MOMS IMMERSED IN THEIR WORK: VIRTUAL REALITY AND MENTAL HEALTH PROMOTION AFTER MATERNITY LEAVE

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Abstract

Mental health, well-being, performance, and numerous other variables in the workplace are frequently managed through a multidisciplinary approach aimed to make the organization more productive. New technology, such as virtual reality (VR), can be adapted to very different needs. It can enhance psychological intervention on workers, making them more effective and efficient. Several studies have analyzed the effectiveness of training with VR in the workplace. VR can be used mainly for: learning relaxation techniques, promoting stress reduction; enhancing personal resources, managing difficult situations; reducing anxiety and depression, both on its own or combined with exposure therapy, which allows to use scenarios and situations that are impossible to implement in vivo.

Return to work (RTW) after maternity leave is a common transition in women's lives that may be a challenge. Several mothers leave their job to devote themselves to their children's care and development. However, that choice is not always a free and personal decision: it may be based on issues related to work-life balance and employment after childbirth or on supervisors' and colleagues' messages about motherhood being inappropriate in the work context. Expectations and responsibilities related to the role of mother are intertwined with those related to the world of work.

With the aim of exploring and enhancing the personal and professional resources of working mothers and deconstructing irrational beliefs on the role of mother and worker, a psychological protocol based on VR was proposed to a small number of working mothers currently engaged in the caregiving of preschool children. The four-step VR-based training comprises two sessions focusing on body consciousness, and two focusing on psychological techniques. The efficacy of the protocol is evaluated through the comparison of questionnaires administered pre and post intervention.

We assumed that: the reinforcement of personal resources may trigger a spiral of "gain" capable of leading the person to positive outcomes both in the work and in the private sphere; the increase of work resources may activate a motivational process with positive outcomes for health.

The limitations of the study are related to the number of participants and to the lack of a control group. Future research could include longitudinal studies involving participants from different organizations. The VR protocol can be a useful contribution to support mothers' RTW after maternity leave while, at the same time, helping organizations to be healthier and more efficient.

Keywords: Virtual reality, return to work after maternity leave, personal resources, irrational belief, mental health.

1. Introduction

New technologies, such as virtual reality (VR), play a growing and central role in our society and can be adapted to very different needs: they are promising ways of caring for employees, in the psychological field as well. This study focuses on the intersection between VR and the support to mothers that return to work (RTW) after maternity leave. VR can make the psychological intervention more effective and efficient.

2. The origin of virtual reality

VR is a technology that allows people to live an experience within a 3D computer-generated virtual environment, the setting of which is controlled by the professional. Within the virtual environment

it is possible to interact both with the surrounding context and with any other user (Botella et al., 2006). Immersive virtual reality (IVR) generally uses a display device, and advanced interface devices. In this case, the user is completely immersed into the virtual environment.

The concepts of immersion and presence are fundamental in VR interventions. Slater and Wilbur (1997) defined immersion 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*" (p. 3). When the virtual world is genuine and similar to the real world, immersion is achieved. Immersion is necessary to enhance the presence, "*a psychological state or subjective perception in which even though part or all of an individual's current experience is generated by and/or filtered through human-made technology, part or all of the individual's perception fails to accurately acknowledge the role of the technology in the experience*" (Lombard & Snyder-Duch, 2001; p. 58). Even if immersion and presence may seem similar concepts, the main difference is that the former is a characteristic of the virtual world, whereas the latter is a personal characteristic.

In the early 2000s, psychologists began to apply VR with exposure therapy (VRET). Between the '90s and the present day, a series of studies have been conducted on the use of VR for the treatment of psychological disorders related to phobias and, more generally, anxiety disorders (Botella et al., 2004). Other studies investigated chemotherapy-derived stress (Schneider et al., 2011), pain reduction (Espinoza et al., 2012). In the organizational context, ample scientific evidence demonstrated that new technologies play an important role in achieving individual and collective well-being (De Carlo, Carluccio et al., 2020). In particular, VR can be an effective tool to develop entrepreneurial skills and teamwork as well as to reduce anxiety and work-related stress also through relaxation techniques. These techniques can influence positive affectivity leading to an increase in positive emotions and a reduction in negative ones (Anderson et al., 2017; Kiss et al., 2016).

