive and behavioral techniques include cognitive restructuring, breathing retraining and relaxation training, interoceptive exposure, and in vivo exposure to feared situations.

However, the effectiveness of CBT in agoraphobia was relatively insufficient compared to the superior effectiveness of CBT in panic disorder. There seem to be various possible reasons that exposure therapy through imagination was not fully effective in some patients. Fear situations and severity that patients complained of were various, and it took considerable time and cost for a therapist to accompany a patient for the guided exposure. Therefore,

[1]Mettaa Institute of Cognitive Behavior Therapy, Seoul, South Korea.
[2]Department of Psychology, Università Cattolica, Milan, Italy.
[3]The Virtual Reality Medical Center, Interactive Media Institute, San Diego, California.
[4]Department of Psychiatry, Inje University Sanggye Paik Hospital, Seoul, South Korea.
[5]Department of Psychology, Catholic University of Korea, Bucheon, South Korea.

a more effective and suitable exposure therapy was needed and the virtual reality (VR) technique was applied additionally in exposure as an alternative solution.

VR is defined as a dynamic and reactive composition with the virtual environment that is created by the computer and used for multimodal interaction with human beings.[6] Imaginary cyberspace provides a series of various strong applications for diagnosis and treatment in VR therapy.

Using VR can offer appropriate stimulus to patients who cannot confront frightening situations or cannot imagine vividly. Desensitization using VR is different than *in vivo* exposure in that it can avoid difficulties which can be experienced in front of other people and can preserve confidentiality because it allows treatment of patients in a secure space. Because VR can provide a strong visual and audible stimulus which is under both therapist and patient's control, it is safer than *in vivo* exposure and is more stimulating than systematic desensitization. Consequently desensitization using VR is more effective and has more economical advantage to be held in the clinic.[7]

The first author was able to obtain positive results in using VR therapy for a 61-year-old male patient who could not climb more than three flights of stairs for 40 years through the use of a VR height phobia simulator and flight phobia simulator. The six sessions of VR exposure treatment, over a 2-week period, allowed the patient to climb Mt. Namsan tower and 63 building observatories.[8] Based on this treatment experience, Choi et al. developed a preliminary treatment protocol to be used for the treatment of PDA, called "experiential cognitive therapy" (ExCT).[9–11]

The purpose of this study was to find if the short-term (four sessions) ExCT was as effective as the traditional CBT, that is, panic control program (PCP)[12] (12 sessions) for the treatment of PDA.

MATERIALS AND METHODS

Participants

Forty subjects who were diagnosed with PDA by two psychiatrists according to DSM-IV[13] diagnostic criteria at the Inje University Seoul Paik Hospital Panic Disorder Clinic were recruited for this study. Patients who met the diagnostic criteria of organic mental disorder, schizophrenia, major depressive disorder, or obsessive-compulsive disorder were excluded, and patients with a history of internal disease, pregnancy, lactation, psychosis, or substance dependence during the last year were also excluded. Patients who had participated in CBT or other psychotherapy for panic disorder were also excluded. After acquiring the informed consent, 20 subjects were assigned randomly into ExCT, and the remainder 20 subjects into PCP.

Demographic information about ExCT patients and PCP patients is described in Table 1. There were no significant differences in gender, age, education, marital status, and duration of illness between the two groups.

Measurements

(1) Self-report measures. Several questionnaire measures commonly used in research for panic disorder were included in this study and were administered at both pre- and post-treatment: (a) Beck Depression Inventory (BDI),[14] (b) Spielberger State-Trait Anxiety Inventory (STAI),[15] (c) Anxiety Sensitivity Index (ASI),[16] (d) Agoraphobic Cognition

TABLE 1. DEMOGRAPHIC CHARACTERISTIC OF EXCT AND PCP PATIENTS

	*ExCT (*n = *20)*	*PCP (*n = *20)*
Percent male	55.0	45.0
Age (years)	35.7 (7.54)	36.7 (9.19)
Education (years)	15.1 (2.00)	14.6 (2.06)
Marital status		
Single	7 (35%)	7 (35%)
Married	12 (60%)	12 (60%)
Divorced/widowed	1 (5%)	1 (5%)
Duration of illness (months)	62.5 (46.68)	57.2 (65.02)

( ), standard deviation; ExCT, experiential cognitive therapy; PCP, panic control program.

