MIND IN THE GAP BETWEEN NEURAL AND SOCIAL NETWORKS – CYBERSPACE AND VIRTUAL REALITY IN PSYCHIATRY AND HEALTHCARE

Šendula-Jengić, Vesna; Šendula-Pavelić, Martina; Hodak, Jelena

Psychiatria Danubina, 2016; Vol. 28, No. 2, pp 100-103 *View point article*

MIND IN THE GAP BETWEEN NEURAL AND SOCIAL NETWORKS – CYBERSPACE AND VIRTUAL REALITY IN PSYCHIATRY AND HEALTHCARE

Vesna Šendula-Jengić[1, 2], Martina Šendula-Pavelić[2] & Jelena Hodak[1]
[1]*Psychiatric Hospital Rab, Rab, Croatia*
[2]*Faculty of Health Studies, University of Rijeka, Rijeka, Croatia*

received: 7.12.2015; revised: 29.3.2016; accepted: 15.4.2016

SUMMARY

In terms of health and healthcare cyberspace and virtual reality can be used differently and for different purposes and consequently create different outcomes. The three main areas which we shall discuss here are: 1) cyberspace as provider of health information and self-help resources, since the anonymity cyberspace provides is particularly important in the highly stigmatized field of psychiatry where a large number of people never seek professional help, which in turn negatively affects not only the person in question, but the family and ultimately the society (work efficiency, disability-adjusted life year - DALY, etc.), 2) cyberspace and virtual reality (VR) as cause of psychopathology, starting from violent behaviour, to addictive behaviour and other, 3) and finally cyberspace and VR as providers of efficient professional therapy in the field of psychiatry.

Key words: *psychiatry – psychopathology – cyberspace - social networks - virtual reality*

* * * * *

INTRODUCTION

Modern trends in neuroscience, neurology, psychiatry and neuropsychology suggest there are areas of the brain responsible for adaptive behaviour, integration and social cognition, and cognition and emotion are interdependent and mutually invigorating. Many factors strongly influence the physiological processes in the brain and disrupt the homeostasis with consequent functional, biochemical and morphological changes. The secrets of the brain have still not been revealed to the point where we could rely on genetic determinism and neuro-programing. However, in the world of science the topic of neuroprediction is increasingly present.

We live in a rapidly changing world in which often the most inhumane and the cruellest ideas are promoted in the name of comfort and well-being of humanity. The time of powerful technologies seeks and finds new ways to reach the human brain and changes our perceptions of the world. Will the psychic profile or status as known in classical clinical psychiatry, completely be replaced by Facebook profile? Are we more aware of our consciousness or is our daily functioning changing and we are not even aware of it?

The irresistible attraction, (un)reliable security and the emergence of new addictions to something virtual is showing growing psychological and economic consequences in the real world. The effects on our cognition and its domain passionately engage the emotions, and emotions are a guide and a quick transfer of energy that can moderate the mind whenever they want.

Alluring electronic devices can provide almost instant information and feedback, and elicit a wide range of sensations. Fun and social networking are the primary reasons of joining the virtual world. Millions of people use this space to explore their alternative identities, social roles and environments with the help of virtual representations of themselves, their digital avatars (Slater et al. 2010, Przybylski et al. 2012).

This immense cyberspace is a relatively new channel of communication, highly versatile and quickly changing. Created by human, used by human, changed by human… or is this last changing going in reverse direction? Maybe the process has become reciprocal. The tool we are using (e.g. Internet) affects us, our behaviour and ultimately our mental health. The change can go either way, towards the positive or the negative pole.

In terms of health and healthcare cyberspace and virtual reality can be used differently and for different purposes as well as have different consequences. The three main areas which we can discuss here are: cyberspace as provider of health information, cyberspace and virtual reality (VR) as provider of self-help resources or professional therapy and finally, cyberspace and VR as cause of psychopathology.

DISCUSSION

Cyberspace: a source of good and bad

There are many reasons why a large number of people with mental health problems never seek professional help. Overcoming the burden of stigma is probably one of the greatest issues, but time and money

could also be seen as large obstacles. Whichever the cause, untreated mental illness takes a high toll not only on the person in question, but the family and ultimately the society, in both psychological and economic sense (work efficiency, disability-adjusted life year - DALY, etc.). The Internet in this case proves to be very beneficial. It offers the needed confidentiality and is readily available, which makes it a perfect first choice for seeking information about mental health.