The main theories employed to create the protocols used in the study are the Conservation of Resources Theory (COR) (Hobfoll, 1998) and the Effort-Recovery Model (E-R) (Meijman & Mulder, 1998). The former is based on the assumption that people struggle to obtain, preserve, and protect their resources, which can be internal and/or external. The E-R Model, on the other hand, focuses mainly on the consequences of workload. The concepts of energy and fatigue are predominant in the model: the aim of the recovery process is to recover and restore optimal energy levels and reduce or eliminate the symptoms of fatigue.

3. Virtual reality and maternity

The perinatal period, defined as the time span from conception to the year following childbirth, is a risk phase for parents' mental health due to the great biological, social, and relational transformations it entails. It can cause a conspicuous increase in stress, alterations in the sleep-wake rhythm and changes in mood. Research in recent decades has been dedicated to studying the phenomenon in depth, and although the experience is naturally marked by a happy event such as the birth of a child, it can also be a cause of suffering. Unexpected difficulties may arise related to the new rhythms and lifestyle that are necessarily upset (Paulson & Bazemore, 2010).

Going through the stages that accompany the woman before, during, and after the pregnancy, if the woman works, one encounters the delicate moment of returning to work (RTW) after maternity leave. Nowadays, working life highlights the different roles of mothers, allowing them to perceive themselves not "only" as mothers, but also as workers. However, it often happens that employers attribute negative characteristics to motherhood, leading working women to perceive concern about the announcement of their pregnancy or, in the most extreme cases, to postpone the choice to become mothers. Many mothers, in fact, prefer to devote themselves to the care of their children rather than re-enter the job market. All this acquires a negative meaning when this choice is not free and personal but is based on issues relating to work-life balance and re-employment after childbirth. For these reasons, when mothers face RTW after maternity, they may perceive feelings of inadequacy, not knowing whether they will be able to cope with organizational and family challenges (Carluccio et al., 2020).

VR can be used in a variety of settings for a variety of purposes, including supporting mothers during pregnancy. Frequently, VR is used to facilitate pregnancy by reducing the anxiety levels of expectant mothers and training them in effective pain management during labor. Among the non-pharmacological methodologies, VR technology can provide a simulation that allows to shift the mother's focus from pain to something else (e.g., sea, mountain, beach, river, lake, woods, etc.).

4. The study

In order to develop a VR-based training aimed to facilitate mothers' RTW after maternity, a self-report questionnaire was administered in this study aimed at identifying some relevant psychological dimensions in RTW after maternity leave.

A psychological protocol based on VR was proposed to a small number of working mothers currently engaged in caregiving. The first phase involves the administration of the self-report questionnaire, which aimed at identifying the following dimensions. *Rigidity of maternity belief* were assessed using the RMBS (Thomason et al., 2015). The scale is composed of 24 items and comprises four subscales[1]. P*ositive supervisor behaviors in RTW after maternity leave* were assessed through SSRW-WM-9 (Carluccio et al., 2020). The instrument is composed of 9 items and comprises three subscales[1] with 3 items each. *Irrational beliefs at work* were assessed using the Italian version of WIB-Q (Falco et al., 2017). The scale is composed of 16 items and measures four types of work-related irrational beliefs[1] with 4 items each. *Quality of maternity leave* were assessed through QMLS (Sterling & Allan, 2019). The instrument is composed of 23 items and comprises six subscales[1]. Trait-anxiety were assessed using the subscale for trait-anxiety of STAI-Y (Pedrabissi & Santinello, 1989). The instrument is composed of 40 items and measures two type of anxiety (state and trait) with 20 items each. *Psychological capital* was assessed through Italian version of PCQ (Di Sipio et al., 2012). The instrument is composed of 32 items and measures four personal resources[1]. *Recovery experiences* were assessed using Recovery Experience Questionnaire (Sonnentag & Fritz, 2007). The instrument is composed of 16 items ad comprises four subscales[1] with 4 items each. *Perceived stress* was assessed through I-PSS-14 (Mondo et al., 2021). The scale is composed of 14 items. *Fear of Covid-19* was assessed through a scale developed by Ahorsu and colleagues (2020). The instrument is composed of 7 items. The *perceived Covid-19 related risk of being infected at work* was assessed through CPRS-W (Falco et al., 2021). The instrument is composed of 8 items and comprises two types of perception (cognitive and emotive) with 4 items each. *General and work satisfaction* were assessed through 2 items (De Carlo et al., 2008). *Job performance* was assessed through 2 items (Falco et al., 2013).

