TPM®

THREE USES OF VIRTUAL REALITY IN WORK AND ORGANIZATIONAL PSYCHOLOGY INTERVENTIONS. A DIALOGUE BETWEEN VIRTUAL REALITY AND ORGANIZATIONAL WELL-BEING: RELAXATION TECHNIQUES, PERSONAL RESOURCES, AND ANXIETY/DEPRESSION TREATMENTS

ALESSANDRO DE CARLO
GIUSTINO FORTUNATO UNIVERSITY, BENEVENTO

FRANCESCA CARLUCCIO
SEBASTIANO RAPISARDA
LUMSA UNIVERSITY OF ROMA

DILETTA MORA
ILARIA OMETTO
PSIOP, INSTITUTE FOR THE INTERVENTION ON ORGANIZATIONAL DISEASE, PADOVA

This study provides an annotated summary of available literature on the use of virtual reality (VR) in work and organizational psychology interventions. VR is a combination of technologies creating realistic virtual environments in which a person feels immersed. Its sensory experiences can enhance organizational interventions, therefore it is considered a relevant innovation for work and organizational psychology. The studies taken into consideration show that VR technology emerged as a potentially effective way to provide general and specialty health care intervention and it can provide support both in improving patient well-being and in reducing pain and anxiety. The fields of application in which VR is most relevant can be divided in three clusters: stress reduction through learning relaxation techniques, improvement of personal resources, and reduction of anxiety and depression. These three categories are relevant in work and organizational psychology, because they are part of many models of organizational well-being/disease. Personal resources and the use of relaxation techniques as a coping strategy are mediators between causes of disease and consequences. Anxiety and depression are two forms of psychological strain, inadequate for a specific situation and consequent to the interaction between organizational causes of disease and personal resources/coping strategies. The use of VR in combination with work and organizational psychology techniques, therefore, can be used on relevant organizational dimensions to improve health and well-being, as well as performance, making interventions more effective and efficient.

Key words: Virtual reality; Work and organizational psychology; Relaxation techniques; Anxiety; Depression.

Correspondence concerning this article should be addressed to Alessandro De Carlo, Giustino Fortunato University, Viale Raffaele Delcogliano 12, 82100 Benevento (BN), Italy. Email: a.decarlo@unifortunato.eu

This study focuses on the intersection between virtual reality (VR) and work and organizational psychology. VR and psychology can coexist in the organizational environment, making the psychological intervention on workers more effective and efficient.

TPM Vol. 27, No. 1, March 2020 – 129-143 – doi:10.4473/TPM27.1.8 – © 2020 Cises

VR, a term coined by Lanier and Biocca (1992), is an evolution of computer graphics and animation from which it has borrowed techniques of representation of 3D mathematical models on the screen. Before starting to describe what VR is, it may be useful to introduce the concepts of immersion and presence, which are fundamental to define VR characteristics.

Immersion is defined as "the extent to which the computer displays are capable of delivering an inclusive, extensive, surrounding, and vivid illusion of reality to the senses of a human participant" (Slater & Wilbur, 1997; p. 3). Immersion is achieved when the individual can interact with a "world" as genuine and similar to the real world as possible. This means that movements, feedback, and ease of interaction are fundamental factors. Some tools are more likely to increase the sense of immersion. Examples are head-mounted displays, sensors of movement, audio isolation, and feedback for different senses (i.e., audio, video, and tactile).

Presence, in general, is defined as the sensation of being in a place. Many are the inputs that build presence, sensory inputs, cognition of the actual conditions, and previous experiences. People are usually considered "present" in an immersive VR environment when they declare a sensation of being in the virtual world — "you are there" (Schuemie, Van Der Straaten, Krijn, & Van Der Mast, 2001).

The major difference between immersion and presence is that the former is a characteristic of the virtual environment, whereas the latter is a characteristic of the subject.

VR involves real-time simulation and interaction through multiple sensorial channels (Steuer, 1992). More specifically, it replicates digital or real environment. In particular, VR aims to create artificial sensory experiences, which may include sight, hearing, touch, taste, and smell (Rheingold, 1991).

VR in the Organizational Contexts

Organizational growth, today, is related to workers' health, satisfaction, and well-being of its workers (Barbieri, Dal Corso, Di Sipio, De Carlo, & Benevene, 2016; Benevene et al., 2018). This concept has become more and more widespread throughout the years, together with the relevance given by companies to corporate social responsibility, social marketing, and reputation. Research, therefore, is now also oriented toward exploring uses of VR in organizations and in relation to organizational needs, because VR is a potentially powerful tool for enhancing health and well-being efficiently and effectively.

Health, well-being, commitment, performance, as well as many other variables in organizations, are often managed through a multidisciplinary approach: psychology, management sciences, medicine, sociology, and other disciplines cooperate to make the workplace safer, healthier, and more productive. In this perspective, VR is a tool that can be adapted to very different needs. One of the first uses of VR in the organizational context was safety training. Through the reconstruction of real environments, workers could effectively learn safety procedures and actions in both normal and emergency conditions (Sacks, Perlman, & Barak, 2013). This use, which is more and more pervasive today, has showed the potential of VR for organizations.

The effectiveness of training with VR in the workplace has been investigated: it was demonstrated that VR can influence training processes thanks to the accessibility of these technologies (Cox, House, Lopez, & Pool, 2017). Several studies highlighted how VR can promote learning: for example, Vora et al. (2002) showed that VR improved the performance of aircraft inspectors. Training, in this case, was delivered in the workplace and researchers found that this significantly improved performance. It was noted that the opportunity to have active learning through immersive VR results in better learning (Sitzmann & Ely, 2011).

One further use of VR which is finding support in organizations is related to collaboration (Srivastava & Chandra, 2017). VR technologies can enhance trust and effectiveness of group work, making even distant job relations much more similar to present ones compared to other systems. This is a great potential advantage for organizations, especially large ones, also in complex contexts and when tasks are difficult.

Nevertheless, the kind of stimuli which can be produced on workers is extremely diversified, because it depends on the equipment used, which can include various software and hardware components, providing experiences that can be immersive by isolating people from the real world and increasingly involve their senses in the computer-generated reality.

These uses of VR in organizational contexts are just examples, given the vastity of the field and the constant progress of technological development and applications, nevertheless, they are a demonstration of how this technology is finding a fertile ground in organizations and how its use is perceived as interesting by those in charge of their growth. Surely, the implementation of VR in organizations has not yet reached its plateau. With technology improving every day and new uses being found, it is still a pioneering field with many areas yet to be discovered.