However, the problem is that the quality and accuracy of the information on the Internet vary greatly, depending on the source and many people lack the skills to evaluate the reliability of online information. Another problem is lack of computer literacy which is often the case with elderly population (Sheng & Simpson 2013), although this can be relatively easily overcome by educational programs for the elderly (Tse et al. 2008).

The next level of seeking help online is via online support groups. Among the many social networking sites (SNS) Facebook is currently by far the most widely used SNS with 900 million users worldwide in November 2015 (eBizMBA Rank). The fact that interpersonal social support is beneficial to mental health, well-being and quality of life has so far been quite firmly scientifically confirmed (Herbert & Cohen 1993, Jensen et al. 2014). However, the current evidence of the same effect mediated through social networking sites is conflicting (McCloskey et al. 2015, Nabi et al. 2013) and requires further research.

The same virtual space can also be a source of negative social interactions (e.g. cyberbullying, cyberstalking, etc.), leading to serious psychological and emotional problems and sometimes tragic consequences in real life.

Offering a wide range of contents, such as audio, video, interactive, and gaming, the Internet is a platform on which a number of addictive behaviours can be provoked and exercised: internet addiction, Facebook addiction, online gaming addiction, online gambling addiction, etc. Research on the prevalence of various pathological cyberspace behaviours, the causes that may have led to them and their repercussions or relationship to real life physical, cognitive, emotional or other mental health problems is growing, and catching a glimpse of the numerous aspects of the relationship of cyberspace and its repercussions on real life and human health. However, much more research is needed in each of the small niches in order to gain more insight and stronger evidence of a particular problem or relationship.

Therapy via Cyberspace and VR

Cyberspace and Virtual Reality (VR) offer numerous possibilities of trying out new activities and experiencing different pleasures. The selection of avatar roles is most frequently based on an idealized self-perception (Przybylski et al. 2012). A large body of research of virtual worlds is directed to the research of violence and addiction in which the virtual experience in a computer game is seen as a possible catalyst and trigger for the development of a range of mental disorders (Lam et al. 2013). Fortunately, the same mechanism can also lead in the opposite direction. The behaviour of avatars in the virtual world and the identification of the player affect the self-perception, opinions and emotions in the real life. If the online environment fulfils the psychological needs in the sense of long-term accumulation of daily experience of autonomy, competence and sense of connectedness, it can reduce the gap between a person's real and idealized traits and thus increase the subjective satisfaction with life (Ryan & Deci 2010, Rigby & Ryan 2011).

Virtual Reality (VR) is a computer-generated 3D simulation of world or environment that can be explored interactively through a variety of computer peripheral devices, like a helmet with an inside screen, gloves etc. Initially developed for use by the military and entertainment industries, VR environments like in Second Life, Avination or other more specific games are designed in cooperation with software experts for specific therapy purposes. Innovative learning and training with high level of interactivity, immersion and elevated motivation allows the user to feel as though he is a part of the VR.

For the last two decades virtual worlds have been used in clinical practice as efficient tools in the prevention of physical and emotional illness, as well as in rehabilitation processes. The virtual experience can be an "empowering environment".

The potential of virtual games to increase wellbeing and satisfaction has recently been the subject of research as well as its value in the area of cognition, problem solving, decision making, affective and social learning. It has been studied how emotions are embedded in games and what mechanisms in games sustain affective learning (Dormann et al. 2013).

Some research finds that virtual games can contribute to improvement in introspection, better understanding of emotions and socioemotional learning. They can affect improvement of mental health and be a strong element of social support (Gale et al. 2014). The potential of virtual games lies also in the increased levels of subjective feeling of satisfaction, increase of wellbeing and in the area of cognitive, affective and social learning, problem solving and prosocial behaviour in real life (Rosenberg et al. 2013, Gentile et al. 2009, Greitemeyer & Osswald 2011).