The second phase, based on the findings of the first, provides a four-step (50 minutes per session, once a week) VR-based training (De Carlo, Rapisarda et al., 2020; Mora et al., 2021). Two sessions (the first and the third) focus on body consciousness through the practice of diaphragmatic breathing and a technique based on mindfulness called *Body Focus*. The other two are psychological techniques: *Virtual Three Good Things*, focused on the woman's past successes and achievements*; Best Possible Self*, focused on the future positive thinking.

4.1. Objective

The aim of the VR-based protocol is to achieve the following objectives: 1) strengthening personal and work resources, which activate a motivational process with positive outcomes for both individual well-being and performance; 2) strengthening and acquiring new personal resources, that can increase positive outcomes in both the personal and work spheres, limiting rigid beliefs relating to the role of working mother and improving the process of RTW after maternity; 3) increasing and improving health and performance in the workplace by teaching and learning specific techniques and strategies that can be used by participants independently also outside the workplace.

4.2. Methods

A total of six participants took part in the ongoing first edition of the VR-based protocol, all working mothers currently engaged in the caregiving of preschool children (0-6 years old). After providing informed consent, mothers are invited to describe, metaphorically, their RTW after maternity. After that, participants were administered the self-report questionnaire described above. The following phase included the four-step VR-based training. The self-report questionnaires were used before (t1), immediately after (t2), and 3 months following the training (t3). State anxiety was measured before and after each session of the training.

4.3. Data analyses, interpretation, and results

Table 1 shows our finding at t1 of the ongoing first edition of the VR-based protocol. Generally, mothers report medium levels of rigid beliefs about maternity (M=3.71) and work (M=2.55). Although the levels of personal resources are good (M=4.30), especially self-efficacy (M=4.96), there is room for improvement, especially about recovery (M=2.76) and satisfaction, mainly at work (M=3.50).

Mothers described their RTW after maternity leave as: "*a race on a route known because I was immediately assigned a complex activity which I know well and I have flexibility both hourly and in terms of presence in the workplace*"; "*a new adventure full of unknowns and uncertainties because I did not know what I should expect*"; "*taking my life back into my hands because I went back to being a woman and not just a mother*"; "*a roller coaster because it was scary but by now I was seated, the carousel had started and I could only wait for the ride to finish*". Largely, mothers expressed the perception of RTW after maternity leave as an adventure, characterized by fear and uncertainty; as an opportunity to assert one's identity as a working woman; as a return to a known place, characterized by a familiar activity.

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[1]Please refer to Table 1.

Table 1. Mean, standard deviation.

