# The Psychological Importance of Green Spaces During COVID-19:

## A comparison between those who had access to gardens and balconies and those who did not in the Balkan region

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Master Thesis submitted in fulfilment of the Degree Master of Science in Sustainable Development, Management and Policy

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# AFFIDAVIT

I hereby affirm that this Master's Thesis represents my own written work and that I have used no sources and aids other than those indicated. All passages quoted from publications or para- phrased from these sources are properly cited and attributed.

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## ABSTRACT

COVID-19 presented a global challenge to society worldwide, with lockdowns becoming a common experience for the majority of the population, where individuals were asked to stay home for extended periods of time as a safety measure to control the spread of the virus. The Balkan region, in particular North Macedonia, Serbia and Bosnia and Herzegovina, were particularly impacted in terms of public green space access which was severely restricted, leaving private spaces such as balconies and gardens as the only means for residents to connect with nature. This thesis seeks to add to the discussion regarding nature and its intrinsic value, through investigating whether having a garden or balcony helped improve psychological well-being during the first lockdown period from March to May of 2020. Mixed methods were used in the forms of preliminary interviews and surveys, of which the data was then interpreted using SPSS. Results show that garden owners felt the least stressed and restricted during lockdown, and were able to engage in far more activities and socialization than the other two groups. Balcony owners and those who had neither exhibited similar levels of stress, with balcony owners being slightly better off but still feeling fairly restricted. All three categories either agreed that those with a garden were the happiest, or preferred having a garden instead. Those who had neither showed significantly more correlations between negative emotions, and were overall the most impacted in terms of psychological well-being. These results are in line with previous studies explored in the literature review, illustrating the importance of nature on mental health, and how access to green spaces aids relaxation, reduces stress as well as negative emotions. These findings open up discussions regarding future green space management, in particular access restrictions as both this thesis and previous studies have shown that having contact with nature can help individuals improve their mental well-being during difficult times.

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# 1. INTRODUCTION

Aldo Leopold, the founding father of wildlife ecology wrote in his book *A Sand County Almanac (1949):*

> "The last word in ignorance is the man who says of an animal or plant, 'What good is it?'"

Throughout history, the intrinsic value of nature has been widely debated among different disciplines, with most findings coming to the conclusion that for the survival of our generation as well as those who come after, it is important for us to promote sustainability, as natural environments are undeniably a central element for maintaining our physical and mental wellbeing. Our evolution, and the societies that we have built up until this day are all founded on a basis of natural resources, which we have utilized over thousands of years in order to make them our own. Yet even in our increasingly urbanizing world, we seek connection with nature on a daily basis, whether it is a stroll through the park, a weekend hike, or a visit to the local flower shop to purchase flowers. The benefits of nature and green spaces are regarded as common knowledge across different cultures, from the scientific claims of getting in more exercise and breathing fresh air to spiritual teachings of Buddhist and Taoist philosophies that promote being one with nature. So what happens when that connection is taken away?

In 2019, the emergence of COVID-19 marked one of the biggest turns of the century. As it spread throughout the globe in rapid succession, so did change in our everyday lives, governance and societal systems. Keeping distance in order to stop the spread of the virus became number one priority for many nations, and citizens were asked to stay at home for extended periods in order to contain the situation. In the study region of this thesis, the political situation had escalated to a point where citizens were not allowed to access nearby parks or green spaces for any reason, and thus a large number of individuals became confined in the prison of their own homes. As the socio-economic situation continued to worsen and the level of stress continued to rise, citizens who would have otherwise benefitted from visiting natural spaces were now limited to private property such as balconies and gardens, and those who did not have these amenities could only entertain whatever view they already had outside of their windows.

