Health, Sports & Rehabilitation Medicine
Vol. 22, no. 3, July-September 2021, 182–187

Cognitive-behavioral therapy augmented with virtual reality in the treatment of generalized anxiety disorders

Cosmin Octavian Popa[1], Adrian Vasile Rus[2], Wesley Clay Lee[2], Cristiana Cojocaru[1,3], Nicoleta Suciu[4], Alina Schenk[1,3], Cristian Gabos Grecu[5]

[1] Department of Ethics and Social-Sciences, "George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology, Tîrgu-Mureș, Romania

[2] Department of Social and Behavioral Sciences, Southwestern Christian University, Bethany, Oklahoma, USA.

[3] The Doctoral School of Medicine and Pharmacy, "George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology, Tîrgu-Mureș, Romania

[4] Department of European Projects, "George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology, Tîrgu-Mureș, Romania

[5] Department of Psychiatry, "George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology, Tîrgu-Mureș, Romania

Abstract

Over the last decade, Cognitive-Behavioral Therapy (CBT) has developed a rapid evolution in the improvement of different strategies and methods for treating emotional disorders. Virtual Reality (VR) is one of those methods, and recent studies in this field show that CBT augmentation with Virtual Reality can represent an efficient psychological intervention for treating specific anxiety disorders. Even though this type of psychological treatment is just at its beginning, the main idea that emerges from this is to investigate further the effects of the augmentation between CBT and VR in this kind of psychological disorders. Also, if the possibility of applying the standard protocols vs. new protocols in the treatment of Generalized Anxiety Disorder (GAD) is taken into consideration, we could determine which is associated with the best outcomes for a particular sample. Therefore, in this article, our quest will be to answer this difficult question, considering the studies published in the lasts years, and to elaborate a conclusion based on this body of research.

Keywords: CBT, Virtual Reality, Generalized Anxiety Disorder, psychological treatmens, CBT protocols.

Introduction

Generalized Anxiety Disorder (GAD) represents an anxiety disorder from the DSM-5 spectrum with specific symptoms consisting of: worry, marked anxiety, muscle tension, fatigue, insomnia, irritability and intolerance to uncertainty lasting at least six months (***, 2013). The prevalence of generalized anxiety disorder (GAD) is 2.6% for 12 months, and 8.7% over a lifetime (Watterson et al., 2017). International medical treatment guidelines recommend Cognitive-Behavioral Therapy (CBT) along with medication and relaxation techniques for the treatment of GAD (***, 2013); (1). CBT is considered one of the most effective forms of psychological treatment for anxiety disorders (***, 2016). Also, the psychological treatment of anxiety disorders has undergone an accelerated development over the last decade, in relation to the innovative technologies that have emerged, such as Virtual Reality (VR). This technique consists of recreating a virtual environment (for example, a plane flight simulation, urban agglomerations, crowds, etc.) using specialized software. The effect that is generated through the patient's exposure to the virtual environment is an increase of anxiety/ stress levels, similarly to classic CBT exposures (Baños et al., 2011). CBT includes cognitive techniques such as cognitive restructuring, descending arrow, Socratic questions, but also exposure to anxious stimuli using standard approaches such as behavioral exposure or VR (Fisher & Newman, 2016). Standard interventions which are specific to both Behavioral Therapy and CBT are associated with the

Received: 2021, June 15; *Accepted for publication:* 2021, June 22
Address for correspondence: Department of Ethics and Social-Sciences, George Emil Palade University of Medicine, Pharmacy, Sciences and Technology, Tîrgu-Mureș, 38 Gheorghe Marinescu Street, Tîrgu Mures, Mureș county, Zip code 540142, Romania
E-mail: cristiana-manuela.cojocaru@umfst.ro
Corresponding author: Cristiana Cojocaru; cristiana-manuela.cojocaru@umfst.ro
https://doi.org/10.26659/pm3.2021.22.3.182