VR health care applications have been applied and studied for surgical procedures, medical therapy, preventive medicine, visualization of databases, skill enhancement, physical and cognitive rehabilitation, medical education and training. Apart from therapeutic purposes, VR is also used in research, diagnostics as well as rehabilitation. For example, it is used along with fMRI brain scans for the study of neural correlates of psychological disorders and to study the impact of therapy on patterns of brain activity. Virtual reality is also used in the assessment of cognitive abilities and

neurocognitive rehabilitation of specific disabilities resulting from brain injury or stroke (Shapi'i et al. 2015, Laver et al. 2012), and cognitive rehabilitation in schizophrenia (Ku et al. 2007, La Paglia et al. 2013).

Virtual reality based technologies and virtual games are used as an adjunctive therapy for distraction from acute pain during painful medical procedures, for the acute pain of labor, burn injuries and dental pain (Wiederhold et al. 2014, Tanja-Dijkstra et al. 2014, Hoffman et al. 2011). It has also proved highly effective as a psychotherapeutic tool (Riva 2005). Graded exposure to virtual world is used during treatment of a wider range of anxiety disorders, fear of heights, spiders, flying, social phobia, public speaking, claustrophobia, panic disorder, agoraphobia (Wiederhold & Wiederhold 2003, Parsons & Rizzo 2008), with cognitive restructuration and desensitisation in preparing for stressful experiences or treatment of posttraumatic stress disorders (McLay et al. 2011, Riva et al. 2010). Other research has shown that it can improve the positive effect of cognitive behavioural therapy in the treatment of obesity, binge-eating disorder, anorexia, bulimia, and body dysmorphic disorder (Marco et al. 2013, Cesa et al. 2013, Riva 2011) and can serve in the treatment for addictive behaviours for reducing cravings and the opioid side effects as well as in treatment of pathological gambling (García-Rodríguez et al. 2012, Gustafson et al. 2008).

Structured and safe virtual environment allows guided visualization, improving relaxation techniques and self-awareness, and practicing social and coping skills with therapists before attempting the interaction in the real world.

This kind of therapy can have numerous advantages: it can be manipulated in ways that the real world cannot, the therapist and the patient can share the experience, experiencing emotions in a „controlled way". The therapists have greater control over all the variables, they can control over the amount of interaction and exposure, repeat the stimuli and tasks objectively measuring performance and physiological responses. The therapy process does not depend upon the patient's visualization abilities and imagination capacity. Virtual games seem to be highly motivating for the patients, and there is less negative transference (Gorini et al. 2008).

Virtual reality therapy offers new opportunities for learning and transfer in cognitive rehabilitation process directed to achieve functional change by re-establishing or reinforcing previously learned patterns of behaviour or establishing new patterns of cognitive activity through compensatory cognitive mechanisms, enabling persons to adapt to their cognitive disability to improve overall functioning (Joseph et al. 2012).

Although VR is technically highly sophisticated and offers a truly wide range of effective clinical applications, therapeutic treatments are also performed via other, more accessible Cyberspace modalities, such as e-mail or chat psychotherapy and videoconference treatment (Hsiung 2000, Germain et al. 2010, Childress 1999).

CONCLUSION

With the fast development of information technologies we can expect that in the future the use of cyberspace and virtual reality in health care will be more widespread and affordable. In Croatia the electronic media are widely used for administrative purposes but very little for therapeutic purposes. Education is needed both for the professionals as well as the public, which has to be based on research and evidence. Finally, new technologies and new applications will inevitably pose new bioethical issues that will have to be addressed accordingly.

Acknowledgements: None.

Conflict of interest: None to declare.