The Origins of VR Applied to Psychology: The Study of Distraction

Over two decades, distraction has been studied and successfully applied in clinical practice to reduce pain associated with medical procedures (Kleiber & Harper, 1999). Classic distraction techniques include watching a movie (Cohen, Blount, Cohen, Schaen, & Zaff, 1999), listening to music (Fowler-Kerry & Lander, 1987), counting objects (Zeltzer, Dolgin, LeBaron, & LeBaron, 1991), and conversing with non-medical staff (Blount, Powers, Cotter, Swan, & Free, 1994).

The use of distraction is based on the assumption that the perception of pain has an important psychological component; the focus on noxious stimuli, in fact, modulates pain perception. Distraction techniques almost completely distract the patient's attention from the aversive stimulus and reduce his/her pain perception.

Some of these techniques use only visual stimuli, but most apply visual stimuli in combination with auditory stimuli, distracting the patient and exposing him/her to three-dimensional (3D) videos. These techniques are referred to as VR audiovisual systems (A/V), audiovisual systems with glasses, or simply A/V distraction.

The A/V distraction techniques do not allow for a direct interaction between the user and the stimuli presented. The latest and most advanced distraction technique that compensates for this lack of interaction is VR.

VR uses the human-computer interface, which allows the user to dynamically interact with the computer-generated environment. This technology is superior to traditional distraction procedures because it offers "immersive" images thanks to the occlusive headphones that project images directly in front of the users' eyes and, in the come models, insulate the users from stimuli (auditory, visual, or both) coming from the real world. VR involves a multimodal integration (auditory stimuli, visual, and kinesthetic sensory channels) and is therefore considered more addictive than traditional A/V distraction methods. In this context, the concept of presence plays a very important role.

Presence is commonly referred to as the sense of being present in the virtual environment (VE) rather than in the physical place where the person is (Slater, 2002; Witmer & Singer, 1998). If the levels of presence sensation are reduced, it means that the user is not properly immersed in the virtual world.

To the extent that the stimulation is or is not immersive, the person's attention will be diverted to a greater or lesser degree from the real world. In the case where the attention is captured in the virtual world, the user will be less attentive to process external stimuli coming from the real world, such as pain perceptions.

This is supported by the hypothesis by which the more immersive the stimulation, the greater the sensation of the perceived presence of the person will be and, consequently, the more effective the reduction of pain sensation will be. McCaffery and colleagues (McCaffery & Pasero, 1999) described this phenomenon as "sensory shielding."

VR and Work and Organizational Psychology

Work and organizational psychology has a long history and a widespread application in private and public companies (Chmiel, 2000) Its ultimate focus is to improve health and performance from both an individual and group perspective. In particular, the concept of organizational well-being plays a key role in work and organizational psychology and includes behavioral, affective, and cognitive variables, such as personal resources, skills, stress, and strain. The World Health Organization has classified stress as the second most common problem that negatively affects health and well-being at work. As regards other work-related issues, the most frequently studied aspects range from climate in the company/workplace, to the aspects strictly related to workload (e.g., repetitiveness, role ambiguity), and the presence of conflicts between peers and with supervisors. All these variables can have a decisive influence on employees' performance, job satisfaction, compliance, presenteeism, psychological and physiological strain. However, any effect can be mediated or moderated, depending on the specific constructs considered, by each person's resources, like positive and negative affectivity, a sense of personal efficacy, optimism, resilience, stress management, and the logical-consequential approach to problems (De Carlo, Falco, & Capozza, 2013). Numerous studies investigated the negative effects that stress can have on the worker resulting in increased inflammation, disease, accidents in the workplace, absenteeism, presenteeism, sickness absences, poor motivation, turnover, and a decrease in work performance (Bélanger et al., 2015; Falco, Dal Corso, Girardi, De Carlo, & Comar, 2018; Falco, Girardi, Dal Corso, Di Sipio, & De Carlo, 2013; Falco, Girardi, Parmiani et al., et al., 2013; Russell, Altmaier, & Van Velzen, 2018).

VR is a technology that, when applied to psychology in organizations, can enhance many activities related to work and organizational psychology. Its utility can be found in primary, secondary, and tertiary interventions. For example, it can be used for effectively teaching relaxation techniques: the literature highlights how scenarios depicting naturalistic environments can lower anxiety and stress (Beukeboom, Langeveld, & Tanja-Dijkstra, 2012). Immersion, one of the key characteristics of VR, together with presence, can reduce work stress (Anderson, Hirth, & Lothe, 2017). VR can also be used to increase coping skills, which are mediator variables between stressors and negative outcomes. VR can also be used to treat symptoms of organizational disease and stress, such as anxiety and depression. These examples show the versatility of this technology and its potential relevance for organizational psychologists.

Three Main Uses of VR in Work and Organizational Psychology Interventions

The literature on VR and work and organizational psychology is not yet as extensive as that on other topics; nevertheless, it is possible to identify some recurring themes. The studies on VR and work

organizational psychology are mostly on how this technology has been used to enhance psychological interventions. Given that the focus of this study is on practical actions enhanced through VR, the literature considered has been organized on the basis of how VR has been used for interventions in organizations. Our analysis of the literature brings out three main applications of VR in the organizational field, specifically: helping workers to relax, enhancing personal positive resources, treating anxiety and depression.

When placed within the multidimensional organizational well-being/disease (see Figure 1; De Carlo & Falco, 2013), these three fields of intervention fall into two of the three main categories identified: mediators or moderators (relaxation techniques and personal resources) and consequences (anxiety and depression).

