

# How Cyberpsychology and Virtual Reality Can Help Us to Overcome the Psychological Burden of Coronavirus

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**L**IVING IN THE TIME of the coronavirus means experiencing not only a global health emergency but also extreme psychological stress that puts a strain on our identity and our relationships. The coronavirus forces us to manage three different psychological dilemmas simultaneously: *the stress of the disease, the disappearance of places, and the crisis of the sense of community.*

The first dilemma is evident. Coronavirus generates anxiety, for the potential risk that it causes for us and/or our loved ones. And this sense of risk is enhanced by the continuous flow of often conflicting information that reaches us through social networks. This situation activates in our brain the “attack-escape-freezing” reactions, a series of changes in the limbic and hormonal system that normally help us manage and successfully overcome possible threats.<sup>1</sup> However, in the case of coronavirus, the situation does not last for only a few minutes and is not easily manageable either with the attack or with the defense. The consequences are twofold. On the one hand, the hyperactivation of the hormonal system generates irritability and insomnia, as well as a continuous sense of anxiety and insecurity. On the other, if attack and escape do not work, the only alternative is the freezing that leads the subject to stop and wait, with significant effects on daily activities and the risk of spending the weeks sitting on the sofa waiting for a solution that never comes.

The second is less evident. In fact, one of the most significant but less obvious effects of quarantine is the disappearance of places from our daily experience. From a psychological point of view, a “place” is a closed space, a space delimited by borders, whereas “place attachment” is the cognitive-emotional bond to a meaningful space, a common phenomenon observed across cultures that produces significant psychological benefits.<sup>2</sup> As shown by neuroscientific research, which led May-Britt Moser and Edvard I. Moser in 2014 to win the Nobel Prize for Medicine, within our brain there are different neurons—the “place cells” and the “border cells”—which are activated when we occupy a certain position in the environment and when we identify a border within it.<sup>3</sup> What are these neurons for? Apparently, to manage our autobiographical memory, we define who we are through the memory of people and events that occurred

within the different places we frequent. We are students because we go to school or university, we are workers because we go to the company, we are fans because we go to the stadium, and so on.

Quarantine is destroying our sense of place. On the one hand, we can no longer go to the places that characterized our daily life and made sense of our identity. On the other, even the home is no longer a place because it has stopped having boundaries for those who live there. Being able to have your own space to work or go to the bathroom becomes a challenge, especially when there are young children in a small apartment. Yet, without our spaces we lose both the sense of identity and our autobiographical memory. The days all seem the same and at the end of the day we feel empty and without fire.

The third is a direct consequence of the second. As psychosocial research has shown, communities are born in places, spaces delimited by borders.<sup>4</sup> But if the places are no longer there, the sense of community also disappears. On the one hand, without the office, the workplace, the school, the pub, even the people we find inside them are more difficult to reach and the bonds weaken. On the other hand, even families who often have to live in spaces without borders stop being communities and become a group of individuals. The result is that the ability to share and accept one another diminishes, leading to an increase in conflict.

Being able to deal with these three dilemmas at the same time is not easy. However, positive technology<sup>5</sup> can help us through the use of an innovative technology, virtual reality (VR).

VR is an advanced form of reality simulation that has many similarities with the functioning of the brain. As suggested by the “predictive coding” paradigm, the brain actively creates an internal model (simulation) of the body and the space around it, which it uses to make predictions about the expected sensory input and to minimize the number of prediction errors (or “surprise”). In this view, the VR experience tries to mimic the brain’s model as much as possible—the more similar the VR model is to the brain model, the more the individual feels present in the VR world—making it the perfect tool for experiential learning.<sup>6</sup>

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For a long time, the main barrier to a broad use of VR technology was its cost. However, now the simplest and cheapest form of VR comprises nothing but a pair of magnifying lenses and a sheet of cardboard or a plastic box. These headsets sell for 15–30 USD and use a standard smartphone as a tracker and display to generate the three-dimensional (3D) environment. Mobile-based VR is particularly suited to a specific VR content that can be very useful to address the coronavirus stress: *360-degree videos*.<sup>7</sup>

These videos, also known as immersive videos or spherical videos, are special video recordings created using a camera with multiple camera lenses or a rig of multiple cameras. The use of different lenses allows the recording of every direction at the same time, effectively giving a full view of what is around the camera. One advantage of projecting a 360-degree video in a VR head-mounted display (HMD) is that when users turn their head, their view of the live-action video footage turns with them in real time, allowing the user to look around anywhere in the filmed footage.

360-Degree videos have the power to virtually transport users, immersing them in the video recording, allowing them to actively explore its content and experience the video from any angle. As recently demonstrated by Li et al.,<sup>7</sup> these videos have the ability to induce specific emotions characterized by different levels of valence and arousal. More, as shown by Robertson and colleagues<sup>8</sup> the neural representations of the part of the 360-degree video presented in VR (the scene within the current field of view) prime the associated representations of the full panoramic environment, facilitating subsequent perceptual judgments. In other words, 360-degree videos generate a dynamic interplay between memory and perception that can be used to improve the features of these cognitive processes and to update their contents.

To help our readers to discover the well-being potential of VR, we suggest the use of a freely available VR tool: “The Secret Garden.” It is a 10-minute 3D 360-degree video (4K resolution supported) that can be found here—<https://www.covidfeelgood.com/>—designed to combat stress and counter the disappearance of places and communities generated by the coronavirus.