References

1. *Cesa GL, Manzoni GM, Bacchetta M, Castelnuovo G, Conti S, Gaggioli A, Mantovani F, Molinari E, Cárdenas-López G, Riva G: Virtual reality for enhancing the cognitive behavioral treatment of obesity with binge eating disorder: randomized controlled study with one-year follow-up. J Med Internet Res 2013; 5:e113.*
2. *Childress CA: Interactive E-mail journals: a model for providing psychotherapeutic interventions using the internet. Cyberpsychol Behav 1999; 2:213-21.*
3. *Dormann C, Whitson JR, Neuvians M: Once More With Feeling Game Design Patterns for Learning in the Affective Domain, Games and Culture 2013; 8:215-237.*
4. *Gale M, Lucas GM, Gratch J, King A, Morency L: It's only a computer: Virtual humans increase willingness to disclose. Computers in Human Behavior 2014; 37:94–100.*
5. *García-Rodríguez O, Pericot-Valverde I, Gutiérrez-Maldonado J, Ferrer-García M, Secades-Villa R: Validation of smoking-related virtual environments for cue exposure therapy. Addict Behav 2012; 37:703-8.*
6. *Gentile DA, Anderson CA, Yukawa S, Ihori N, Saleem M, Ming LK, et al.: The effects of prosocial video games on prosocial behaviors: International evidence from correlational, experimental, and longitudinal Studies. Pers Soc Psychol Bull 2009; 35:752–763.*
7. *Germain V1, Marchand A, Bouchard S, Guay S, Drouin MS: Assessment of the therapeutic alliance in face-to-face or videoconference treatment for posttraumatic stress disorder. Cyberpsychol Behav Soc Netw 2010; 13:29-35.*
8. *Gorini A, Gaggioli A, Vigna C, and Riva G: A Second Life for eHealth: Prospects for the Use of 3-D Virtual Worlds in Clinical Psychology. Journal of Medical Internet Research 2008; 10: e21.*
9. *Greitemeyer T, Osswald S: Playing prosocial video games increases the accessibility of prosocial thoughts. J Soc Psychol 2011; 151:121–128.*
10. *Gustafson D, Shaw B, Isham A, Dillon D, Spartz J: Exploring the potential of the web-based virtual world of Second Life to improve substance abuse treatment outcomes. Robert Wood Johnson Foundation, 2008. https://www.niatx.net/pdf/enews/september2008/secondlife_report.pdf*