Psychological dimensions	Range	Mean	St. dev.	Psychological dimensions	Range	Mean	St. dev.
Rigidity of maternal belief	**1-7**	**3.71**	**1.64**	**Positive supervisor behaviors in RTW after maternity leave**	**1-5**	**3.05**	**1.10**
Perceptions and societal expectations of mothers	*1-7*	*3.91*	*.68*	*Inclusive behavior*	*1-5*	*2.61*	*1.06*
Role identity	*1-7*	*5.19*	*1.14*	*Negative behavior**	*1-5*	*3.56*	*1.24*
Maternal confidence	*1-7*	*3.71*	*1.83*	*General proactive support*	*1-5*	*3.20*	*1.12*
Maternal dichotomy	*1-7*	*3.71*	*1.64*	**Psychological capital**	**1-6**	**4.30**	**.78**
Irrational belief at work	**1-5**	**2.55**	**.49**	*Resilience*	*1-6*	*4.38*	*.66*
Performance demands	*1-5*	*3.78*	*.87*	*Hope*	*1-6*	*4.14*	*1.19*
Coworkers' approval	*1-5*	*2.17*	*.86*	*Optimism*	*1-6*	*3.50*	*1.36*
Failure	*1-5*	*3.00*	*1.46*	*Self-efficacy*	*1-6*	*4.96*	*.71*
Control	*1-5*	*1.39*	*.49*	**Recovery experience**	**1-5**	**2.76**	**.57**
Quality of maternity leave	**1-7**	**4.72**	**1.23**	*Psychological detachment*	*1-5*	*2.21*	*.64*
Time off	*1-7*	*5.04*	*1.27*	*Relaxation*	*1-5*	*2.21*	*.95*
Flexibility	*1-7*	*4.79*	*1.70*	*Mastery experiences*	*1-5*	*3.04*	*1.13*
Coworker support	*1-7*	*4.44*	*1.39*	*Control*	*1-5*	*3.58*	*1.40*
Discrimination*	*1-7*	*5.25*	*1.94*	**Perceived stress**	**0-4**	**2.95**	**1.00**
Microaggression*	*1-7*	*5.92*	*1.31*	**Fear of Covid-19**	**1-6**	**2.19**	**1.07**
Benefits	*1-7*	*2.83*	*1.14*	**Perceived risk of Covid-19**	**1-5**	**2.33**	**.72**
Trait anxiety	**1-4**	**2.61**	**.60**	**General satisfaction**	**1-6**	**4.33**	**1.03**
				Work satisfaction	**1-6**	**3.5**	**1.89**
				Performance	**1-10**	**7.08**	**1.59**

* High values indicate low presence of the construct.

5. Discussion

The study shows our finding related to some psychological dimensions, relevant in RTW after maternity leave, investigated through the self-report questionnaires employed in the first phase of the ongoing VR-based protocol. Based on the potential of VR and in line with the results shown in other studies (Mora et al., 2021; Rapisarda et al., 2021), in t2 and t3 we expect an improvement in personal resources, in the management of anxiety and stress and, in general, in individual and organizational well-being. Specifically, a reduction in rigid beliefs about maternity and work is expected.

Given the limited number of mothers who participated in the study, mainly because of the Covid-19-related restrictions, this work is still an ongoing experience. A larger sample is needed as well as control groups. However, the results already obtained suggest that this area of intervention and this VR-based protocol may have a potential that should be further investigated and replicated in broader contexts. The use of VR, characterized by innovative and immersive technologies, is promisingly placed among the applications of psychology for the support of workers in the organizational context.

References

Ahorsu, D.K., Lin, C.Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A.H. (2020). The Fear of COVID-19 Scale: Development and Initial Validation. *International Journal of Mental Health and Addiction*, 1–9.

Anderson, A.P., Mayer, M.D., Fellows, A.M., Cowan, D.R., Hegel, M.T., & Buckey, J.C. (2017). Relaxation with immersive natural scenes presented using virtual reality. *Aerospace Medicine and Human Performance*, *88*(6), 520-526.

Botella, C., Hofmann, S. G., & Moscovitch, D. A. (2004). A self-applied, Internet-based intervention for fear of public speaking. *Journal of Clinical Psychology*, *60*(8), 821-830.

Botella, C., Quero, S., Baños, R.M., Perpiñá, C., & Riva, G. (2006). Virtual Reality and Psychotherapy. In G. Riva, C. Botella, P. Légeron, & G. Optale (ed.), *Cybertherapy: Internet and virtual reality as assessment and rehabilitation tools for clinical psychology and neuroscience*. Amsterdam: IOS Press.

Carluccio, F., Dal Corso, L., Falco, A., & De Carlo, A. (2020). How to positively manage return to work after maternity leave: Positive supervisor behaviors to promote working mothers' well-being. *TPM - Testing, Psychometrics, Methodology in Applied Psychology*, *27*(4), 583-601.

De Carlo, A., Carluccio, F., Rapisarda, S., Mora, D., & Ometto, I. (2020). 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. *TPM - Testing, Psychometrics, Methodology in Applied Psychology*, *27*(1), 129-143.

De Carlo, A., Rapisarda, S., Mora, D., & Benevene, P. (2020, April). *Your best virtual self-improvement. The use of virtual reality in stress management training*. International Psychological Applications Conference and Trends - InPACT 2020.