Copyright © 2010 by "Iuliu Haţieganu" University of Medicine and Pharmacy Publishing

same positive therapeutic response as in the case of using standard in vitro exposure techniques. Patients receiving this combination treatment present improvements in their quality of life, as well as positive therapeutic results that are stable over time (Opriș et al., 2012). Used as an exposure technique, VR has been shown to be effective in lowering the level of anxiety in GAD (Navarro et al., 2019). Also, this approach represents an efficient treatment in Post Traumatic Stress Disorder (PTSD) due to the fact that the therapist can use VR to personalize the treatment for patients, while, at the same time, this technology offers multiple choices for "rescripting", enabling specific virtual frames that may reconstitute the environment in which the trauma appeared (for example, a battlefield). Another advantage of using VR technology in the treatment of PTSD is the possibility to create behavioral exposure scenarios in a virtual environment, when in vivo (real life) exposure is impossible, such as combat scenarios for soldiers who suffer from PTSD (DiMauro, 2017). The implementation of VR as a form of exposure to anxious stimuli in the treatment of anxiety disorders has been shown to be effective over time (Freeman et al., 2017; Cardoș et al., 2017; Freeman et al., 2018). Despite this, a recent meta-analysis indicated that there are no differences between classical behavioral exposure (in vivo/ in vitro) and behavioral exposures performed by VR in terms of therapeutic outcomes (Carl et al., 2019).

CBT intervention protocols for GAD

As we have shown above, CBT is effective in treating anxiety disorders, including GAD, but it is not yet known exactly which specific therapeutic processes contribute to the reduction of symptoms. Thus, regarding anxiety disorders, CBT is more effective in treating panic attacks, compared to GAD or social anxiety. Also, when comparing the magnitude of the effects in GAD versus social anxiety, no statistically significant differences were found, indicating that, when addressing these particular problems, the efficacy of CBT is similar (Cuijpers et al., 2016). However, unfortunately, due to the chronic nature of GAD, patients commonly face multiple relapses. Therefore, among anxiety disorders, this diagnosis remains the most difficult to approach using standard CBT interventions (Yonkers et al., 1996; Gould et al., 2004; Cougle, 2012). According to Dugas & Robinchaud (2007) and Beck (2021), an efficient CBT protocol/treatment plan for treating GAD should include: a) psychoeducation and conceptualization; b) cognitive techniques; c) behavioral techniques; d) a good, collaborative therapeutic relationship; f) problem solving techniques; g) acquisition of new skills; h) integration of new skills in everyday life; i) strategies for increasing self-efficacy, (l) time limited interventions; (m) techniques for living in the present moment; o) application of different strategies from the established action plan (Dugas & Robichaud, 2006; Beck, 2021). In our opinion, and according to studies published in the last period (Grenier et al., 2015; Triscari et al., 2015), this protocol can integrate a VR intervention along with behavioral methods in GAD. Accordingly, the most important techniques incorporated in the present protocol, tailored for the treatment of GAD from the perspective of CBT, are:

Psychoeducation and Conceptualization

In this phase, the therapist presents the principles of cognitive-behavioral therapy to the patient, explaining the diagnosis of GAD, all this to normalize the symptoms. There are lots of conceptualization models for GAD, the main purpose being to provide an explanation to patients regarding how symptoms "work" and an introductory training related to the "recognition of concerns". Conceptualization has the role to describe the association between situations, the way the patient interprets them, automatic thoughts, meaning of automatic thoughts, emotions and behaviors. Also, patient's core beliefs, intermediate belief and dysfunctional coping mechanism can be investigated (Sperry & Carlson, 2020). For the therapist, clinical conceptualization represents the foundation of the treatment plan, and is one of the most important parts in the psychological treatment of GAD.

