

## **Better Than Drugs: VR, Meditation and Pain**

Dr. Diane Gromala

### **Bibliography**

#### **VR as a Therapeutic Modality**

Botella, C. M., Juan, M.C., Baños, R.M., Alcañiz, M., Guillén, V. & Rey. B., "Mixing realities? An application of augmented reality for the treatment of cockroach phobia," *CyberPsychology & Behavior* 8(2): 162-171 (2005).

De Boeck, J. Raymaekers, C. & Coninx, K. (2006) Exploiting Proprioception to Improve Haptic Interaction in a Virtual Environment. *Presence*, 15(6), 627-636.

Emmelkamp, P., "Post-traumatic Stress Disorder: Assessment and follow-up," M.J. Roy (Ed.) [Novel Approaches to the Diagnosis and Treatment of Posttraumatic Stress Disorder], IOS Press, Washington, 309-320 (2006).

Brinkman, W. van der Mast, C., & de Vliegher, D. (2008). Virtual Reality Exposure Therapy for Social Phobia: A Pilot Study in Evoking Fear in a Virtual World. *Proceedings of the 22nd HCI 2008 Workshop - HCI for Technology Enhanced Learning*, Liverpool, UK, 29-35.

Krijn, M., Emmelkamp, P., Ólafsson, R., Bouwman, M., van Gerwen, M. L., Spinhoven, P., Schuemie, M. J., & van der Mast, C. A., "Fear of flying treatment methods: Virtual reality exposure vs. cognitive behavioral therapy," *Aviation, Space and Environmental Medicine* 78 (2), 121-128 (2007).

Mahrer, N. & Gold, J. (2009). The Use of Virtual Reality for Pain Control: A Review. *Current Pain and Headache Reports* 2009, 13:100-109.

Robillard, G., Bouchard, S., Fournier, T., & Renaud, P. (2003). Anxiety and Presence during VR Immersion: A Comparative Study of the Reactions of Phobic and Non-phobic Participants in Therapeutic Virtual Environments Derived from Computer Games. *CyberPsychology & Behavior*, 6 (5), 467-476.

Rothbaum, B., Hodges, L., Smith, S., Lee, J. H., & Price, L., "A controlled study of virtual reality exposure therapy for the fear of flying," *Journal of Consulting and Clinical Psychology* 68 (6), 1020-1026 (2000).

Rothbaum, B. O., Hodges, L., Alarcon, R., Ready, D., Shahar, F., Graap, K., Pair, J., Hebert, P., Gotz, D., Wills, B. and Baltzell, D., "Virtual reality exposure therapy for PTSD Vietnam veterans: A case study," *Journal of Traumatic Stress* 12(2), 263-271 (2004).

Slater, M. Presence Blog: <http://presence-thoughts.blogspot.com/>

## **Pain**

Gatchel, R., Peng, Y., Peters, M., Fuchs, P. and Turk, D., "The biopsychosocial approach to chronic pain: Scientific advances and future directions," *Psychological Bulletin* 133(4), 581-624 (2007).

Turk, D. C. & Nash, J. M., "Chronic pain: New ways to cope" Goleman, D. & Gurin, J. (Eds.) [Mind body medicine: How to use your mind for better health], Consumer Reports Books, New York (1993).

Scientific American: <http://www.scientificamerican.com/article.cfm?id=new-culprits-in-chronic-pain>

Melzack, R. and Wall, P.D., [The Challenge of Pain], Penguin, New York (1996).

Scarry, E., [The Body in Pain], Oxford University Press, Oxford (1987).

Morris, D., [The Culture of Pain]. University of California Press, Berkeley (1993).

Schatman, M., & Campbell, A., [Chronic Pain Management: Guidelines for Multidisciplinary Program Development], Informa Healthcare, New York (2007).

Turk, D. C. & Nash, J. M. (1993). Chronic pain: New ways to cope. In Goleman, D. & Gurin, J. (Eds.) Mind body medicine. New York, NY, USA: Consumer Reports Books.