Questionnaire (ACQ),[17] (e) Body Sensation Questionnaire (BSQ),[17] and (f) Panic Belief Questionnaire (PBQ).[18]

(2) Evaluation of improvement. End-State Functioning[19] was used to evaluate therapeutic improvement at the end of the treatment and at 6-month follow-up. A composite measure of high end-state functioning (HES) was based upon the following criteria: (1) zero panic attacks during the 4 weeks of monitoring in the assessment period (panic free); (2) 2 or less on the nine-point Clinician's Severity Rating of ADIS-R (Anxiety Disorders Interview Schedule–Revised).[20] In order to examine whether panic disorder patients may discontinue or reduce medication after treatment, patients were asked about their use of medication at the end of the treatment and at 6-month follow-up.

(3) Tapering medication and discontinuation schedule. Tapering medication was tried in the middle phase of treatment, and patients were told about the possible consequence of tapering medication and discontinuation. Clinical evaluation related with tapering or discontinuation was conducted once a week during the sessions. Patients were encouraged and supported in coping within difficulty in tapering medication and discontinuation. Criteria of successful medication discontinuation were as follows: (a) did not use medicine as needed more than two times for 2 weeks after discontinuation (doses did not exceed 0.5 mg each time in the case of using Alprazolam or Clonazepam), and (b) discontinued medication after 2 weeks of discontinuation.

Treatment

Panic Control Program (PCP). Twenty subjects received PCP which was developed by Barlow and Craske.[12] PCP was given with a group format for 12 2-h weekly sessions. PCP consisted of several components, which were psychoeducation (session 1–2), breathing retraining and muscle relaxation training (sessions 3–5), cognitive restructuring (session 6–8), interoceptive exposure (session 9), and *in vivo* exposure (sessions 10–12).

Experiential Cognitive Therapy (ExCT). Twenty subjects assigned to ExCT received a total of four weekly sessions, which consisted of 2-h group therapy and 30 min of individual VR therapy. Specifically, the first session consisted of psychoeducation and cognitive restructuring. After the group session subjects were asked to participate in 30 min of an individual session using VR. In the second session, subjects were taught diaphragmatic breathing and relaxation techniques in group format, and after the group session VR therapy was performed individually. The third session, interoceptive exposure was performed in group format, and then individual VR therapy was performed. In session 4, subjects were asked to participate in the *in vivo* exposure accompanied with therapists in challenging the subway, bus, cable car, and tower, for example.

Statistical analysis

To compare pretest and posttest scores in the ExCT And PCP groups, the data were analyzed using *t*-tests.

RESULTS

The *t*-tests of several self-report measures of ExCT at post-treatment showed significant improvements over pre-treatment. Also, *t*-tests of the several self-report measures of PCP at post-treatment showed significant improvements over pre-treatment (Table 2).

There were no significant differences between the two groups in all the pre-treatment measures. The pre- and post-differences in several measures between the two groups were compared to examine which treatment would be relatively effective. There was a significant group difference only in PBQ, while other measures showed no significant group differences (Table 3).

We also calculated Cohen's *d* and *r* effect sizes to evaluate the differences in the treatments using some indices that are independent of sample size (Table 3). The results showed small/medium effect sizes for most of the differences between the two treatments: ExCT was able to induce higher modification in the State score of the STAI questionnaires (effect size: 0.24); PCP instead produced a higher modification in all the measures related to the cognitive evaluation of the anxiety feeling (their effect size was always higher than 0.2, with a *r* value of 0.335 for the PBQ).