Recently developed in Lombardy, the Italian region at the center of Italy’s coronavirus outbreak by a group of Italian psychologists (<https://become-hub.com/en/>), it has been designed keeping in mind that providing psychological relief to so many (Lombardy population is >8 million inhabitants) over such a large geographical area would be complex. In fact, to experience it, any smartphone or tablet/PC will work. However, to fully experience the psychological benefits of being in a digital place, a cardboard headset is also necessary, including those sold for 15–30 USD in different digital marketplaces. The suggested use is the following:

- *Use it for a week, two or more times a day.* Depending on your level of anxiety. The idea is to try it in the morning as soon as you wake up and then again before going to sleep as an emotional regulation tool. However, if there are difficult times during the day, the Secret Garden can become a safe place to reduce emotional stress and start again.
- *Use it together with one or more people.* It can be your partner, your son, or simply a group of friends, even not in the same physical place. Doing the experience together and sharing the feelings and reflection induced by it can reconstruct the sense of community and reduce the differences.
- *Use it to reflect on your identity and future goals.* One of the paradoxes of coronavirus is that despite being a problem, it can also be a unique opportunity. In fact, willingly or unwillingly, it forces us to change and manage new situations such as quarantine, close coexistence with children and spouse, lack of relationships, and so on. In this view, the Secret Garden experience can be used for clearing our mind, giving new space and energy to reflect and cope with our dreams and what is blocking them. Given hereunder is the suggested protocol to follow after the first daily Secret Garden experience:
  - *Day 1. Fight rumination.* Reflecting on the coronavirus and its consequences, dwelling on them in one’s mind is natural. However, to prevent them from becoming a fixation, one must learn to control them. To do this, start by changing your point of view. For example, try to imagine that you are a different person—a doctor who has to treat a patient, a politician who has to decide what to do, a nurse who has to support the patient in the last moments of life—and describe in writing the emotions that occur and what you would do. Then, try to describe in writing how you would vent the anger, feelings of helplessness, and/or other difficult emotions these situations can generate. If you want, you can discuss your feelings with your partner and compare them with his/hers to understand the similarities and differences.
  - *Day 2. Awaken your self-esteem.* Quarantine, by forcing us to always repeat the same things with the same people in the same physical space, can make us apathetic and reduce our self-esteem. To awaken it, list in writing the five aspects of your character and your personality that you own and appreciate, put them in order of importance, and discuss the following two points for each: why is it important and how does it influence your life and relationships? If you want, you can discuss them with your partner and check whether he/she shares the same vision or not and why.
  - *Day 3. Awaken your autobiographical memory.* The lack of places weakens our autobiographical memory, leading us to remember always the same days and making us lose the memory of who we are and what we want. To awaken it, list in writing four moments and/or events in your life that have helped you to be who you are and a moment of the coronavirus emergency that you particularly remember. For each, discuss the following points: why are they important, what emotions did they elicit in me, and when have I experienced similar emotions? If you want, you can discuss them with your partner and compare them with his/hers to understand similarities and differences.
  - *Day 4. Awaken your sense of community.* The weakening of the sense of community can increase our sense of loneliness. To awaken the sense of community, list the five most significant people in your

relationships. For each, discuss the following points: why are they important, are you also important to them, and why? If you want, you can discuss them with your partner and compare them with his/her choices to understand similarities and differences.

- *Day 5. Awaken your goals and/or dreams.* The continuous sense of anxiety generated by the coronavirus emergency can lead to the halting of our daily activities, making us lose sight of our goals and aspirations. To awaken them, list in writing three concrete goals and two dreams/aspirations that you would like to achieve after the quarantine. For each, discuss the following points: why are they important to you, what do you miss to reach them, and what can you do now? If you want, you can discuss them with your partner to understand similarities and differences.
- *Day 6. Boost your empathy.* All relationships always involve a giving and receiving. But to effectively “give” we must be able to “receive” the other’s point of view. To do this, think about the last significant interaction you had with each of the five people you indicated on day 4 and try to describe in writing the emotions that you think they felt at that time. Again, you can discuss your emotions with your partner and compare them to understand similarities and differences.
- *Day 7. Plan your change.* At this point you can try using this period to try to improve your life. Start by identifying in writing three aspects of your life with which you are dissatisfied. Then on a first sheet describe the possible solutions by placing them in order of probability of success and cost/opportunity. On a second sheet, identify potential problems and their impact. Finally, on the third sheet, identify the tools and/or information that you are lacking but which can help you reach the possible solutions. Finally, tear off the problems sheet and use the other two sheets to plan strategies that can move you closer to solving your problems with the support of your partner.

## References

1. Bastos AF, Vieira AS, Oliveira JM, et al. Stop or move: defensive strategies in humans. *Behavioural Brain Research* 2016; 302:252–262.
2. Scannell L, Gifford R. The experienced psychological benefits of place attachment. *Journal of Environmental Psychology* 2017; 51:256–269.
3. Moser EI, Moser M-B, McNoughton BL. Spatial representation in the hippocampal formation: a history. *Nature Neuroscience* 2017; 20:1448.
4. Silk J. The dynamics of community, place, and identity. *Environment and Planning A: Economy and Space* 1999; 31: 5–17.
5. Wiederhold BK, Riva G. Positive technology supports shift to preventive, integrative health. *Cyberpsychology, Behavior and Social Networking* 2012; 15:67–68.
6. Riva G, Wiederhold BK, Mantovani F. Neuroscience of virtual reality: from virtual exposure to embodied medicine. *Cyberpsychology, Behavior and Social Networking* 2019; 22:82–96.
7. Li BJ, Bailenson JN, Pines A, et al. A public database of immersive VR videos with corresponding ratings of arousal, valence, and correlations between head movements and self report measures. *Frontier in Psychology* 2017; 8:2116.
8. Robertson Caroline E, Hermann Katherine L, Mynick A, et al. Neural representations integrate the current field of view with the remembered 360° panorama in scene-selective cortex. *Current Biology* 2016; 26:2463–2468.

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