Cognitive techniques

Cognitive restructuring is a process through which the patient's negative automatic thoughts are debated in a logical, rational way, to the extent that the patient succeeds in changing distorted cognitions in an adaptive manner. This process is based on the descending arrow and Socratic questioning techniques. Specifically, the therapist uses a set of questions that start from an already known truth, through these questions the patient managing to identify and evaluate particular automatic thoughts that generate anxiety, and then their content is discussed and an alternative interpretation is offered (Clark & Beck, 2011; Beck et al., 1987). Cognitive fusion is a cognitive process that occurs especially in Obsessive-Compulsive Disorder (OCD), as well as in GAD (Abramowitz et al., 2003), in fact this concept defining two objects that become one. It is also described as the thought-action fusion, this phenomenon causing marked anxiety (Shafran & Rachman, 2004) because the patient states, for example, that: a) *If I thought about this, it means that the bad thing I was thinking about is about to happen;* b) *If I had this thought, it means that the negative thing I thought about will definitely happen*. In the first phase, patients often try to apply thought suppression as a way to control their thought/thoughts. This process can be described as a dysfunctional cognitive coping mechanism that occurs not just in GAD, but in many other disorders from the DSM-5 spectrum (Popa et al., 2020a). Thought suppression can be briefly defined as being actually the opposite of cognitive flexibility. In general, the occurrence of thoughts, as well as their frequency or intensity cannot be controlled by any person. Also, while most automatic thoughts can be changed, there are still a number of thoughts that are very difficult to change or cannot be changed at all. Again, in this case, acceptance is of great significance, as it can help the patient to get used to these extremely rigid thoughts (such as obsessions/worries). Both for cognitive fusion and for thought suppression, the therapist can apply techniques such as pros and cons analysis (Popa et al., 2020b), and/ or cognitive defusion techniques which are specific to the "third wave" of CBT (Hayes & Hofmann, 2020).

Behavioral techniques

Specific anxiety disorders are related to different dysfunctional coping mechanisms, the most common

for GAD being avoidance and reassurance (Kobori & Salkovskis, 2013; Haciomeroglu & Inozu, 2019). The problem is that if the patient avoids and/or uses reassurance to handle different situations that generate his/her fear (for instance, a patient with agoraphobia may avoid going out of the house), he/she does not have the chance to figure out new, adaptive behaviors for anxiety management (Hayes et al., 2016). On the contrary, if the patient faces his/her avoidance and exposes himself/herself by repeating a behavior that generates anxiety/ discomfort (exposure to phobias), at some point, he/she will be able to manage those types of situations, due to numerous repetitions and behavioral reinforcements (Bach & Moran, 2008). Even if the results do not appear immediately, it is recommended that the patient continue the exposure. For example, in depression, lying in bed during the day, unhealthy eating, spending too much time in front of the TV, etc. are negative behavioral reinforcements that maintain and aggravate the depressive episode (Beck, 2011). In anxiety disorders, it is the same, therefore it is important to help patients learn how to proceed in order to carry out their activities in a different way, without focusing on what they are feeling (anxiety, panic, etc.), but rather on what they need to do practically. From this perspective, behavioral experiments can represent a very efficient behavioral technique, since it is important to help patients get involved in adaptive behavioral change throughout therapy (Moran et al., 2018). When the patient expresses negative predictions related to specific situations, the patient and the therapist may decide to test these predictions/ hypotheses together between psychotherapeutic sessions. All the details of this experiment will be discussed by the patient and the therapist in advance in order to increase the success rate of that experiment. The patient will be prepared to cope / adapt to the "most negative result" that may occur as a result of this action. The results of the experiment, its implications, but also the thoughts and beliefs will be discussed later, during subsequent meetings (Beck, 2011). At the same time, behavioral monitoring is extremely important for patients, so that they learn how to monitor and change their dysfunctional behavior. The effect of the behavioral change will be measured together with the patient, applying the behavioral analysis as follows: a) frequency: how often that behavior was applied / practiced; b) duration: how long a behavioral action lasts; c) latency: if it is manifest or appears only in certain circumstances; d) intensity: how strong that behavior is; f) perseverance / persistence: how well he/she does in that role and if he/she is constant; g) taking action: something new that pushes him/her to action; h) engagement in the particular behavior: how to implement that new behavior (Dixon et al., 2020).

VR exposure techniques could complete/replace the classical exposure in the psychological treatment of anxiety disorders, including GAD. For example, the therapist can use VR to recreate the framework linked to the patient's worries, such as flight, car accidents, crowds, etc., given that the effect of VR exposure is similarly efficient to classical behavioral exposure (Clemmensen et al., 2020). When applied in GAD, the advantage of VR is that the therapist can generate different scenarios, impossible to produce in reality, while, at the same time, if patients have a VR at home, the action plan could involve this kind of home work.

