

Research in Psychosocial Genomics: A New Perspective of Genes Modulation in Response to Psychological and Social Experiences

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Abstract: *In the context of covid-19 pandemics, different studies have reported an increase in the occurrence of psychological symptoms in the population, linking the coronavirus outbreak to a mental health epidemic. Stress and anxiety are the most commonly reported symptoms, along with panic behavior, fear of public events and other less impacting psychological issues. During the pandemic most affected countries have implemented online mental health interventions to deal with social distancing and isolation. To this end, it appears necessary to manage long-term impacts of the pandemic on mental health through effective evidence-based therapies, easily administered online. In the present work, mind-body interventions are discussed as an effective tool to this purpose. Particular focus is paid on the link between mental processes and gene expression, through the application of valid new class of mind-body practices: Mind-Body Transformations Therapy (MBT-T) and Creative Psychosocial Genomic Healing Experience (CPGHE). MBIs have been proven to be effective tools particularly in stress reduction as well as overall well-being promotion, in addition, they are easy to learn and administer both face-to-face and online.*

Keywords: *covid-19, mental health, stress, anxiety, e-health, online therapy, psychosocial genomics, mind-body therapy, genes modulation.*

ABBREVIATIONS: *MBIs (Mind-body interventions); MBT-T (Mind-body Transformations Therapy); CPGHE (Creative Psychosocial Genomic Healing Experience); BWM-T (Brain Wave Modulation Technique)*

1. INTRODUCTION:

The present manuscript focuses on the current pandemic outbreak and the consequences on mental health and related treatments. In particular, after illustrating the most common symptoms associated to COVID19 pandemics, such as stress and anxiety, an innovative approach to mental health is introduced. Conventional treatment of the aforementioned symptoms often require face-to-face setting and are thus less appropriate for exceptional situations that require remote interaction, such as the ongoing pandemic context. A recent approach within neuroscience known as psychosocial genomics has given a new perspective in the study of stress physiology and its mind-body therapy, highlighting the connection between mental processes and gene expression. Against this background, the Mind-Body Transformation Therapy (MBT-T), and his protocols have been studied as a valid new class of interventions, both face-to face and online. In particular, MBT-T and it's therapeutic protocol are presented as an effective tool in stress reduction, without the necessity of standard therapies.

Actually, there have been 129.711 millions of COVID19 cases, with almost more than 2.82 millions confirmed deaths (WHO, 2021). Latest studies have highlighted the pandemic psychological impact on the population, reporting widespread mental health issues. (Yao, Chen, & Xu, 2020). Stress and anxiety are the most commonly psychological symptoms reported during the outbreak of COVID-19 (Araújo, de Lima, Cidade, Nobre, & Neto, 2020; Asmundson & Taylor, 2020; Galea, Merchant,