De Carlo, N.A., Falco, A., & Capozza, D. (2008). *Test di valutazione del rischio stress lavoro-correlato nella prospettiva del benessere organizzativo, Qu-Bo* [Test for the assessment of work-related stress risk in the organizational well-being perspective, Qu-Bo]. Milano, Italy: FrancoAngeli.

Di Sipio, A., Falco, A., Kravina, L., & De Carlo, N.A. (2012). Positive personal resources and organizational well-being: resilience, hope, optimism, and self-efficacy in an Italian health care setting. *TPM – Testing, Psychometrics, Methodology in Applied Psychology*, *19*(2), 81-95.

Espinoza, M., Baños, R. M., García-Palacios, A., Cervera, J.M., Esquerdo, G., Barrajón, E., & Botella, C. (2012). Promotion of emotional wellbeing in oncology inpatients using VR. *Annual Review of Cybertherapy and Telemedicine*, 53-57.

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*(4), 583-600.

Falco, A., Girardi, D., Dal Corso, L., Yildirim, M., & Converso, D. (2021). The perceived risk of being infected at work: An application of the job-demands-resources model to workplace safety during the COVID-19 outbreak. *PLoS ONE*, *16*(9), e0257197.

Falco, A., Girardi, D., Kravina, L., Trifiletti, E., Bartolucci, G.B., Capozza, D., & De Carlo, N.A. (2013). The mediating role of psychophysic strain in the relationship between workaholism, job performance, and sickness absence: A longitudinal study. *Journal of Occupational and Environmental Medicine*, *55*(11), 1255-1261.

Hobfoll, S.E. (1998). *Stress, culture, and community: The psychology and physiology of stress*. New York: Plenum Press.

Lombard, M., & Snyder-Duch, J. (2001). Interactive advertising and presence: A framework. *Journal of Interactive Advertising, 1*(2), 56-65.

Meijman, T.F., & Mulder, G. (1998). Psychological aspects of workload. In P.J.D. Drenth, & H. Thierry (ed.), *Handbook of work and organizational psychology* (Vol. 2: Work psychology, pp. 5-33). Hove, England: Psychology Press.

Mondo, M., Sechi, C., & Cabras, C. (2021). Psychometric evaluation of three versions of the Italian Perceived Stress Scale. *Current Psychology*, *40*, 1884-1892.

Mora, D., Falco, A., Di Sipio, A., & De Carlo, A. (2021, April). *4 steps for fighting Covid-related anxiety: An application of virtual reality in a small company*. International Psychological Applications Conference and Trends - InPACT 2021.

Paulson, J.F., & Bazemore, S.D. (2010). Prenatal and postpartum depression in fathers and its association with maternal depression. *Journal of the American Medical Association*, *303*(19), 1961-9.

Pedrabissi, L., & Santinello, M. (1989). Verifica della validità dello STAI forma Y di Spielberger [Verification of the validity of the STAI, Form Y, by Spielberger]. *Giunti Organizzazioni Speciali*, *191-192*, 11–14.

Rapisarda, S., Mora, D., & De Carlo, A. (2020, november). *Applicazioni della Realtà Virtuale per la promozione della salute e la prevenzione del disagio lavorativo* [Applications of Virtual Reality for the promotion of health and the prevention of work discomfort]. AIP - Giornate di Studio: Sezione di Psicologia per le Organizzazioni.

Schneider, S.M., Kisby, C.K., & Flint, E.P. (2011). Effect of virtual reality on time perception in patients receiving chemotherapy. *Support Care Cancer*, *19*(4), 555-564.

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.

Sonnentag, S., & Fritz, C. (2007). The Recovery Experience Questionnaire: Development and validation of a measure for assessing recuperation and unwinding from work. *Journal of Occupational HEalth Psychology*, *12*(3), 204-221.

Sterling, H.M., & Allan, B.A. (2019). Construction and validation of the quality of maternity leave scales (QMLS). *Journal of Career Assessment*, 1-23.

Thomason, E., Flynn, H.A., Himle, J.A., & Volling, B.L. (2015). Are women's parenting-specific beliefs associated with depressive symptoms in the perinatal period? Development of the rigidity of maternal beliefs scale. *Depression and Anxiety*, *32*, 141-148.