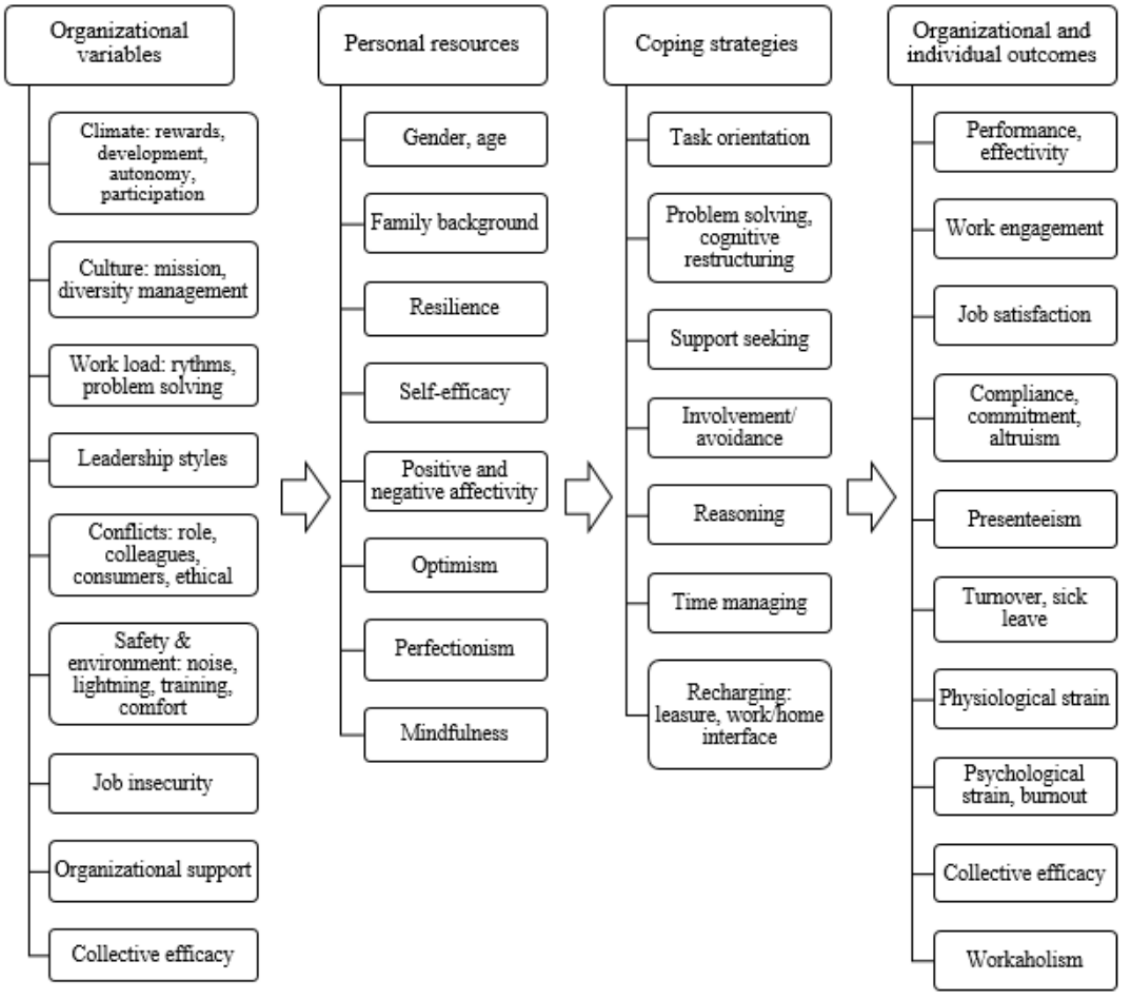

FIGURE 1
Multidimensional organizational well-being/disease model.

However, it should be noted that the constructs depicted in Figure 1 may have different roles, depending on the specific processes under investigation — for example, job resources such as job autonomy or social support may lead to work engagement but they may also buffer the impact of job demands on job burnout and the strain response (Bakker & Demerouti, 2017; Barbieri, Amato, Passafaro, Dal Corso, & Picciau, 2014; Falco et al., 2018). In particular, personal resources and coping strategies can perform both the

role of mediator and moderator. Overall, the above-mentioned partition in the literature shows the great extent to which VR can be used in conjunction with work and organizational psychology to intervene in organizations and improve individual and organizational well-being while preventing disease and its effects.

VR and Relaxation Techniques

One of the most effective ways to reduce individual stress is relaxation techniques (Norelli & Krepps, 2019). The term stress derives from the Latin "strictus", which means "tight," and from a medical point of view it refers to anything that wears and tears the body. McEwen (2000) underlined how this word was used in common language and lately it refers to how the body reacts and copes with psychological, environmental, and physical stimuli and challenges. It is also related to other terms such as: stressor, general and non-specific increase in arousal, feedback to the brain from this response (Levine & Ursin, 1991; Ursin & Eriksen, 2004). After Cannon (1915), Selye (1956) described the general adaptation syndrome (GAS), which comprises three stages: an alarm reaction on recognition of a stressor; an effort to resist, cope with, or adapt to the stressor; the depletion of resources (resulting in exhaustion) if a stressor cannot be overcome. Selye argued that prolonged activation of the body's stress response systems may be damaging to the organism, resulting in depletion of resources and ill health. In organizational contexts, stress is one of the highest costs for companies in terms of health and performance.

From the perspective of helping workers to learn individual relaxation techniques that can reduce stress, VR can be a very effective tool. Similarly, VR may also be useful for decreasing tension and negative emotions related to bad forms of heavy work investment, such as workaholism (Falco et al., 2012, 2017; Girardi, Falco, De Carlo, Dal Corso, & Benevene, 2018; Girardi et al., 2015; van Wijhe, Peeters, Schaufeli, & Ouweneel, 2013). One of the approaches to achieve this goal is the relaxing VR, which presents different contents inspired by classical relaxation techniques such as progressive muscle relaxation, autogenic training, meditation. These scenarios usually depict naturalistic environments (beaches, seas, mountains, etc.), which can lower anxiety and stress (Beukeboom et al., 2012). It was also demonstrated (Annersteld et.al., 2013) that natural scenarios accompanied by coherent (natural) sounds enhance the stress reduction effect compared to the environment without sounds. Another element that increased the effectiveness was the presence of a calm, welcoming leading the user to progressive relaxation and driving negative thoughts away. The goal of VR is, in fact, to achieve a positive state of well-being during the experience, rather than learning the procedure or acquiring new skills.

Besides this use of VR, it was demonstrated (Tichon & Mavin, 2016) that VR environments replicating real stressful situations can be used to train professionals to cope with stress and the emotions evoked. In this perspective, VR can also strengthen the professional's confidence through exposure.

Pallavicini, Argenton, Toniazzi, Aceti, and Mantovani (2016) examined the effects of stress management training in decreasing perceived stress and negative affect in military personnel. The authors showed how VR could be useful to assess an individual's resilience skills and to determine the impact that stress may have on physiological reactivity and performance.

VR and Work and Organizational Psychology for Enhancing Personal Resources

In between the causes of stress and organizational disease and their effects are personal resources (De Carlo & Falco, 2013) that act as a mediator or a moderator, on the basis of the specific processes

investigated. Situations that can be detrimental for a person may be positive for another, it all depends on which characteristics the person has and how he or she manages to cope with stress and difficulties. Enhancing some personal resources which are particularly desirable to withstand stress and helping workers to learn how to cope with it, therefore, can be a very powerful tool for an organizational psychologist. VR can be a valuable aid in making the interventions aiming to reach these goals more effective and efficient.