Collaborative therapeutic relationship

From the part of the therapist, the therapeutic relationship requires genuine attitude, kindness, empathy, and most importantly, remembering that the development of a good therapeutic relationship starts from the very first session (Sperry & Sperry, 2016). However, during the first sessions, a collaborative, non-evaluative position and reserved emotional expression are requested (e.g., it is not appropriate to look surprised at the patient's evocations). Also, an important part is the therapist's creativity. The higher it is, the more the dialogue is stimulated. It is important to know that the therapeutic relationship with the patient is built over time, and during acute phases, there may be periods when the therapeutic relationship may be affected (Sperry et al., 2014). In those moments, patience and the application of specific elements of the motivational interview are needed. Regarding the processes of change generated by CBT in other anxiety disorders, one of the most frequently mentioned factors is the therapeutic relationship. Although it has been studied for a long time, the therapeutic relationship is important in everything that means and involves the therapeutic process, but the results obtained in various explorations are mixed, some emphasizing its importance, while others showing that it is not so important (Luong et al., 2020).

Problem solving

These techniques will focus on increasing the patient's problem-solving ability related to the management of worries. In addition, another important aspect is the timely recognition/ identification of the problem before the onset of a high level of anxiety. In order to achieve this, patients will be taught how to identify their negative emotions, and then to identify the thoughts that led to the occurrence of uncomfortable emotions such as anxiety. It is even recommended to make a list that includes most of the situations/ problems that cause concern and anxiety (Nezu et al., 2012). Then, the analysis of possibilities and the generation of alternative solutions will follow, when quantitative and qualitative evaluation, postponement of decision making, factor analysis and cost-benefit analysis will be used. This technique is usually implemented when the content of automatic thoughts is true or partially true (Beck, 2021; Nezu & Nezu, 2018).

Acquisition of new skills and involvement of these skills in everyday life

New approaches derived from "the third wave" of CBT are recommended at this point to complete standard CBT (Beck, 2021). In this regard, different Acceptance and Commitment Therapy (ACT) techniques can help patients acquire new adaptive skills. Before trying to change the dysfunctional behaviors of patients, it is important to help them gain new skills and abilities. Also, the goal has to be set realistically, meaning that patients can successfully implement the new behavioral skills in everyday life. Thus, a way to efficiently motivate the patient for developing new skills is to correlate the patient's personal life values with the new desired behavioral patterns. Life values/ assumptions can be defined as beliefs that give meaning and significance to people's lives (Hayes, 2019). These

values differ greatly depending on the cultural factors, the geographical area and the customs of people. Since the beginning of intervention, it is important to evaluate the life values/assumptions of the patient. From this perspective, it is not advisable to set therapeutic goals at the beginning of therapy, because the patient has not yet clarified his own life values. Patients are heavily influenced by the environment where they live, but there are choices that can help them achieve their goals in life. When patients verbalize the content of these goals, or other content in general, then they motivate themselves to act towards a goal, because language influences their reactions (Roediger et al., 2018). As a result, values refer to the final result and not to the process; therefore, under no circumstances should the therapist induce, or even suggest to the patient his/ her own life values. It is a serious therapeutic error to say to the patient, for example: *If you would be dealing with art, visiting museums, if you would get involved in sports, then these will help you!* Although the intention and behavioral activation are absolutely fine, suggesting values that belong to the therapist may not match the patient's expectations and this may weaken the therapeutic alliance. To discover the personal life values of patients, it is recommended to use the Socratic interrogation and the descending arrow, so that the patient realizes what is most important to him/ her, from this point of view (Gordon & Borushok, 2017). When we want an assessment of the patient's behavior in relation to his/her life values/assumptions, we must ask the following questions: *What actions do you take concretely to achieve a goal in life?* In fact, the basic idea that the patient should remember and implement is: *Because my life values/ assumptions are important for me, even if I need to deal with high levels of negative emotions, I will act in the direction of changing my behavior* (Harris, 2019). The main therapeutic goal that derives from this is to help the patient postpone immediate gratification and accept the process of change, as well as negative reinforcements that result from this process. There may also be situations in which a patient fails to identify/ establish his/her life values/ assumptions and goals, at that moment becoming blocked/ thinking that he is blocked (Hayes et al., 2013). In this case, the therapist will offer the patient several alternatives, the application of a specific questionnaire being recommended, or the patient will be given a list of values and will be asked to circle those that define him. It should be emphasized that, at this point in therapy, it is important not to try to change the lives of those patients. Instead, the main therapeutic goal is teaching them to discover how to live their lives in relation to their own values, so that, in this way, they can regain their emotional balance (Luoma et al., 2017). Socratic questions are recommended when the patient fails to identify his own life values, on the one hand, or, on the other hand, even when he manages to do so, it is important to know the extent to which he/she lives his/her life in relation to those values. The most important thing at this stage of the therapeutic intervention is that the patient is willing to do things, to take concrete actions, even if he/she does not feel comfortable in those roles (e.g., behavioral exposure) (Leahy, 2017).