11. Herbert TB, Cohen S: Stress and immunity in humans: a metaanalytic review. Psychosomatic Medicine 1993; 55:364–379.
12. Hoffman HG, Chambers GT, Meyer WJ, Arceneaux LL, Russell WJ, Seibel EJ, Richards TL, Sharar SR, Patterson DR: Virtual reality as an adjunctive non-pharmacologic analgesic for acute burn pain during medical procedures. Ann Behav Med 2011; 41:183-91.
13. Hsiung RC: The Best of Both Worlds: An Online Self-Help Group Hosted by a Mental Health Professional. Cyberpsychol Behav 2000; 3:935-950.
14. Jensen MP, Smith AE, Bombardier CH, et al.: Social support, depression, and physical disability: age and diagnostic group effects. Disability & Health Journal 2014; 7:164–172.
15. Joseph PA, Mazaux JM, Sorita E: Virtual reality for cognitive rehabilitation: from new use of computers to better knowledge of brain black box? Proc. 9th Intl Conf. on Disability, Virtual Reality and Assoc. Technologies, P. M. Sharkey, E. Klinger (Eds), 1-8, Laval, France, 10-12 Sept. 2012.
16. Ku J, Han K, Lee HR, Jang HJ, Kim KU, Park SH, Kim JJ, Kim CH, Kim IY, Kim SI: VR-based conversation training program for patients with schizophrenia: a preliminary clinical trial. Cyberpsychol Behav 2007; 10:567–74.
17. La Paglia F, La Cascia C, Rizzo R, Sideli L, Francomano A, La Barbera D: Cognitive rehabilitation of scizophrenia through NeuroVr training. Stud Health Technol Inform 2013;191:158-62.
18. Lam LT, Cheng Z, Liu X: Violent online games exposure and cyberbullying/victimization among adolescents. Cyberpsychol Behav Soc Netw 2013; 16:159-65.
19. Laver K, George S, Thomas S, Deutsch JE, Crotty M: Cochrane review: virtual reality for stroke rehabilitation. Eur J Phys Rehabil Med, ane Database Syst Rev 2012; 48:523-30.
20. Marco JH, Perpiñá C, Botella C: Effectiveness of cognitive behavioral therapy supported by virtual reality in the treatment of body image in eating disorders: one year follow-up. Psychiatry Res 2013; 209:619-25.
21. McCloskey W, Iwanicki S, Lauterbach D, Giammittorio DM, Maxwell K: Are Facebook "Friends" Helpful? Development of a Facebook-Based Measure of Social Support and Examination of Relationships Among Depression, Quality of Life, and Social Support. Cyberpsychol Behav Soc Netw 2015; 18:499-505.
22. McLay RN, Wood DP, Webb-Murphy JA, Spira JL, Wiederhold MD, Pyne JM, Wiederhold BK: A Randomized, Controlled Trial of Virtual Reality-Graded Exposure Therapy for PTSP in Active Duty Service Members with Combat-Related PTSP. Cyberpsychol Behav Soc Netw 2011; 14:223-9.
23. Nabi RL, Prestin A, So J. Facebook friends with (health) benefits? Exploring social network site use and perceptions of social support, stress, and well-being. Cyberpsychol Behav Soc Netw 2013; 16:721-7.
24. Parsons TD, Rizzo AA: Affective Outcomes of Virtual Reality Exposure Therapy for Anxiety and Specific Phobias: A Meta-analysis. Journal of Behavior Therapy and Experimental Psychiatry 2008; 39:250–261.
25. Przybylski AK, Weinstein N, Murayama K, Lynch MF, Ryan RM: The Ideal Self at Play: The Appeal of Video Games That Let You Be All You Can Be. Psychological Science 2012; 23:69–7.
26. Rigby CS & Ryan RM: Glued to games: How video games draw us in and hold us spellbound. Santa Barbara, CA: Praeger, 2011.
27. Riva G, Raspelli S, Algeri D, Pallavicini F, Gorini A, Wiederhold BK, Gaggioli A: Interreality in practice: bridging virtual and real worlds in the treatment of posttraumatic stress disorders. Cyberpsychol Behav Soc Netw 2010; 13:55-65
28. Riva G: The key to unlocking the virtual body: virtual reality in the treatment of obesity and eating disorders. J Diabetes Sci Technol 2011; 5:283-92.
29. Riva G: Virtual Reality in Psychotherapy: Review. CyberPsychology & Behavior 2005; 8:220–230.
30. Rosenberg RS, Baughman SL, Bailenson JN. Virtual Superheroes: Using Superpowers in Virtual Reality to Encourage Prosocial Behavior. PLoS ONE 2013; 8: e55003.
31. Ryan RM & Deci EL: Self-determination theory and the facilitation of intrinsic motivation, social development, and wellbeing. Am Psychologist 2000; 55:68–78.
32. Shapi'i A, Mat Zin NA, Elaklouk AM. A game system for cognitive rehabilitation. Biomed Res Int 2015; 2015:493562.
33. Sheng X & Simpson PM: Seniors, Health Information, and the Internet: Motivation, Ability, and Internet Knowledge. Cyberpsychol Behav Soc Netw 2013;16:740-6
34. Slater M, Spanlang B, Sanchez-Vives MV, Blanke O.: First Person Experience of Body Transfer in Virtual Reality. PLoS ONE 2010; 5: e10564.
35. Tanja-Dijkstra K, Pahl S, White MP, Andrade J, Qian C, Bruce M, May J, Moles DR: Improving dental experiences by using virtual reality distraction: a simulation study. PLoS One 2014; 9:e91276.
36. Tse MM, Choi KC, Leung RS: E-health for older people: the use of technology in health promotion. Cyberpsychol Behav 2008; 11:475-9.
37. Wiederhold , BK, Wiederhold, MD: Three-Year Follow-up for Virtual Reality Exposure for Fear of Flying. Cyber-psychology & Behavior 2003; 6:441-6.
38. Wiederhold BK, Soomro A, Riva G, Wiederhold MD: Future directions: advances and implications of virtual environments designed for pain management. Cyber-psychol Behav Soc Netw 2014; 17:414-22.

Correspondence:
Assist. Prof. Vesna Šendula-Jengić, MD, PhD
Psychiatric Hospital Rab
Kampor 224, 51280 Rab, Croatia
E-mail: vesna.sendula@gmail.com