(Citation: pain is experienced & communicated differently according to specific cultures; social stigmas vary wildly)

## **VR & Pain**

VR is more effective than opiates for ACUTE pain ---> Gromala's alternative approach for CHRONIC pain (self-modulation)

Gatchel, R. (2009) Biofeedback as an Adjunctive Treatment Modality in Pain Management. *American Pain Society Bulletin*, 14 (4). Retrieved 10 March 2009, from <http://www.ampainsoc.org/pub/bulletin/jul04/clin1.htm>

Hoffman, H.G., & Patterson, D. (2005). Virtual Reality Pain Distraction. *American Pain Society Bulletin* 15 (2). Retrieved 31 March 2009, from <http://www.ampainsoc.org/pub/bulletin/spr05/inno1.htm>

Hoffman, H., Doctor, J., Patterson, D., Carrougher, G. and Furness III, T., "Use of virtual reality for adjunctive treatment of adolescent burn pain during wound care: A case report," *Pain* 85(1-2), 305-309 (2000).

Hoffman, H. G., Sharar, S., Coda, B., Everett, J., Ciol, M., Richards, T. and Patterson, D., "Manipulating presence influences the magnitude of virtual reality analgesia," *Pain* 111(1-2), 162-168 (2004).

Hoffman, H.G., Richards, T., Coda, B., Bills, A, Blough, D., Richards, A., & Sharar, S. (2004a). Modulation of Thermal Pain-related Brain Activity with Virtual Reality: Evidence from fMRI. *Neuroreport*, 15 (8), 1245-1248.

Shaw, C., Gromala, D. and Song, M., "The meditation chamber: Towards self-modulation," Mura, G. (Ed.) [Metaplasticity in Virtual Worlds: Aesthetics and Semantics Concepts], IGI Publishing (Forthcoming 2010).

Steele, E., Grimmer, K., Thomas, B., Mulley, B., Fulton, I., & Hoffman, H., "Virtual reality as a pediatric pain modulation technique: A case study," *CyberPsychology & Behavior* 6 (6), 633-638 (2003).

Mahrer, N. and Gold, J., "The use of virtual reality for pain control: A review," *Current Pain and Headache Reports* 200913:100-109 (2009).

Shaw, C., Gromala, D. and Fleming Seay, A., "The meditation chamber: Enacting autonomic senses," *Proc. ENACTIVE/07*, 405-408 (2007).

Villanueva, L. (2009) Diffuse Noxious Inhibitory Control (DNIC) as a tool for exploring dysfunction of endogenous pain modulatory systems. *Pain*, 143 (3), 161-162.

### **Meditation**

Kabat-Zinn, J., [Coming to Our Senses: Healing Ourselves and the World Through Mindfulness], Hyperion Publishers, New York (2006).

Kabat-Zinn, J.. "Mindfulness meditation: Health benefits of an ancient Buddhist practice" Goleman, D. & Gurin, J. (Eds.) [Mind body medicine: How to use your mind for better health], Consumer Reports Books, New York (1993).

Lutz, A., Slagter, H., Dunne, J.D., & Davidson, R.J., "Attention regulation and monitoring in meditation," *Trends in Cognitive Science* 12(4), 163-169 (2008).

Tulku, T. (1977). *Gesture of Balance: A Guide to Self-Healing & Meditation*. Berkley, CA: Dharma Publishing.

### **Representation (incommensurability of pain, following Scarrey)/ Post-Existentialist Phenomenology (contemporary theorists following Merleau-Ponty)**

Bolter, J. & Gromala, D. (2005) *Windows and Mirrors: Interaction Design, Digital Art and the Myth of Transparency*. Cambridge, MA: MIT Press.

Elkins, J. (1999) *Pictures of the Body: Pain and Metamorphosis*. Stanford: Stanford University Press.

Gromala, D. (2000) Pain and subjectivity in virtual reality. In Bell, D. (Ed.), *The Cybercultures Reader* (pp. 598-608). Routledge: London.

Morris, D. (1993) *The Culture of Pain*. Berkeley: University of California Press.

Sturken, M. and Cartwright, L., [*Practices of Looking: An Introduction to Visual Culture*], Oxford University Press, Oxford (2001).

Shaw, C., Gromala, D., & Fleming Seay, A. (2007). *The Meditation Chamber: Enacting Autonomic Senses*. Proceedings of ENACTIVE/07, 4th International Conference on Enactive Interfaces, Grenoble, France, 19-22 November 2007, 405-408.

Song, Meehae. (2009). *Virtual Reality for Cultural Heritage Applications*. VDM-Verlag Dr. Muller: Saarbrücken.

(Citation: contemporary phenomenologists: Andy Clark, F. Varela, et al.; body image/body schema; inextricability of mind/body/world)