Table 4 presents the results of group comparison in medication discontinuation and high end state functioning to compare the degree of improvements between two groups at post-treatment and 6-month follow-up. ExCT and PCP groups did not show significant differences in medication discontinuation ($\chi^2 = 4.56$, $p > 0.05$), and HES ($\chi^2 = 0.10$, $p > 0.05$) at post-treatment. At 6-month follow-up, the two groups did not show significant difference in HES ($\chi^2 = 1.03$, $p > 0.05$), but did show significant difference in medication discontinuation ($\chi^2 = 8.47$, $p < 0.05$). That is, comparing the two groups, more

TABLE 2. COMPARISON OF PRE-POST TEST SCORES IN EXCT AND PCP GROUPS

	ExCT (n = *20*)			*PCP* (n = *20*)		
	Pretest, M (SD)	*Posttest, M (SD)*	t-*test*	*Pretest, M (SD)*	*Posttest, M (SD)*	t-*test*
STAI-State	65.11 (8.32)	36.89 (18.22)	5.34***	61.42 (11.04)	42.42 (8.66)	6.37***
STAI-Trait	61.82 (7.76)	48.24 (5.95)	5.71***	61.84 (10.12)	46.37 (10.81)	5.77***
ASI	31.47 (10.68)	19.16 (11.52)	3.94**	36.85 (10.81)	15.65 (11.38)	6.40***
BDI	20.68 (9.21)	11.16 (8.31)	4.66***	24.80 (11.09)	10.25 (8.08)	5.78***
PBQ	150.61 (36.68)	106.78 (37.45)	4.79***	159.79 (21.93)	90.79 (29.41)	9.55***
ACQ	37.53 (13.99)	27.89 (9.75)	3.10**	38.50 (11.39)	22.35 (6.86)	5.12***
BSQ	52.37 (14.78)	38.26 (11.67)	4.43***	55.95 (18.44)	34.63 (7.83)	5.38***

STAI-State, Spielberger State Anxiety Inventory; STAI-Trait, Spielberger Trait Anxiety Inventory; ASI, Anxiety Sensitivity Index; BDI, Beck Depression Inventory; PBQ, Panic Belief Questionnaire; ACQ, Agoraphobic Cognition Questionnaire; BSQ, Body Sensation Questionnaire; ExCT, experiential cognitive therapy; PCP, panic control program.

**$p < 0.01$; ***$p < 0.001$.

patients in the PCP group discontinued medication at 6-month follow-up.

DISCUSSION

It was November 1992 when the idea for applying VR to the treatment of phobias to supplement the weak points of imaginal exposure and *in vivo* exposure was first proposed at the meeting of Human–Computer Interaction Group of Clark Atlanta University.[21] Thereafter, several studies investigating the efficacy of VR therapy phobic situations such as flight fear, height fear, or speech fear have been conducted.

ExCT, which originally developed as an individual format was performed in group format for this research, and the results showed that the effectiveness of ExCT was similar to the effectiveness of traditional CBT, that is, PCP. These results were consistent with the previous results of studies that briefly modified CBT and were not significantly different in effectiveness of the treatment outcome compared to traditional CBT consisting of 12–15 sessions.[25–27]

Clark et al.[27] compared the therapeutic efficacy between brief cognitive therapy (BCT: five sessions) and full cognitive therapy (FCT: 12 sessions) for panic disorder patients. They suggested that BCT was superior to a wait-list control group, and did not differ from FCT at post-treatment or at follow-up. It was their impression that extensive use of between-session self-study modules was very useful and was one of the key therapeutic ingredients. However, they suggested that it seemed unlikely that patients would be consistently willing to drop