The following identifiable characteristics in the literature can be enhanced with the help of VR:

- Risk-taking. Being able to understand how people behave in a situation of danger or difficulty has always been a topic of interest, because people often face risk-taking situations. In a study of 2018 (de-Juan-Ripoll et al., 2018) the use of VR was proposed because it recreated interactive environments in which users could perform while their behavioral responses were recorded. Evaluations based on the virtual environment are thought to improve the ecological validity of the evaluation of the evoked responses (Parsey & Schmitter-Edgecombe, 2013). When it comes to training and learning, failure is a fundamental step. People who have faced real risks have been shown to have a more rational and cautious attitude (Cavalcanti & Soares, 2012). Dangers in real life can pose serious threats, for this reason, VR is a possible tool for evaluators to operate, without risk, in a safe and "real" environment (Amokrane, Lourdeaux, & Burkhardt, 2008). VR allows a person to be exposed to a risky situation and the activation of high-fidelity cognitive processes and behaviors due to the plausibility of the situation. In this perspective, VR environments allow users to take part in an embedded learning experience (Kilteni, Groten, & Slater, 2012).
- Leadership. In a company, leadership represents a fundamental aspect for workers, especially in positions of responsibility. Leadership was usually measured using traditional methods (e.g., self-report questionnaires, surveys, and projective measures). Self-assessment tools, however, may be conditioned by "social desirability" which can lead to inaccurate results (Paulus, 1991). In recent years, innovative methods have been used in this sector to recreate real-life situations through VR. This novel method allows observing different behavioral models related to leadership in complicated and realistic situations.

VR can provide ecological validity to objective evaluations and also allow many possibilities for leadership training (Alcañiz, Parra, & Chicchi Giglioli, 2018). What's more, VR can be a new approach to gain more skills and improve leadership behaviors. The authors showed how VR could be an advantageous tool to study management competences and to observe different leadership-related behavioral patterns through real-life situations. Growing attention has been recently dedicated to the new multidisciplinary field of organizational neuroscience (ON) to study how brain processes influence behavior and attitudes in the workplace. For organizational behavior and human resource management (OBHRM), the implicit brain processes are crucial in personal relationships, in business,s and decision-making. The storytelling possibilities of VR in future research may be crucial to predict leadership attributes and skills. The possibilities to recreate real-life situations different stimuli, but also the possibilities to create specific virtual characters with particular characteristics such as body language, non-verbal communication, and dialectics, may be useful to better understand the role of implicit brain processes and better train management style. The effectiveness of VR for leadership development was also demonstrated by Gordon and colleagues (Gordon, van Lent, van Velsen, Carpenter, & Jhala, 2004). These aspects are important because of the social-economics context that could lead the companies to experience moments of uncertainty.

- Resilience. One of the personal resources, resilience can be described as the ability to react positively to negative events by using positive emotions. Many studies highlighted a positive correlation between positive emotions and psychological resilience because resilient people experience positive emotions and can absorb them from other people as well (Tugade, Fredrickson, & Feldman Barrett, 2004). An emerging treatment modality, originally applied for reducing the effects of trauma, showed positive

results with the use of immersive VR. Resilience training through VR better prepares users for emotional stress and may also reduce the incidence of post-traumatic stress disorder (PTSD) and other psychosocial health conditions (Rizzo et al., 2013).

- Optimism. Tiger (1979) defined optimism as the state of mind or attitude associated with expectations about a future that is considered desirable. According to Seligman (1998) optimism is a style of attribution that leads individuals to explain positive events as the result of causes attributable to permanent and general personal resources. As highlighted by a 2012 study, technology and VR can improve individual well-being by increasing positive emotions such as optimism, happiness, and physical health, as well as by improving social communication (Botella et al., 2012).
- Self-efficacy. Self-efficacy refers to an individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments (Bandura, 1977, 1997). Self-efficacy reflects confidence in the ability to exert control over one's motivation, behavior, and social environment. VR has proven to be effective in increasing self-efficacy in different ways. A 2017 study showed that the use of VR in learning increased self-efficacy by allowing learners to be more innovative and creative. VR allows for active learning, making learners active participants able to create and innovate their profession (Nissim & Weissblueth, 2017).

VR and the Reduction of Anxiety and Depression

Anxiety is defined as an apprehensive anticipation of a danger or a future negative event, accompanied by feelings of dysphoria or physical symptoms of tension (Hodges & Spielberger, 1969). Because it involves cognitive and psychophysiological aspects, it is considered a two-dimensional construct.

Depression is a serious psychological disorder associated with low mood, sleep and/or appetite disorders, significant weight loss, loss of interest and pleasure in daily activities, lack of energy, inability to concentrate, possible recurring thoughts of death and/or suicide (Kazdin, 2000).

Even though anxiety and depression are two different ailments, people who have had depressive episodes may also have experienced an anxiety disorder throughout their life. Symptoms are sometimes common: irritability, sleep and appetite disturbance, and poor concentration (Da Silva et al., 2012). Fortunately, this type of pathologies can be treated with appropriate professional care and constant promotion of mental health also through innovative approaches.

In a work and organizational psychology perspective, anxiety and depression are two types of psychological strain, caused by the interaction between organizational causes and personal resources/lack of coping strategies. They are a consequence as well as a cause of continuous and general organizational disease that spreads until they are treated. The treatment of personal conditions such as anxiety and depression is commonly defined tertiary interventions.

Extensive research highlighted therapeutic effects for therapy based on exposure to anxiety disorders (Bandelow et al., 2015). Exposure therapy is based on the theory of emotional processing, according to which the memories of fear are structures that must be activated and modified by promoting emotional processing. VR is the best tool of exposure therapy because the sense of presence experienced through this technology offers therapists the opportunity to gradually immerse the patient in the feared environment in total safety while retaining control (Maples-Keller, Bunnell, Kim, & Rothbaum, 2017). Scientific evidence suggested that the treatment for anxiety disorders through VR is effective because it correlates with lowering anxiety levels (Parsons & Rizzo, 2008) and has a strong impact on real life with long-lasting results (Opriș

et al., 2012). VR has many advantages compared to traditional methods normally used in exposure therapy because it facilitates people who have poor imaginative skills. VR is also a low-cost, and therefore affordable, vehicle to reproduce scenarios and situations that are impossible to implement in vivo (Maples-Keller et al., 2017). A 2010 study showed that VR is an effective method in the treatment of social anxiety (Robillard, Bouchard, Dumoulin, Guitard, & Klinger, 2010) and in that of the fear of public speaking (Harris, Kemmerling, & North, 2002) with positive results confirmed at a one-year follow-up (Safir, Wallach, & Bar-Zvi, 2012). There also appear to be other advantages in using VR-based cognitive-behavioral therapy: a better response to treatment and a reduction in treatment time (Vincelli et al., 2003; Botella et al., 2007). Specific phobias are the most studied in VR treatments and a significant reduction in flight-related anxiety was demonstrated (Ferrand, Ruffault, Tytelman, Flahault, & Négovanska, 2015) in addition to a greater probability of traveling by plane again after treatment (Kahan, Tanzer, Darvin, & Borer, 2000).