& Lurie, 2020; Rajkumar, 2020; Zhou et al., 2020). Other psychological problems with a higher incidence following the virus spread include: panic attacks; impulsive buying of essential goods, social anxiety, preoccupation about financial security (Zhou et al., 2020). Different dynamics of the ongoing epidemic, such as a great increase in disturbing news, social distancing and restrictions, have been linked to the onset of the aforementioned symptoms (Araújo et al., 2020; Zhou et al., 2020). Thus, it appears necessary to address the extended consequences of COVID19 on mental health and the potential psychological impairments in the population (Rajkumar, 2020; Zhou et al., 2020). The actual standards for COVID19 containment discourage traditional face-to-face psychological interventions, due to the virus quick transmission, making mental health treatment a great challenge (Wind et al., 2020). In light of actual virus containment measures, an unprecedented shift to online procedures is taking place, speeding up e-health services and tools implementation in traditional practice (Wind et al., 2020). These means of communication, while requiring an adaptation of traditional methods, have been proven effective particularly in the treatment of the psychological symptoms linked to the pandemics (Zhou et al., 2020). Most countries affected from COVID19 have issued online measures to support psychological wellbeing (Araújo et al., 2020). Italian government made several remote services available to the population, including an online psychological support meant for graduates and overall medical institutions. Online psychological interventions have been also implemented in China, together with several artificial intelligence (AI) programs, including one in the prevention of suicide (Liu et al., 2020). Experts agree that pandemic related psychological issues will last long after the end of the pandemic (Araújo et al., 2020). To this end, it appears necessary to manage this abiding effect through effective evidence-based therapies that easily adapt to these new methods, providing mental health consultation access even in cases where face-to-face services are not possible. Regarding this, mind-body interventions (MBIs) could be a useful resource in this particular context. In fact, MBIs have been proven to be effective tools particularly in the reduction of stress (Cozzolino, Girelli, Vivo, Limone, & Celia, 2020; Gallego, Aguilar-Parra, Cangas, Rosado, & Langer, 2016) as well as overall well-being promotion (Finkelstein-Fox, Park, & Riley, 2018; Sawni & Breuner, 2017). MBIs are also easy to learn and to administer techniques, both to individuals and groups (Celia, 2020). A recent approach within neuroscience and psychosocial genomics (Atkinson et al., 2010; Cozzolino et al., 2015, 2014; Niles, Mehta, Corrigan, Bhasin, & Denninger, 2014; Rossi et al., 2008; Rossi & Rossi, 2007; Rossi, Rossi, Yount, Cozzolino, & Iannotti, 2006) has given a new perspective in the study of stress physiology and its mind-body therapy. Psychosocial Genomics is a branch that studies gene expression modulation in response to psychological, social and cultural experiences in individuals daily life (Rossi et al., 2010). Studies in this field identified a particular gene set involved in a number of different biological pathways, including stress response, inflammation and physical health. These genes include activity-dependent genes and rapid early genes that promptly respond to environmental stimuli (Atkinson et al., 2010; Rossi, 2002; Rossi, Cozzolino, Mortimer, Atkinson, & Rossi, 2011; Rossi & Rossi, 2006). In our studies we analyzed the connection between mental processes and gene expression. The Mind-Body Transformations Therapy (MBT-T), has emerged as a valid new class of mind-body practices, both face-to face and online (Cozzolino et al., 2014; Muñoz & Larkey, 2018; Rossi, Mortimer, & Rossi, 2013). This specific kind of mind-body therapy includes the Creative Psychosocial Genomic Healing Experience (CPGHE) and Brain Wave Modulation Technique (BWM-T) (Cozzolino & Celia, 2016; Cozzolino et al., 2020) which was used for the purposes of our studies. Research shows how natural mind-body processes during the routinely alternation of activity and inactivity states, stimulate genomic and epigenetic changes in pathway of stress and consequent positive impact on his reduction (Lloyd & Rossi, 2008).

In particular, MBT-T and it's therapeutic protocol, CPGHE, were the focus of our studies on stress reduction, proving their therapeutic efficacy without the necessity of standard therapies. The aforementioned procedure results from the studies of M.H. Erickson and E. Rossi's Mind-body Therapy, both theoretically and empirically. The protocol is based on the four-stage creative

process, a very easy to learn procedure, that allows stress reduction without the need for standard, elaborate methods. In our studies we aimed to measure the impact of MBT-T technique on stress.

Subsequently to recent research on in-person BWM-T application (Cozzolino et al., 2020), we investigated the efficacy of this technique on overall wellbeing promotion, positive affect improvement and the reduction of different symptoms such as reported stress, anxiety, global distress, and negative affect reduction. Furthermore, we tested BWM-T online administration efficacy, through an online platform during the first pandemic outbreak in Italy. The results suggested that remote technique's application could produce beneficial effects on the factors considered in the experimental group, compared to the control group.

In different studies we evaluated BWM-T proving its effectiveness in a 4-week treatment following which a reduction of psychological symptoms and a change in particular states was observed. In particular it was observed: a reduction in self-reported distress and perceived stress as well as lower levels of state and trait anxiety, global distress, and negative affect. BWM-T also increased positive affect levels in the experimental participants, compared to controls. This technique is particularly indicated in the actual situation because of its characteristics. It is in fact a low-cost procedure easy to reproduce in a brief period of time. No particular conditions or specific materials are necessary to perform BWM-T: it is carried out by a clinical psychologist and, once it has been mastered, it can be performed easily independently (Cozzolino et al., 2020). Moreover, as this study shows, it can be effective even when administered online through an online platform, both to individuals and groups. Conventional treatment of stress and anxiety often require face-to-face setting and are thus less appropriate for exceptional situations that require remote interaction, such as the ongoing pandemic context. It can be concluded that this new perspective on the mind-body relationship may offer new clinical opportunities although it needs further evidence and in-depth studies.