TABLE 3. GROUP COMPARISON OF PRE-POST DIFFERENCE SCORES

	ExCT, M (SD)	*PCP, M (SD)*	*Cohen's* d	*Effect size* r	t-*test*
STAI-state	28.22 (22.43)	19.00 (13.00)	0.503	0.244	1.52
STAI-trait	13.59 (9.82)	15.47 (11.70)	−0.174	−0.087	−0.52
ASI	12.32 (13.63)	21.20 (14.81)	−0.624	−0.298	−1.95
BDI	9.53 (8.91)	14.55 (11.26)	−0.494	−0.240	−1.54
PBQ	43.83 (38.84)	69.00 (31.49)	−0.712	−0.335	−2.17*
ACQ	9.63 (13.52)	16.15 (14.21)	−0.470	−0.229	−1.47
BSQ	14.11 (13.87)	21.32 (17.28)	−0.460	−0.224	−1.42

STAI-State, Spielberger State Anxiety Inventory; STAI-Trait, Spielberger Trait Anxiety Inventory; ASI, Anxiety Sensitivity Index; BDI, Beck Depression Inventory; PBQ, Panic Belief Questionnaire; ACQ, Agoraphobic Cognition Questionnaire; BSQ, Body Sensation Questionnaire; ExCT, experiential cognitive therapy; PCP, panic control program.

*$p < 0.05$.

TABLE 4. GROUP COMPARISON OF IMPROVEMENT AT POST-TREATMENT AND 6-MONTH FOLLOW-UP

	Post-treatment		*6-month follow-up*	
	ExCT (n = *20)*	*PCP* (n = *20)*	*ExCT* (n = *20)*	*PCP* (n = *20)*
Medication				
Stop	1 (5%)	3 (15%)	4 (20%)	12 (60%)
Intermittently	2 (10%)	5 (25%)	6 (30%)	2 (10%)
Regularly	9 (45%)	9 (45%)	2 (10%)	3 (15%)
No medication	8 (40%)	3 (15%)	8 (40%)	3 (15%)
HES	11 (55%)	12 (60%)	12 (60%)	15 (75%)

ExCT, experiential cognitive therapy; PCP, panic control program; HES, high end-state functioning.

their safety behaviors in feared situations and during panic attacks if they had not had the opportunity to discuss, and often practice, the crucial but highly threatening self-study modules with a therapist. In addition, they proposed that although five sessions of BCT were spread over 3 months to allow an appropriate comparison with FCT and the waitlist condition, in normal clinical practice closer spacing of sessions might be desirable.

Also, weekly 1-h session is common in clinics, but it is questionable whether this type of scheduling is optimal. Salkovskis et al.[28] investigated the effectiveness of four sessions of cognitive therapy spread over 10 days in a group of patients with panic disorder and severe agoraphobic avoidance, and reported that this treatment was more effective than an equivalent number of sessions of traditional exposure therapy. Clark et al.[29] reported a successfully treated case of panic disorder without agoraphobia in which most of the therapy was completed in a single 4-h session after the patient had completed some of the self-study modules.

Recently, Spiegel et al.[30] who has experienced the efficacy of 8-day intensive treatment in panic disorder with moderate to severe agoraphobia, suggested that the core aspects of treatment were removing all safety signals of patients and repeating exposure, then patients could recognize the consequences of non-dangerous panic attacks in contrast with their anticipation.

Then, what are the factors by which ExCT used in this research can be effective? It would be difficult to find the key factors without component analysis, but some possible factors in this research may be considered.

First, as Clark et al.[27] emphasized, the fact that change of cognition was the key point to improve and was emphasized consistently by the authors during treatment as in traditional cognitive therapy, and somewhat insufficient practices during in-session were supplemented by using self-treatment assignments. Second, it may be presumed that each patient was prepared to confront *in vivo* exposure through individual VR therapy at the end of each session. Third, improved patients in groups were used as therapeutic models for the other group members. Finally, self-help groups for the panic disorder named "smiling meeting," which was founded by the authors and the patients who completed group CBT, were worked as a facilitator for the improvement.

Although these factors might be overlapped with the therapeutic factors of traditional group CBT, the authors thought that more active and intensive exposure was needed and the opportunity of VR exposure was offered in order to compensate the shortness of therapy time in ExCT compare to PCP.