Contact with the present moment

From the perspective of establishing contact with the present moment, it must be said that patients with anxiety disorders judge certain current events in their lives in relation to past behavioral antecedents, for example: *If I had a panic attack in the Mall, there is a high probability of having a panic attack again, whenever I'm going to the Mall*. In other words, the patient is stuck in the past, thinking all the time about those events and failing to live in the present (David, 2012). Another example is that of patients suffering from GAD, who have the same type of cognitive distortions related to different negative life situations. These patients need to be assisted in learning new skills every day. In therapy, this can be formulated as follows: *Be present in your life, live the present moment* (Cheng-Kar & Oei, 2012). The practice of mindfulness is based on the premise that only the experience of the current event can help us perceive what is happening at that moment, in reality. We can adopt any kind of behavior, but this is only valid for the present moment, "here and now", and patients need to be taught how to take this perspective (Woods et al., 2019). Mindfulness used from a CBT perspective is a technique for increasing attention/ awareness skills. It is not a meditation/ relaxation technique, therefore it will not be used for this purpose. Mindfulness is related to the therapeutic process, a skill through which the therapist helps the patient to live in the present moment in relation to his/ her life values. For applying mindfulness techniques, the management of contingencies will be taken into account, i.e., mindfulness will be applied complementarily to behavioral techniques (see behavioral analysis) (Sears, 2017). As a complementary experiential method, the empty chair technique can also be used, starting from the question: *Can you accept the feelings you have?* With this technique, the intervention may help patients be more grounded, which may in turn positively influence their welfare (Pugh, 2019).

Applying different strategies from the action plan

The action plan is an important therapeutic instrument in the treatment of anxiety disorders, including GAD. Different activities are integrated here. An example would be the fact that three times a day, patients have to stop whatever they are doing and pay attention to their worries. Besides, it is recommended that patients share their concerns to someone close, ideally with their partners in this case. Also, it is important that different behavioral exposure strategies, mindfulness, relaxation techniques, and so on are included in this action plan (Beck et al., 2016). It is also important to note that VR can be adapted to all the techniques presented above, but it can be efficiently applied in other protocols, which are specific to other approaches, such as ACT (Prudenzi et al., 2019).

Conclusions

CBT represents the gold standard psychological intervention in treating generalized anxiety, while the ascending trend of VR interventions is not only a modern concept, but also an extremely effective one. Although the therapeutic effect is similar, VR can be a viable choice for classical exposures, especially given that in reality and/ or through in vitro guided imaging, particular anxiogenic situations cannot be created.

Certain CBT treatment plans for GAD can be adjusted and augmented with VR exposure techniques and/ or mindfulness techniques generated by different softwares. Therefore, these approaches represent an efficient combined treatment for GAD, as well as for other anxiety disorders.

Conflict of interests

The authors report no conflict of interest. The authors alone are responsible for the content and the writing of the paper.

Acknowledgment

This work was supported by the "George Emil Palade" University of Medicine, Pharmacy, Science and Technology of Târgu-Mureș, Research Grant number 239/7/14.01.2020.

References

Abramowitz JS, Franklin ME, Schwartz SA, Furr JM. Symptom presentation and outcome of cognitive-behavioral therapy for obsessive-compulsive disorder. J Consult Clin Psychol. 2003;71(6):1049-1057. doi: 10.1037/0022-006X.71.6.1049.

Bach PA, Moran DJ. ACT in Practice: Case Conceptualization in Acceptance and Commitment Therapy. Illustrated Ed. New Harbinger Publications, Oakland, 2008.

Baños RM, Guillen V, Quero S, García-Palacios A, Alcaniz M, Botella C. A virtual reality system for the treatment of stress-related disorders: A preliminary analysis of efficacy compared to a standard cognitive behavioral program. Int J Hum-Comput Stud. 2011;69(9):602-613.doi: 10.1016/j.ijhcs.2011.06.002.