Many treatments are used for depression, including medicines, but also meditation, mindfulness, and cognitive-behavioral therapy. They can help in the reduction of depressive and anxious symptoms. Zeng, Pope, Lee, and Gao (2018) showed how VR can be useful to support these treatments for depression making them more efficient and effective. The recent literature on the effects of VR-based treatments on depression focuses mainly on exposure therapy with VR. In these studies, traditional equipment such as stationary bikes and treadmills were used with the help of VR technology. In particular, some machines were equipped with integrated sensors that synchronize with a computer or game console allowing the player to engage in intense physical effort on the device while simultaneously engaging in VR gameplay. It was showed that the combination of VR and exercise can decrease symptoms, alleviating anxiety and depression with significant psychological benefits as well as increasing and improving adherence to exercise (Mestre, Ewald, & Maïano, 2011; Mestre, Maïano, Dagonneau, & Mercier, 2011; Plante, Cage, Clements, & Stover, 2006).

Discussion

This study shows the growing potential of VR in work and organizational psychology interventions. This is also related to the development of technology, which makes VR more affordable, portable, and realistic. It should be kept in mind that, until very recently, VR was not available to professionals, being either too bulky or too expensive for applications outside experimental environments. However, the nowadays technology is starting to be adequate; therefore, a more widespread use is to be expected.

The applications of VR in conjunction with work and organizational psychology are mostly on an individual level. This is related to a specificity of such a technology which is at the same time a strength and a weakness: its very individual nature. While it is theoretically possible for more than one person to be in a virtual environment at the same time, that scenario is much more complex than the one in which one person alone is wearing a visor and having a professional standing by, observing what is taking place. Therefore, most applications are one-to-one training courses and activities. While this makes organizational interventions with VR long, difficult to apply to all workers (especially in large companies), and more costly (considering the need to repeat every activity worker by worker), the effectiveness of what is carried out in a virtual environment can counterbalance such a shortcoming. The role of a professional, guiding the activities and the training conducted with the aid of VR, is not to be underestimated: many of the most advanced systems allow viewing what is happening within the virtual environment from an external device (computer or tablet), making real-time interaction with the person inside the environment possible. This is a key aspect of the possibilities of using VR technology sustainably: professionals must not think that this new technology

will take their place because this would imply an over-standardization of any intervention; they must be educated to know that VR is a tool that can enhance their potential and enlarge their set of options. Real-time communication allows "being" in the virtual environment together — even though just one person is immersed in it — by interacting, sharing what is happening and what is being experienced. In this perspective, the virtual environment is a "setting" with endless possibilities, which can be adapted to any approach and methodology for psychological interventions.

Some collaboration activities show the potential of VR also at a group level, despite the technology not seeming mature enough for a widespread diffusion of these interventions on a large scale yet. Nevertheless, this possibility is not to be discarded: when ready, it will be the vehicle for mass spreading VR within organizations.

The interventions supported by VR identified in this study are, according to the model of organizational well-being/disease taken into consideration, on the mediators/moderators and the effects of stress/disease. Moreover, they can be applied to the groups of secondary and tertiary interventions. Secondary (strengthening the resources already present among workers) and tertiary (treating existing disease) interventions are generally more focused on the individual level, which is in line with what stated above. Primary interventions on existing risks (generally related to re-organizing a company to reduce stress/disease risks) and well-being promotion, which in the model taken into consideration are related to the causes of stress/disease, tend to be more on a group level (e.g., interventions on conflict, climate) or on an organizational level (e.g., security, environment) (Barbieri, Farnese, Sulis, Dal Corso, & De Carlo, 2018). Specifically, the interventions aimed to teach relaxation techniques and to strengthen personal resources can be placed in the secondary interventions group, while the treatment of anxiety and depression can be placed in the tertiary. This division suggests a potential characteristic of the current use of VR in organizations: while primary organizational interventions tend to need to be spread among all workers and at the organizational level, secondary and tertiary interventions can be focused on clusters at risk or already experiencing stress/disease. This could make interventions with VR more limited in number, but could also be very much in line with the actual strengths and weaknesses of this technology. Given the great effectiveness of VR in enhancing psychological interventions and for a shortcoming of the one-to-one approach, using this technology on restricted and particularly sensitive situations is appropriate and could be its preeminent use for the next few years, making its diffusion possible.

It is important to spread the knowledge of the possibilities and strengths of the use of VR in relation to work and organizational psychology among both professionals and organizations. However, VR can also be perceived as negative. Professionals' fear of being replaced might prevent them from exploring what VR is and what its potential uses are. On an organizational level, the fact that workers might spend time alone in some virtual environments might create a feeling of "estrangement," of distancing and reduction of mutual knowledge, especially given the recent and numerous other working modes, such as co-working (Ivaldi & Scaratti, 2018, 2019). Finally, both professionals and organizations might still perceive VR as mostly a gaming-related technology, useful for fun and to experience something new but not to be seriously applied in a company. The first fear must be replaced with knowledge that the interventions are mostly human-driven. Such knowledge could bring professionals to perceive that their possibilities are much wider with this technology than they have ever been: psychologists had up to now not been able to manipulate (at least easily) the total perception of a person they were working with, and this makes psychological knowledge and professional expertise invaluable. The second fear must be addressed by showing how virtual environments are an added dimension to the experience of the person that is immersed in them, not just like a business or pleasure trip. Furthermore, workers could experience the immersive scenarios with the guidance of a

professional who would link the activities conducted within VR to the organizational goals, making workers more efficient and effective, healthier and more committed, not strangers to their organization. With regard to the perception of VR as an entertainment, it must be remembered that it mostly still is. While VR was thought to be a great leap forward in technology for the second half of the 2010s, its acceptance by the general public is still an issue for debate. This is probably due to its intrinsic nature: to experience VR one must be alone in an alien world with one's body completely defenseless in the real world. Few people yet accept to immerse themselves in a virtual world alone in their homes or with others around, either in private or work environments. Furthermore, the development of technology has been slightly slower than expected. These factors have brought VR to be used mostly for amusement. In this perspective, the presence of a professional guiding VR interventions in organizations may be the key for its diffusion: the experience of being unable to control what happens around one's body while in the virtual world is no different from many situations that involve the presence of a professional (e.g., medical procedures).

VR is a very promising technology that can help increase health and performance in organizations. Today its uses are mostly related to secondary and tertiary interventions, however, this is probably a temporary condition. Regardless, this is not a shortcoming considering that secondary and tertiary interventions are fundamental for creating health and well-being. The diffusion of this technology can be expected to grow, but it needs to be sustained because the benefits it can bring are not to be underestimated and, given the increase of complexity and stressors in today's organizations, not introducing it among the tools at a professional's disposal may be a waste of resources that the scientific and professional community should not tolerate.

References

Alcañiz, M., Parra, E., & Chicchi Giglioli, I. A. (2018). Virtual reality as an emerging methodology for leadership assessment and training. *Frontiers in Psychology*, *9*, 1658. doi:10.3389/fpsyg.2018.01658

Amokrane, K., Lourdeaux, D., & Burkhardt, J. M. (2008). HERA: Learner tracking in a virtual environment. *The International Journal of Virtual Reality*, *7*(3), 23-30.