These results revealed that ExCT which was originally developed as an individual therapy format was as effective as in group format and was efficient for the aspect of cost-benefit analysis. Furthermore, ExCT showed almost similar therapeutic effect compared to the effectiveness of traditional 3-month CBT. These results showed the possibility of modification in therapeutic method and duration for future CBT of PDA.

However, we should not overlook the fact that the rate of tapering and discontinuation of medication was significantly different between ExCT and PCP at 6-month follow-up. The rate of discontinuation of medication was not different significantly between two groups at post-treatment, but the number of subjects in PCP who could discontinue their medication was gradually increased than the number of subjects in ExCT at 6-month follow-up. These results suggested that, although short-term effectiveness of ExCT might be comparable to the effectiveness of PCP, long-term effectiveness of ExCT might be relatively inferior to the effectiveness of PCP.

These differences in the effectiveness might be due to the lack of time assigned to cognitive restructuring process in ExCT, which was regarded as a key component of PCP, consisted of understanding cognitive model, identifying and modifying automatic

thoughts, and core beliefs. A support to this hypothesis comes from the differences in effect sizes found in the study. We found that ExCT was more effective in addressing the state component of the anxiety; PCP instead was more effective in modifying the measures related to the cognitive evaluation of anxiety. Further research about long-term effectiveness of ExCT is needed.

Despite the several significant findings, the present study had several limitations. First, the number of subjects in ExCT was relatively small and the evaluation of the outcome was largely dependent on patients' self-report. It is necessary for future research to recruit more subjects and include objective measures for the comprehensive evaluation of the outcome. Second, because not all subjects in ExCT could sufficiently immerse in the VR scenes, some subjects could not feel vivid fear during VR exposure. So, it was necessary to use additional stimuli (e.g., verbal threatening cues from the operator) for the patients to immerse in VR scenes. Finally, it was not clear whether the improvement of subjects in ExCT was due to the effect of CBT itself or VR exposure itself or both in this study design.

We need to develop more effective VR environments and future research should be focused on modifying ExCT more effectively and analyzing key ingredients of ExCT.

ACKNOWLEDGMENTS

This research was supported by the Korea Science and Engineering Foundation, grant no. KOSEF R01-2002-000-00327-0.