Beck AT, Rush AJ, Shaw BF, Emery G. Cognitive Therapy of Depression 1st Ed. The Guilford Press, New York, 1987.

Beck J. Cognitive Behavior Therapy. Basics and Beyond. 3th edition. The Guilford Press, New York, 2021.

Beck J. Cognitive Therapy for Challenging Problems: What to Do When the Basics Don't Work. The Guilford Press, New York, 2011.

Beck J. Cognitive-Behavior Therapy. Basic and Beyond. 2nd Ed. Guilford Press, New York, 2011.

Beck JS, Broder F, Hindman R. Frontiers in Cognitive Behaviour Therapy for Personality Disorders. Behav Change. 2016;33(2):80-93. doi: 10.1017/BEC.2016.3.

Cardoș RAI, David OA, David DO. Virtual reality exposure therapy in flight anxiety: A quantitative meta-analysis. Comput Hum Behav. 2017;72(C):371-380. doi: 10.1016/j.chb.2017.03.007.

Carl E, Stein AT, Levihn-Coon A, Pogue JR, Rothbaum B, Emmelkamp P, Asmundson GJG, Carlbring P, Powers MB. Virtual reality exposure therapy for anxiety and related disorders: A meta-analysis of randomized controlled trials. J Anxiety Disord. 2019; 61: 27-36. doi: 10.1016/j.janxdis.2018.08.003.

Cheng-Kar P, Oei TPS. From Mindfulness to Meta-mindfulness: Further Integration of Meta-mindfulness Concept and Strategies into Cognitive-Behavioral Therapy. Mindfulness. 2012;3(2):104-116. doi: 10.1007/s12671-011-0084-z.

Clark DA, Beck AT. Cognitive Therapy of Anxiety Disorders. The Guilford Press, New York. 2011.

Clemmensen L, Bouchard S, Rasmussen J, Holmberg TT, Nielsen JH, Jepsen JRM, Lichtenstein MB. Study protocol: exposure in virtual reality for social anxiety disorder - a randomized controlled superiority trial comparing cognitive behavioral therapy with virtual reality based exposure to cognitive behavioral therapy with in vivo exposure. BMC Psychiatry. 2020; 20: 1. doi: 10.1186/s12888-020-2453-4.

Cougle JR. What makes a quality therapy? A consideration of parsimony, ease, and efficiency. Behav Ther. 2012;43(3):468-481. doi: 10.1016/j.beth.2010.12.007.

Cuijpers P, Gentili C, Banos RM, Garcia-Campayo J, Botella C, Cristea IA. Relative effects of cognitive and behavioral therapies on generalized anxiety disorder, social anxiety disorder and panic disorder: A meta-analysis. J Anxiety Disord. 2016;43:79-89. doi: 10.1016/j.janxdis.2016.09.003.

David D. Cognitive-Behavior Therapy Compedium (Tratat de psihoterapii cognitive și comportamentale). Polirom, Iași, 2012.

DiMauro J. Exposure Therapy for Posttraumatic Stress Disorder: A Meta-Analysis. Mil Psychol. 2017; 26(2):120-130. doi: 10.1037/mil0000038.

Dixon MR, Hayes SC, Stanley C, Law S, al-Nasser T. Is Acceptance and Commitment Training or Therapy (ACT) a Method that Applied Behavior Analysts Can and Should Use? Psychol Rec. 2020;70(4):559-579. doi: 10.1007/s40732-020-00436-9.

Dugas MJ, Robichaud M. Cognitive-behavioral treatment for generalized anxiety disorder: From science to practice. Routledge, New York, 2006.

Fisher AJ, Newman MG. Reductions in the diurnal rigidity of anxiety predict treatment outcome in cognitive behavioral therapy for generalized anxiety disorder. Behav Res Ther. 2016;79:46-55. doi: 10.1016/j.brat.2016.02.006.

Freeman D, Haselton P, Freeman J, Spanlang B, Kishore S, Albery E, Denne M, Brown P, Slater M, Nickless A. Automated psychological therapy using immersive virtual reality for treatment of fear of heights: a single-blind, parallel-group, randomised controlled trial. Lancet Psychiatry. 2018;5(8):625-632. doi: 10.1016/S2215-0366(18)30226-8.