2. REFERENCES:

- [1] Atkinson D., Iannotti S., Cozzolino M., Castiglione S., Ciatelli A., Mortimer B. V. J., et. al., (2010). A New Bioinformatics Paradigm for the Theory, Research, and Practice of Therapeutic Hypnosis, *American Journal of Clinical Hypnosis* 53:1, 27-46
- [2] Alivernini, F., Manganelli, S., Girelli, L., Cozzolino, M., Lucidi, F., & Cavicchiolo, E. (2021). Physical Distancing Behavior: The Role of Emotions, Personality, Motivations, and Moral Decision-Making. *Journal of pediatric psychology*, 46(1), 15-26.
- [3] Asmundson, G. J., & Taylor, S. (2020). How health anxiety influences responses to viral outbreaks like COVID-19: What all decision-makers, health authorities, and health care professionals need to know. *Journal of anxiety disorders*, 71, 102211.
- [4] Atkinson, D., Iannotti, S., Cozzolino, M., Castiglione, S., Ciatelli, A., Vyas, B., ... & Rossi, E. (2010). A new bioinformatics paradigm for the theory, research, and practice of therapeutic hypnosis. *American Journal of Clinical Hypnosis*, 53(1), 27-46.
- [5] Celia, G. (2020). The narrative styles of the group as indicators of change. *Revue de psychotherapie psychanalytique de groupe*, (1), 157-168.
- [6] Cozzolino, M., Celia, G., Rossi, K. L., & Rossi, E. L. (2020). Hypnosis as sole anesthesia for dental removal in a patient with multiple chemical sensitivity. *International Journal of Clinical and Experimental Hypnosis*, 68(3), 371-383.
- [7] Cozzolino, M., Cocco, S., Piezzo, M., Celia, G., Costantini, S., Abate, V., ... & De Laurentiis, M. (2021). A Psychosocial Genomics Pilot Study in Oncology for Verifying Clinical, Inflammatory and Psychological Effects of Mind-Body Transformations-Therapy (MBT-T) in Breast Cancer Patients: Preliminary Results. *Journal of Clinical Medicine*, 10(1), 136.
- [8] Cozzolino, M., Girelli, L., Vivo, D. R., Limone, P., & Celia, G. (2020). A mind-body intervention for stress reduction as an adjunct to an information session on stress management in university students. *Brain and behavior*, 10(6), e01651.
- [9] Cozzolino, M., Guarino, F., Castiglione, S., Ciatelli, A., & Celia, G. (2017). Pilot study on