REFERENCES

1. Clum, G.A., Clum, G.A., & Surls, R. (1993). A meta-analysis of treatments for panic disorder. *Journal of Consulting & Clinical Psychology* 61:317–326.
2. Gould, R.A., Otto, M.W., & Pollack, M.H. (1995). A meta-analysis of treatment outcome for panic disorder. *Clinical Psychology Review* 15:819–844.
3. Barlow, D.H. (1988). The nature and treatment of anxiety and panic. In: Barlow, D.H. (ed.), *Anxiety and its disorders.* New York: Guilford Press, pp. 328–379.
4. Clark, D., Salkovskis, P., Gelder, M., et al. (1988). Tests of a cognitive theory of panic. In: Hand, I., & Wittchen, H. (eds.), *Panic and phobias,* 2nd ed. Berlin: Springer-Verlag.
5. Clark, D.M., & Wells, A. (1997). Cognitive therapy for anxiety disorder. In: Dickstein, L.J., Riba, M.B., & Oldham, J.M. (eds), *Review of psychiatry. Vol. 16.* Washington, DC: American Psychiatric Press.
6. Bullinger, A.H., Roessler, A., & Mueller-Spahn, F. (1998). From toy to tool: the development of immersive virtual reality environments for psychotherapy of specific phobia. In: Riva, G., et al. (eds.), *Virtual environments in clinical psychology & neuroscience. Studies in health technology and informatics. Vol. 58.* Amsterdam: ISO Press, pp. 103–111.
7. North, M.M., North, S.M., & Coble, J.R. (1996). Effectiveness of virtual environment desensitization in the treatment of agoraphobia. *Presence* 5:127–132.
8. Choi, Y.H., Jang, D.P., Ku, J.H., et al. (2001). Short-term treatment of acrophobia with virtual reality therapy (VRT): a case report. *CyberPsychology & Behavior* 4:349–354.
9. Vincelli, F., Choi, Y.H., Molinary, E., et al. (2000). Experiential cognitive therapy for the treatment of panic disorder with agoraphobia: definition of a clinical protocol. *CyberPsychology & Behavior* 3:375–385.
10. Wiederhold, B.K., & Wiederhold, M.D. (2004). *Virtual reality therapy for anxiety disorders: advances in education and treatment.* Washington, DC: American Psychological Association.
11. Riva, G., Botella, C., Légeron, P., et al. (2004). *Cybertherapy: Internet and virtual reality as assessment and rehabilitation tools for clinical psychology and neuroscience.* Amsterdam: IOS Press. Available: <www. cybertherapy.info/pages/book3.htm>.
12. Barlow, D.H., & Craske, M.G. (1994). *Mastery of your anxiety and panic–II.* Albany, NY: Graywind.
13. American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders,* 4th ed. Washington, DC: Author.
14. Beck, A.T., Ward, C.H., Mendelson, M., et al. (1961). An inventory for measuring depression. *Archives of General Psychiatry* 4:561–571.
15. Spielberger, C.D., Gorsuch, R.L., & Lushene, R.E. (1970). *Manual for the State-Trait Anxiety Inventory.* Palo Alto, CA: Consulting Psychologists Press.
16. Reiss, S., Peterson, R.A., Gursky, D.M., et al. (1986). Anxiety sensitivity, anxiety frequency and the prediction of fearfulness. *Behavior Research & Therapy* 24:1–8.
17. Chambless, D.L., Caputo, G.S., Bright, P., et al. (1984). Assessment of fear on agoraphobics. The Bodily Sensation Questionnaire and the Agoraphobic Cognitions Questionnaire. *Journal of Consulting and Clinical Psychology* 52:1090–1097.
18. Greenberg, R.L. (1989). Panic disorder and agoraphobia. In: Scott, J., Williams, J.M.G., & Beck, A.T. (eds.), *Cognitive therapy in clinical practice: an illustrative casebook.* New York: Routledge, pp. 25–49.
19. Barlow, D.H. (1990). Long-term outcome for patients with panic disorder treated with cognitive-behavioral therapy. *Journal of Clinical Psychiatry* 51:17–23.
20. Di Nardo, P.A., & Barlow, D.H. (1988). *Anxiety Disorders Interview Schedule, Revised (ADIS-R).* Albany, NY: Graywind Publications.
21. North, M.M., & North, S.M. (1994). Virtual environments and psychological disorders. *Electronic Journal of Virtual Culture* 2:37–42.

22. Rothbaum, B.O., Hodges, L., Kooper, R., et al. (1995). Effectiveness of computer-generated (virtual reality) graded exposure in the treatment of acrophobia. *American Journal of Psychiatry* 152:626–628.
23. Rothbaum, B.O., Hodges, L., & Kooper, R. (1997). Virtual reality exposure therapy. *Journal of Psychotherapy: Practice & Research* 6:219–226.
24. Williford, J.S., Hodges, L.F., North, M.M., et al. (1993). Relative effectiveness of virtual environment desensitization and imaginal desensitization in the treatment of acrophobia. *Proceedings of Graphics Interface '93 Conference,* p. 162.
25. Craske, M.G., Maidenberg, E., & Bystritsky, A. (1995). Brief cognitive-behavioral versus nondirective therapy for panic disorder. *Journal of Behavior Therapy and Experimental Psychiatry* 26:113–120.
26. Newman, M.G., Kenardy, J., Herman, S., et al. (1997). Comparison of palmtop-computer-assisted brief cognitive-behavioral treatment to cognitive-behavioral treatment for panic disorder. *Journal of Consulting and Clinical Psychology* 65:178–183.
27. Clark, D.M., Salkovskis, P.M., Hackmann, A., et al. (1999). Brief cognitive therapy for panic disorder: a randomized controlled trial. *Journal of Consulting and Clinical Psychology* 67:583–589.
28. Salkovskis, P.M., Clark, D.M., Hackmann, A., et al. (1997). Panic disorder with severe agoraphobia: comparing exposure with a cognitive or behavioural emphasis. Presented at the 25th Annual Conference of the British Association of Behavioural and Cognitive Therapies, Canterbury, UK.
29. Clark, D.M. (1996). Panic disorder: from theory to therapy. In: Salkovskis, P.M. (ed.), *Frontiers of cognitive therapy*. New York: Guilford Press, pp. 328–332.
30. Spiegel, D.A., Heinrich, N., & Baker-Morissette, S. (2002). 8-day treatment of panic disorder with moderate to severe agoraphobia. Presented at the 36th Annual Convention of Association for Advancement of Behavior Therapy, Reno, Nevada.