Freeman D, Reeve S, Robinson A, Ehlers A, Clark D, Spanlang B, Slater M. Virtual reality in the assessment, understanding, and treatment of mental health disorders. Psychol Med. 2017;47(14): 2393-2400. doi: 10.1017/S003329171700040X.

Gordon T, Borushok J. The ACT Approach: A Comprehensive Guide for Acceptance and Commitment Therapy. PESI Publ & Media. Washington D.C, 2017.

Gould RA, Safren SA, Washington DO, Otto MW. A Meta-Analytic Review of Cognitive-Behavioral Treatments. In: Heimberg RG, Turk CL, Mennin DS (Eds). Generalized anxiety disorder: Advances in research and practice. The Guilford Press, New York, 2004, 248-264.

Grenier S, Forget H, Bouchard S, Isere S, Belleville S, Potvin O, Rioux M-È, Talbot M. Using virtual reality to improve the efficacy of cognitive-behavioral therapy (CBT) in the treatment of late-life anxiety: preliminary recommendations for future research. Int Psychogeriatr. 2015; 27(7):1217-1225. doi: 10.1017/S1041610214002300.

Haciomeroglu B, Inozu M. Is reassurance seeking specific to OCD? Adaptation study of the Turkish Version of Reassurance Seeking Questionnaire in Clinical and Non-Clinical Samples. Behav Cogn Psychother. 2019;47(3):363-385. doi: 10.1017/S1352465818000462.

Harris R. ACT Made Simple: An Easy-To-Read Primer on Acceptance and Commitment Therapy. New Harbinger Publ, Oakland, 2019.

Hayes S, Strosahl KD, Wilson KG. Acceptance and Commitment Therapy. 2nd Ed: The Process and Practice of Mindful Change. The Guilford Press, New York, 2016.

Hayes SC, Hofmann SG. Beyond the DSM. Pub New Harbinger Publications, Oakland, 2020.

Hayes SC, Levin ME, Plumb-Vilardaga J, Villatte JL, Pistorello J. Acceptance and Commitment Therapy and Contextual

Behavioral Science: Examining the Progress of a Distinctive Model of Behavioral and Cognitive Therapy. Behav Ther. 2013;44(2):180-198. doi: 10.1016/j.beth.2009.08.002.

Hayes SC. A Eliberated Mind: How to Pivot Toward What Matters. Avery, New York, 2019.

Kobori O, Salkovskis PM. Patterns of reassurance seeking and reassurance-related behaviours in OCD and anxiety disorders. Behav Cogn Psychother. 2013;41(1):1-23. doi: 10.1017/S1352465812000665.

Leahy RL. Cognitive Therapy Techniques: A Practitioner's Guide. 2nd Ed. The Guilford Press, New York, 2017.

Luoma JB, Hayes SC, Walser RD. Learning ACT: An Acceptance and Commitment Therapy Skills Training Manual for Therapists. Context Press, Oakland, 2017.

Luong, HK, Drummond SPA, Norton PJ. Elements of the therapeutic relationship in CBT for anxiety disorders: A systematic review. J Anxiety Disord. 2020; 76: 102322. doi: 10.1016/j.janxdis.2020.102322.

Moran DJ, Bach PA, Batten SV. Committed Action in Practice: A Clinician's Guide to Assessing, Planning, and Supporting Change in Your Client. Context Press. Oakland. 2018.

Navarro H, Modrego-Alarcón M, Hoffman HG, López-Montoyo A, Navarro-Gil M, Montero-Marin J, García-Palacios A, Borao L, García-Campayo J . Evaluation of a Mindfulness-Based Intervention With and Without Virtual Reality Dialectical Behavior Therapy® Mindfulness Skills Training for the Treatment of Generalized Anxiety Disorder in Primary Care: A Pilot Study. Front Psychol. 2019; 10:55. doi: 10.3389/fpsyg.2019.00055.

Nezu AM, Nezu CM, D'Zurilla T. Problem-Solving Therapy: A Treatment Manual. 1st Ed. Springer Publ Comp, New York, 2012.