- epigenetic response to a mind-body treatment. *Translational Medicine@ UniSa*, 17, 37.
- [10] Cozzolino, M., Vivo, D. R., Girelli, L., Limone, P., & Celia, G. (2020). The Evaluation of a Mind–Body Intervention (MBT-T) for Stress Reduction in Academic Settings: A Pilot Study. *Behavioral Sciences*, 10(8), 124.
- [11] de Oliveira Araújo, F. J., de Lima, L. S. A., Cidade, P. I. M., Nobre, C. B., & Neto, M. L. R. (2020). Impact of Sars-Cov-2 and its reverberation in global higher education and mental health. *Psychiatry Research*, 288, 112977.
- [12] Finkelstein-Fox, L., Park, C. L., & Riley, K. E. (2018). Mindfulness and emotion regulation: Promoting well-being during the transition to college. *Anxiety, Stress, & Coping*, 31(6), 639-653.
- [13] Galea, S., Merchant, R. M., & Lurie, N. (2020). The mental health consequences of COVID-19 and physical distancing: the need for prevention and early intervention. *JAMA internal medicine*, 180(6), 817-818.
- [14] Gallego Antonio, J., Aguilar Parra, J., Cangas Díaz, A., Rosado, A., & Langer, Á. (2015). Effect of Mind/ Body Interventions on Levels of Anxiety, Stress and Depression Among Future Primary School Teacher: A Controlled Study // Efecto de intervenciones mente/cuerpo sobre los niveles de ansiedad, estrés y depresión en futuros docentes de edu. *Revista de Psicodidáctica*, 21(1).
- [15] Girelli, L., Alivernini, F., Lucidi, F., Cozzolino, M., Savarese, G., Sibilio, M., & Salvatore, S. (2018, November). Autonomy supportive contexts, autonomous motivation, and self-efficacy predict academic adjustment of first-year university students. In *Frontiers in Education* (Vol. 3, p. 95). Frontiers.
- [16] Girelli, L., Alivernini, F., Salvatore, S., Cozzolino, M., Sibilio, M., & Lucidi, F. (2018). Affrontare i primi esami: motivazione, supporto all'autonomia e percezione di controllo predicono il rendimento degli studenti universitari del primo anno. *Journal of Educational, Cultural and Psychological Studies (ECPS Journal)*, (18), 165-185.
- [17] Girelli, L., Cavicchiolo, E., Alivernini, F., Manganelli, S., Chirico, A., Galli, F., ... & Lucidi, F. (2020). Doping use in high-school students: Measuring attitudes, self-efficacy, and moral disengagement across genders and countries. *Frontiers in psychology*, 11, 663.
- [18] Liu, S., Yang, L., Zhang, C., Xiang, Y. T., Liu, Z., Hu, S., & Zhang, B. (2020). Online mental health services in China during the COVID-19 outbreak. *The Lancet Psychiatry*, 7(4), e17-e18.
- [19] Lloyd, D., & Rossi, E. L. (2008). *Ultradian rhythms from molecules to mind: A new vision of life*. Berlin, Germany: Springer.
- [20] Niles, H., Mehta, D. H., Corrigan, A. A., Bhasin, M. K., & Denninger, J. W. (2014). Functional genomics in the study of mind-body therapies. *The Ochsner Journal*, 14(4), 681–695.
- [21] Rajkumar, R. P. (2020). COVID-19 and mental health: A review of the existing literature. *Asian journal of psychiatry*, 52, 102066.
- [22] Rocco, D., Pastore, M., Gennaro, A., Salvatore, S., Cozzolino, M., & Scorza, M. (2018). Beyond verbal behavior: an empirical analysis of speech rates in psychotherapy sessions. *Frontiers in psychology*, 9, 978.
- [23] Rossi E., Cozzolino, M., Mortimer, J., Atkinson, D., & Rossi, K. L. (2011). A brief protocol for the creative psychosocial genomic healing experience: The 4-stage creative process in therapeutic hypnosis and brief psychotherapy. *American Journal of Clinical Hypnosis*, 54(2), 133-152.
- [24] Rossi, E., Rossi, K., Yount, G., Cozzolino, M., & Iannotti, S. (2006). The bioinformatics of integrative medical insights: Proposals for an International Psycho-Social and Cultural Bioinformatics Project. *Integrative Medicine Insights*, 1, 117863370600100002.
- [25] Rossi, E. L., & Rossi, K. L. (2006). *The neuroscience of observing consciousness & mirror neurons in therapeutic hypnosis*. *American Journal of Clinical Hypnosis*, 48(4), 263–278.

<https://doi.org/10.1080/00029157.2006.10401533>

- [26] Sawni A, Breuner CC (2017) *Clinical Hypnosis, an Effective Mind-Body Modality for Adolescents with Behavioral and Physical Complaints*. Child Basel Switz 4: doi:10.3390/children4040019
- [27] Venuleo, C., Mangeli, G., Mossi, P., Amico, A. F., Cozzolino, M., Distante, A., ... & Salvatore, S. (2018). The Cardiac Rehabilitation Psychodynamic Group Intervention: An Explorative Study.
- [28] Venuleo, C., Salvatore, G., Andrisano-Ruggieri, R., Marinaci, T., Cozzolino, M., & Salvatore, S. (2020). Steps towards a unified theory of psychopathology: The Phase Space of Meaning model. *Clinical Neuropsychiatry*, 17(4), 236-252.
- [29] Yao, H., Chen, J. H., & Xu, Y. F. (2020). Patients with mental health disorders in the COVID-19 epidemic.
- [30] Wind, T. R., Rijkeboer, M., Andersson, G., & Riper, H. (2020). The COVID-19 pandemic: The 'black swan' for mental health care and a turning point for e-health. *Internet interventions*, 20.
- [31] Zhou, J., Liu, L., Xue, P., Yang, X., & Tang, X. (2020). Mental health response to the COVID-19 outbreak in China. *American Journal of Psychiatry*, 177(7), 574-575.