Address reprint requests to:
Dr. Kee H. Park
Department of Psychology
Catholic University of Korea
Bucheon, South Korea

E-mail: psyclinic@catholic.ac.kr

This article has been cited by:

1. Soledad Quero, M. Ángeles Pérez-Ara, Juana Bretón-López, Azucena García-Palacios, Rosa M. Baños, Cristina Botella. 2014. Acceptability of virtual reality interoceptive exposure for the treatment of panic disorder with agoraphobia. *British Journal of Guidance & Counselling* **42**:2, 123-137. [CrossRef]
2. Michael J. Telch, Adam R. Cobb, Cynthia L. LancasterAgoraphobia 941-978. [CrossRef]
3. Yun Ling, Willem-Paul Brinkman, Harold T. Nefs, Chao Qu, Ingrid Heynderickx. 2012. Effects of Stereoscopic Viewing on Presence, Anxiety, and Cybersickness in a Virtual Reality Environment for Public Speaking. *Presence: Teleoperators and Virtual Environments* **21**:3, 254-267. [CrossRef]
4. Michelle G. Newman, Lauren E. Szkodny, Sandra J. Llera, Amy Przeworski. 2011. A review of technology-assisted self-help and minimal contact therapies for anxiety and depression: Is human contact necessary for therapeutic efficacy?. *Clinical Psychology Review* **31**:1, 89-103. [CrossRef]
5. David Opriş, Sebastian Pintea, Azucena García-Palacios, Cristina Botella, Ştefan Szamosközi, Daniel David. 2011. Virtual reality exposure therapy in anxiety disorders: a quantitative meta-analysis. *Depression and Anxiety* n/a-n/a. [CrossRef]
6. Ivan Alsina-Jurnet, José Gutiérrez-Maldonado, María-Virgina Rangel-Gómez. 2011. The role of presence in the level of anxiety experienced in clinical virtual environments. *Computers in Human Behavior* **27**:1, 504-512. [CrossRef]
7. Katharina Meyerbröker, Paul M.G. Emmelkamp. 2010. Virtual reality exposure therapy in anxiety disorders: a systematic review of process-and-outcome studies. *Depression and Anxiety* **27**:10, 933-944. [CrossRef]
8. Rafael C. Freire, Marcele R. De Carvalho, Mateus Joffily, Walter A. Zin, Antonio E. Nardi. 2010. Anxiogenic properties of a computer simulation for panic disorder with agoraphobia. *Journal of Affective Disorders* **125**:1-3, 301-306. [CrossRef]
9. T PARSONS, A RIZZO. 2008. Affective outcomes of virtual reality exposure therapy for anxiety and specific phobias: A meta-analysis. *Journal of Behavior Therapy and Experimental Psychiatry* **39**:3, 250-261. [CrossRef]
10. Alessandra Gorini, Giuseppe Riva. 2008. Virtual reality in anxiety disorders: the past and the future. *Expert Review of Neurotherapeutics* **8**:2, 215-233. [CrossRef]
11. Giuseppe RivaVirtual Reality . [CrossRef]