Anderson, P. M., Hirth, J. P., & Lothe, J. (2017). *Theory of dislocations*. Cambridge, UK: Cambridge University Press.

Annerstedt, M., Jönsson, P., Wallergård, M., Johansson, G., Karlson, B., Grahn, P., . . . Währborg, P. (2013). Inducing physiological stress recovery with sounds of nature in a virtual reality forest. Results from a pilot study. *Physiology & Behavior*, *118*, 240-250. doi:10.1016/j.physbeh.2013.05.023

Bakker, A. B., & Demerouti, E. (2017). Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, *22*, 273-285. doi:10.1037/ocp0000056

Bandelow, B., Reitt, M., Röver, C., Michaelis, S., Görlich, Y., & Wedekind, D. (2015). Efficacy of treatments for anxiety disorders: A meta-analysis. *International Clinical Psychopharmacology*, *30*(4), 183-192. doi:10.1097/YIC.0000000000000078

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191-215.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Cambridge University Press.

Barbieri, B., Amato, C., Passafaro, P., Dal Corso, L., & Picciau, M. (2014). Social support, work engagement, and non-vocational outcomes in people with severe mental illness. *TPM – Testing, Psychometrics, Methodology in Applied Psychology*, *21*(2), 181-196. doi:10.4473/TPM21.2.5

Barbieri, B., Dal Corso, L., Di Sipio, A. M., De Carlo, A., & Benevene, P. (2016). Small opportunities are often the beginning of great enterprises: the role of work engagement in support of people through the recovery process and in preventing relapse in drug and alcohol abuse. *Work*, *55*(2), 373-383. doi:10.3233/WOR-162411

Barbieri, B., Farnese, M. L., Sulis, I., Dal Corso, L., & De Carlo, A. (2018). One perception, two perspectives: Measuring psychological contract dimensionality through the psychological contract content questionnaire. *TPM – Testing, Psychometrics, Methodology in Applied Psychology*, *25*(1), 21-47. doi:10.4473/TPM25.1.2

Bélanger, J. J., Pierro, A., Kruglanski, A. W., Vallerand, R. J., De Carlo, N. A., & Falco, A. (2015). On feeling good at work: The role of regulatory mode and passion in psychological adjustment. *Journal of Applied Social Psychology*, *45*, 319-329. doi:10.1111/jasp.12298

Benevene, P., Dal Corso, L., De Carlo, A., Falco, A., Carluccio, F., & Vecina, M.L. (2018). Ethical leadership as antecedent of job satisfaction, affective organizational commitment and intention to stay among volunteers of non-profit organizations. *Frontiers in Psychology*, *9*, 2069. doi:10.3389/fpsyg.2018.02069

Beukeboom, C. J., Langeveld, D., & Tanja-Dijkstra, K. (2012). Stress-reducing effects of real and artificial nature in a hospital waiting room. *The Journal of Alternative and Complementary Medicine*, *18*(4), 329-333. doi:10.1089/acm.2011.0488

Blount, R. L., Powers, S. W., Cotter, M. W., Swan, S., & Free, K. (1994). Making the system work: Training pediatric oncology patients to cope and their parents to coach them during BMA/LP procedures. *Behavior Modification*, *18*(1), 6-31. doi:10.1177/01454455940181002

Botella, C., García-Palacios, A., Villa, H., Baños, R. M., Quero, S., Alcañiz, M., & Riva, G. (2007). Virtual reality exposure in the treatment of panic disorder and agoraphobia: A controlled study. *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice*, *14*(3), 164-175. doi:10.1002/cpp.524

Botella, C., Riva, G., Gaggioli, A., Wiederhold, B. K., Alcaniz, M., & Baños, R. M. (2012). The present and future of positive technologies. *Cyberpsychology, Behavior, and Social Networking*, *15*(2), 78-84. doi:10.1089/cyber.2011.0140

Cannon, W. B. (1915). *Bodily changes in pain, hunger, fear and rage: An account of recent researches into the function of emotional excitement.* Boston, MA: D. Appleton & Company.

Cavalcanti, J., & Soares, M. (2012). Ergonomic analysis of safety signs: A focus of informational and cultural ergonomics. *Work*, *41*(1), 3427-3432. doi:10.3233/WOR-2012-0619-3427

Chmiel, N. (2000). History and context for work and organizational psychology. In N. Chmiel (Ed.). *Introduction to work and organizational psychology: A European perspective*. Malden, MA: Blackwell.

Cohen, L. L., Blount, R. L., Cohen, R. J., Schaen, E. R., & Zaff, J. F. (1999). Comparative study of distraction versus topical anesthesia for pediatric pain management during immunizations. *Health Psychology*, *18*(6), 591-598. doi:10.1037/0278-6133.18.6.591

Cox, C. B., House, A., Lopez, A., & Pool, G. J. (2017). The need for conceptual models of technology in training and development: How immersive does training need to be?. *Industrial and Organizational Psychology*, *10*(4), 696-701. doi:10.1017/iop.2017.78

Da Silva, M. A., Singh-Manoux, A., Brunner, E. J., Kaffashian, S., Shipley, M. J., Kivimäki, M., & Nabi, H. (2012). Bidirectional association between physical activity and symptoms of anxiety and depression: The Whitehall II study. *European Journal of Epidemiology*, *27*(7), 537-546. doi:10.1007/s10654-012-9692-8

De Carlo, N. A., & Falco, A. (2013). Il test Q_u-Bo come strumento per la ricerca-azione. In N. A. De Carlo, A. Falco, & D. Capozza (Eds.), *Stress, benessere organizzativo e performance. Valutazione & intervento per l'azienda positiva* [Stress, organizational well-being, and performance. Assessment & intervention for the positive organization] (pp. 443-463). Milano, Italy: FrancoAngeli

De Carlo, N. A., Falco, A., & Capozza, D. (Eds.). (2013). *Stress, benessere organizzativo e performance. Valutazione & intervento per l'azienda positiva* [Stress, organizational well-being, and performance. Assessment & intervention for the positive organization]. Milano, Italy: FrancoAngeli.

de-Juan-Ripoll, C., Soler-Domínguez, J. L., Guixeres, J., Contero, M., Álvarez Gutiérrez, N., & Alcañiz, M. (2018). Virtual reality as a new approach for risk taking assessment. *Frontiers in Psychology*, *9*, 2532. doi:10.3389/fpsyg.2018.02532