Nezu AM, Nezu CM. Emotion-Centered Problem-Solving Therapy: Treatment Guidelines. 1st Ed. Springer Publ Comp, New York, 2018.

Opriş D, Pintea S, García-Palacios A, Botella C, Szamosközi S, David D. Virtual reality exposure therapy in anxiety disorders: a quantitative meta-analysis. Depress Anxiety. 2012;29(2):85-93. doi: 10.1002/da.20910.

Popa CO, Lee WC, Rus VA. New Approaches in Behavioral Sciences. University Press, Targu Mures, 2020b.

Popa CO, Predatu R, Lee WC, Blaga P, Sirbu E, Rus AV, Clark A, Cojocaru C, Schenk A, Vacaras V, Szasz S, Muresan S, Bredicean C. Thought Suppression in Primary Psychotic Disorders and Substance/Medication Induced Psychotic Disorder. Int J Environ Res Public Health. 2020a;18(1): 116. doi: 10.3390/ijerph18010116.

Prudenzi A, Rooney B, Presti G, Lombardo M, Lombardo D, Messina C, McHugh L. Testing the effectiveness of virtual reality as a defusion technique for coping with unwanted thoughts. Virtual Reality. 2019;23(2):179-185. doi: 10.1007/s10055-018-0372-1.

Pugh M. A little less talk, a little more action: a dialogical approach to cognitive therapy. Cogn Behav Ther. 2019;12:1-24. doi: 10.1017/S1754470X19000333.

Roediger E, Stevens B, Brockman R.. Contextual Schema Therapy: An Integrative Approach to Personality Disorders, Emotional Dysregulation, and Interpersonal Functioning. Context Press, Okland, 2018.

Sears R. Cognitive Behavioral Therapy & Mindfulness Toolbox: 50 Tips, Tools and Handouts for Anxiety, Stress, Depression, Personality and Mood Disorders. PESI Publ & Media. Washington D.C, 2017.

Shafran R, Rachman S. Thought-action fusion: a review. J Behav Ther Exp Psychiatry. 2004;35(2):87-107. doi: 10.1016/j.jbtep.2004.04.002.

Sperry L, Carlson J, Sauerheber JD, Sperry J. Psychopatology and Psychotherapy. Taylor and Francis, London, 2014.

Sperry L, Carlson J. Case conceptualization. 2nd Ed. Routledge, London, 2020.

Sperry L, Sperry J. Cognitive Behavior-Therapy of DSM-5 personality disorders. 2nd Ed. Routledge, London, 2016.

Triscari MT, Faraci P, Catalisano D, D'Angelo V, Urso V. Effectiveness of cognitive behavioral therapy integrated with systematic desensitization, cognitive behavioral therapy combined with eye movement desensitization and reprocessing therapy, and cognitive behavioral therapy combined with virtual reality exposure therapy methods in the treatment of flight anxiety: a randomized trial. Neuropsychiatr Dis Treat. 2015;11:2591-2598. doi: 10.2147/NDT.S93401.

Watterson RA, Williams JVA, Lavorato DH,cPatten SB. Descriptive epidemiology of generalized anxiety disorder in Canada. Can J Psychiatry, 2017;62(1):24-29. doi: 10.1177/0706743716645304.

Woods SL, Rockman P, Collins E. Mindfulness-Based Cognitive Therapy: Embodied Presence and Inquiry in Practice. Context Press, Oakland, 2019.

Yonkers K, Warshaw M, Massion A, Keller M. Phenomenology and Course of Generalised Anxiety Disorder. Br J Psychiatry. 1996;168(3):308-313. doi: 10.1192/bjp.168.3.308.

***, APA Diagnostic and Statistical Manual of Mental Disorders (DSM-5; 5th ed.), American Psychiatric Association, 2013, Washington D.C.

***, Mental Health Diseases and Conditions - Generalized Anxiety Disorders; Studies from University of Sheffield Yield New Information about Generalized Anxiety Disorders (Efficacy of Cognitive Behavioral Therapy for Generalized Anxiety Disorder in Older Adults: Systematic Review, Meta-Analysis, and Meta-Regression). Health & Med. 2016, 285.

Websites

https://www.nice.org.uk/guidance/cg113/chapter/1-Guidance#stepped-care-for-people-with-gad. Accessed on 15 July 2021.