Falco, A., Girardi, D., Dal Corso, L., Di Sipio, A., & De Carlo, N. A. (2013). Fear of workload, job autonomy, and work-related stress: The mediating role of work-home interference. *TPM – Testing, Psychometrics, Methodology in Applied Psychology*, *20*(3), 217-234. doi:10.4473/TPM20.3.2

Falco, A., Dal Corso, L., Girardi, D., De Carlo, A., & Comar, M. (2018). The moderating role of job resources in the relationship between job demands and Interleukin-6 in an Italian healthcare organization. *Research in Nursing & Health*, *41*, 39-48. doi:10.1002/nur.21844

Falco, A., Dal Corso, L., Girardi, D., De Carlo, A., Barbieri, B., Boatto, T., & Schaufeli, W. B. (2017). Why is perfectionism a risk factor for workaholism? The mediating role of irrational beliefs at work. *TPM – Testing, Psychometrics, Methodology in Applied Psychology*, *24*, 583-600. doi:10.4473/TPM24.4.8

Falco, A., Girardi, D., Parmiani, G., Bortolato, S., Piccirelli, A., Bartolucci, G. B., & De Carlo, N. A. (2013). Presenteismo e salute dei lavoratori: Effetti di mediazione sullo strain psico-fisico in un'indagine longitudinale [Presenteeism and workers' health: Effects of mediation on psycho-physical stress in a longitudinal study]. *Giornale Italiano di Medicina del Lavoro ed Ergonomia*, *35*, 138-150.

Falco, A., Kravina, L., Girardi, D., Dal Corso, L., Di Sipio, A., & De Carlo, N. A. (2012). The convergence between self and observer ratings of workaholism: A comparison between couples. *TPM – Testing, Psychometrics, Methodology in Applied Psychology*, *19*(4), 311-324. doi:10.4473/TPM19.4.5

Ferrand, M., Ruffault, A., Tytelman, X., Flahault, C., & Négovanska, V. (2015). A cognitive and virtual reality treatment program for the fear of flying. *Aerospace Medicine and Human Performance*, *86*(8), 723-727. doi:10.3357/AMHP.4211.2015

Fowler-Kerry, S., & Lander, J. R. (1987). Management of injection pain in children. *Pain*, *30*(2), 169-175. doi:10.1016/0304-3959(87)91072-4

Girardi, D., Falco, A., Piccirelli, A., Dal Corso, L., Bortolato, S., & De Carlo, A. (2015). Perfectionism and presenteeism among managers of a service organization: The mediating role of workaholism. *TPM – Testing, Psychometrics, Methodology in Applied Psychology*, *22*(3), 507-521. doi:10.4473/TPM22.4.5

Girardi, D., Falco, A., De Carlo, A., Dal Corso, L., & Benevene, P. (2018). Perfectionism and workaholism in managers: The moderating role of workload. *TPM – Testing, Psychometrics, Methodology in Applied Psychology*, *25*(4), 571-588. doi:10.4473/TPM25.4.7

Gordon, A., van Lent, M., van Velsen, M., Carpenter, P., & Jhala, A. (2004). *Branching storylines in virtual reality environments for leadership development*. Proceedings of the 16th on Innovative Applications of Artificial Intelligence Conference (pp. 844-851). Menlo Park, CA: AAAI Press.

Harris, S. R., Kemmerling, R. L., & North, M. M. (2002). Brief virtual reality therapy for public speaking anxiety. *Cyberpsychology & Behavior*, *5*(6), 543-550. doi:10.1089/109493102321018187

Hodges, W. F., & Spielberger, C. D. (1969). Digit span: An indicant of trait or state anxiety?. *Journal of Consulting and Clinical Psychology*, *33*(4), 430-434. doi:10.1037/h0027813

Ivaldi, S., & Scaratti, G. (2018) Narrative and conversational manifestation of contradictions: Social production of knowledge for expansive learning. *Learning, Culture and Social Interaction*. Advance online publication. doi:10.1016/j.lcsi.2018.11.002

Ivaldi, S., & Scaratti, G. (2019). Coworking hybrid activities between plural objects and sharing thickness. *TPM – Testing, Psychometrics, Methodology in Applied Psychology*, *26*(1), 121-147. doi:10.4473/TPM26.1.7

Kahan, M., Tanzer, J., Darvin, D., & Borer, F. (2000). Virtual reality-assisted cognitive-behavioral treatment for fear of flying: Acute treatment and follow-up. *CyberPsychology & Behavior*, *3*(3), 387-392. doi:10.1089/10949310050078832

Kazdin, A. E. (2000). *Encyclopedia of psychology* (Vol. 8). Washington, DC: American Psychological Association.

Kilteni, K., Groten, R., & Slater, M. (2012). The sense of embodiment in virtual reality. *Presence: Teleoperators and Virtual Environments*, *21*(4), 373-387. doi:10.1162/PRES_a_00124

Kleiber, C., & Harper, D. C. (1999). Effects of distraction on children's pain and distress during medical procedures: A meta-analysis. *Nursing Research*, *48*(1), 44-49. doi:10.1097/00006199-199901000-00007

Lanier, J., & Biocca, F. (1992). An insider's view of the future of virtual reality. *Journal of Communication*, *42*(4), 150-172.

Levine, S., & Ursin, H. (1991). What is stress? In M. R. Brown, G. F. Koob, & C. Rivier (Eds.), *Stress: Neurobiology and Neuroendocrinology* (pp. 3-21). New York, NY: Marcel Dekker Inc.

Maples-Keller, J. L., Bunnell, B. E., Kim, S. J., & Rothbaum, B. O. (2017). The use of virtual reality technology in the treatment of anxiety and other psychiatric disorders. *Harvard Review of Psychiatry*, *25*(3), 103-113. doi:10.1097/HRP.0000000000000138

McCaffery, M., & Pasero, C. (1999). *Pain Clinical Manual*. St. Louis, MO: Mosby.

McEwen, B. S. (2000). Allostasis and allostatic load: Implications for neuropsychopharmacology. *Neuropsychopharmacology*, *22*(2), 108-124.

Mestre, D. R., Maïano, C., Dagonneau, V., & Mercier, C. S. (2011). Does virtual reality enhance exercise performance, enjoyment, and dissociation? An exploratory study on a stationary bike apparatus. *Presence: Teleoperators and Virtual Environments*, *20*(1), 1-14. doi:10.1162/pres_a_00031

Mestre, D., Ewald, M., & Maïano, C. (2011). Virtual reality and exercise: Behavioral and psychological effects of visual feedback. *Annual Review of Cybertherapy and Telemedicine*, *167*(1), 122-127. doi:10.3233/978-1-60750-766-6-122

Nissim, Y., & Weissblueth, E. (2017). Virtual reality (VR) as a source for self-efficacy in teacher training. *International Education Studies*, *10*(8), 52-59. doi:10.5539/ies.v10n8p52. doi:10.5539/ies.v10n8p52

Norelli S. K., & Krepps J. M. (2019). *Relaxation Techniques*. Treasure Island, FL: StatPearls Publishing.

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

Pallavicini, F., Argenton, L., Toniazzi, N., Aceti, L., & Mantovani, F. (2016). Virtual reality applications for stress management training in the military. *Aerospace Medicine and Human Performance*, *87*(12), 1021-1030. doi:10.3357/AMHP.4596.2016

Parsey, C. M., & Schmitter-Edgecombe, M. (2013). Applications of technology in neuropsychological assessment. *The Clinical Neuropsychologist*, *27*(8), 1328-1361. doi:10.1080/13854046.2013.834971

Parsons, T. D., & Rizzo, A. A. (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. doi:10.1016/j.jbtep.2007.07.007

Paulus, D. L. (1991). Measurement and control of response bias. Measures of personality and social psychological attitudes. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes* (pp. 17-59). San Diego, CA: Academic Press.

Plante, T. G., Cage, C., Clements, S., & Stover, A. (2006). Psychological benefits of exercise paired with virtual reality: Outdoor exercise energizes whereas indoor virtual exercise relaxes. *International Journal of Stress Management*, *13*(1), 108-117.

Rheingold, H. (1991). *Virtual reality*. New York, NY: Summit Books.

Rizzo, A., John, B., Newman, B., Williams, J., Hartholt, A., Lethin, C., & Buckwalter, J. G. (2013). Virtual reality as a tool for delivering PTSD exposure therapy and stress resilience training. *Military Behavioral Health*, *1*(1), 52-58. doi:10.1080/21635781.2012.721064

Robillard, G., Bouchard, S., Dumoulin, S., Guitard, T., & Klinger, E. (2010). Using virtual humans to alleviate social anxiety: Preliminary report from a comparative outcome study. *Studies in Health Technology and Informatics*, *154*, 57-60. doi:10.3233/978-1-60750-561-7-57

Russell, D. W., Altmaier, E., & Van Velzen, D. (2018). Job-related stress, social support, and burnout among classroom teachers. *Journal of Applied Psychology*, *72*(2), 269-274. doi:10.1037//0021-9010.72.2.269

Sacks, A., Perlman, A., & Barak, R. (2013). Construction safety training using immersive virtual reality. *Construction Management and Economics*, *31*(9), 1005-1017. doi:10.1080/01446193.2013.828844

Safir, M. P., Wallach, H. S., & Bar-Zvi, M. (2012). Virtual reality cognitive-behavior therapy for public speaking anxiety: One-year follow-up. *Behavior Modification*, *36*(2), 235-246. doi:10.1177/0145445511429999

Schuemie, M. J., Van Der Straaten, P., Krijn, M., & Van Der Mast, C. A. (2001). Research on presence in virtual reality: A survey. *CyberPsychology & Behavior*, *4*(2), 183-201. doi:10.1089/109493101300117884

Seligman, M. E. P. (1998). *Learned optimism*. New York, NY: Pocket Books.

Selye, H. (1956). *The stress of life*. New York, NY: McGraw-Hill.

Sitzmann, T., & Ely, K. (2011). A meta-analysis of self-regulated learning in work-related training and educational attainment: What we know and where we need to go. *Psychological Bulletin*, *137*(3), 421-442. doi:10.1037/a0022777

Slater, D. (2002) Social relationships and identity online and offline. In L. Lievrouw & S. Livingstone (Eds.), *Handbook of new media: Social shaping and consequences of ICTs* (pp. 533-546). London, UK: Sage Publications.

Slater, M., & Wilbur, S. (1997). A framework for immersive virtual environments (FIVE): Speculations on the role of presence in virtual environments. *Presence: Teleoperators and virtual environments*, *6*(6), 603-616. doi:10.1162/pres.1997.6.6.603

Srivastava, S., & Chandra, S., (2017) Social presence in virtual world collaboration: An uncertainty reduction perspective using a mixed methods approach. *Management Information System Quarterly*, *42*(3), 779-803. doi:10.25300/MISQ/2018/11914

Steuer, J. (1992). Defining virtual reality: Dimensions determining telepresence. *Journal of Communication*, *42*(4), 73-93. doi:10.1111/j.1460-2466.1992.tb00812.x

Tichon, J. G., & Mavin, T. (2016). Using the experience of evoked emotion in virtual reality to manage workplace stress: Affective Control theory (ACT). In D. Villani, P. Cipresso, A. Gaggioli, & G. Riva (Eds.), *Integrating technology in positive psychology practice* (pp. 344-362). Hershey, PA: IGI Global.

Tiger, L. (1979). *Optimism: The biology of hope*. New York, NY: Simon & Schuster.

Tugade, M. M., Fredrickson, B. L., & Feldman Barrett, L. (2004). Psychological resilience and positive emotional granularity: Examining the benefits of positive emotions on coping and health. *Journal of Personality*, *72*(6), 1161-1190. doi:10.1111/j.1467-6494.2004.00294.x

Ursin, H., & Eriksen, H. R. (2004). The cognitive activation theory of stress. *Psychoneuroendocrinology*, *29*(5), 567-592. doi:10.1016/S0306-4530(03)00091-X

van Wijhe, C. I., Peeters, M. C. W., Schaufeli, W. B., & Ouweneel, E. (2013). Rise and shine: Recovery experiences of workaholic and nonworkaholic employees. *European Journal of Work and Organizational Psychology*, *22*, 476-489. doi:10.1080/1359432X.2012.663527

Vincelli, F., Anolli, L., Bouchard, S., Wiederhold, B. K., Zurloni, V., & Riva, G. (2003). Experiential cognitive therapy in the treatment of panic disorders with agoraphobia: A controlled study. *CyberPsychology & Behavior*, *6*(3), 321-328. doi:10.1089/109493103322011632

Vora, J., Nair, S., Gramopadhye, A. K., Duchowski, A. T., Melloy, B. J., & Kanki, B. (2002). Using virtual reality technology for aircraft visual inspection training: Presence and comparison studies. *Applied Ergonomics*, *33*(6), 559-570. doi:10.1016/S0003-6870(02)00039-X

Witmer, B. G., & Singer, M. J. (1998). Measuring presence in virtual environments: A presence questionnaire. *Presence*, *7*(3), 225-240.

Zeltzer, L. K., Dolgin, M. J., LeBaron, S., & LeBaron, C. (1991). A randomized, controlled study of behavioral intervention for chemotherapy distress in children with cancer. *Pediatrics*, *88*(1), 34-42.

Zeng, N., Pope, Z., Lee, J. E., & Gao, Z. (2018). Virtual reality exercise for anxiety and depression: A preliminary review of current research in an emerging field. *Journal of Clinical Medicine*, *7*(3), 42. doi:10.3390/jcm7030042