Thus, a question concerning both mental wellbeing and the intrinsic value of nature arises, as this thesis sets out to explore whether having gardens and balconies during COVID-19 significantly changed individuals' experiences and their psychological wellbeing while being isolated, with the hypothesis that those who had access to private green spaces were less negatively impacted in terms of psychological

well-being compared to those who had neither, with gardens having the most prominent effect. The research question pays homage to the author's foundation in urban forestry, as well as the current study of sustainability with the aim of merging the two disciplines and contributing to the discussion of how natural spaces—no matter how small—can make a significant difference during hard times. Furthermore, green spaces are not only sustainable in terms of ecosystems, but also in terms of sustaining our mental wellbeing. Now, during a pandemic more than ever, sustainable management is needed in order to provide equal access to green spaces, as well as promote the benefits of nature to help cope with collective trauma. Though the regulations to stay home were largely implemented in order to prevent further infections, the author argues that the forceful tearing of individuals' access to natural spaces will only contribute to further degradation of mental wellbeing. Strong negative mindsets and emotions, unlike a virus, cannot be contained. The loss of green spaces as a mitigation strategy will only result in poorer mental health, and at the same time highlights our inherent need to connect to nature through the spaces around us.

This thesis consists of five chapters, chapter one contains a brief introduction and outline of the thesis along with its significance; chapter two reviews current literature and relevant theories that are connected to the topic. This chapter is divided into two parts: Part A dives into theories on our inherent link to nature while Part B analyses negative mental impacts brought on by COVID-19; chapter three is dedicated to methodology, where the research design is described in detail, as well as justification of the methods used to gather data along with their limitations; chapter four analyses and discusses the results presented, and chapter five concludes the findings and outlines possibilities for future research.

# 2. LITERATURE REVIEW

# Part A: Psychology & Nature

## 2.1 Introduction

The idea that nature and natural spaces have an inherent link to human well-being has been studied by a vast amount of scholars across multiple disciplines within the field of psychology. Specifically, the concepts most relevant to the thesis are evolutionary psychology, cognitive psychology and ecopsychology. Evolutionary psychology is defined as "…an approach to psychology, in which knowledge and principles from evolutionary biology are put to use in research on the structure of the human mind" (Cosmides & Tooby, 2009), whereas cognitive psychology is defined as the study of "operation of mental processes related to perceiving, attending, thinking, language, and memory, mainly through inferences from behavior" (American Psychological Association, 2013). Lastly, ecopsychology is the study of the relationship between people and the natural environment, in attempt to bridge the gap between the psychological and ecological (Reser, 1995). All of these concepts shed light on the inseparable connection between humans and their natural environment by offering insights on behaviors that have followed us through evolution.

## 2.2 Evolutionary Psychology

Evolutionary psychology is rooted in concepts of evolutionary biology, with Darwin's theory of evolution by natural selected as a central concept that is expanded to better understand the inner workings of the human mind. Evolutionary psychology views the brain as an information processing tool that is designed by natural selection, and the decisions humans make as directly linked to the brains of our hunter-gatherer ancestors which were primed to solve adaptive problems (Cosmides & Tooby, 2009). Each problem we face requires a different adaptive solution, and each solution is therefore distinctly complex (Buss, 1995).

Darwin was the first to recognize that evolution by natural selection had implications on the human brain (Darwin, 1895). Afterwards, George Williams and William.D.Hamilton set the ground work for evolutionary psychology during the 1950s and 60s, linking natural selection to a range of human behavior and interactions (Cosmides & Tooby, 2005). Specifically, Williams devised the view of adaptationism, which argues that selection is the only known natural process which allows adaptations, and that a species' complex and functional organisation is always rooted in its previous history. Subsequently, both

physical and psychological traits are evolved adaptations that can be traced back ancestrally (Cosmides & Tooby, 2005).

Evolutionary psychologists believe that we are all darwinians as evolution is responsible for who we are today (Buss, 1995). In fact, "*Evolution by natural selection is the only known causal process capable of producing complex physiological and psychological mechanisms*" describes the central belief within evolutionary psychology (Buss, 1995). All psychological theories imply that internal psychological mechanisms exist, and all humans have a nature which requires specific input in order to activate and function properly. Therefore, a central premise within evolutionary psychology is to describe and understand these mechanisms and to communicate which adaptive problems they were designed to solve by selection as well as how they function (Buss, 1995).

Cosmides and Tooby (2009) draw the focus of evolutionary psychology to that of instinct, pointing out that it is often assumed that animals operate on a basis of instinct whereas humans are considered more evolved because they are capable of reason. Evolutionary psychologists argue that it is precisely having these instincts—more rather than less—which have contributed to our flexibility and complexity. Instincts allow us to process much more, everything ranging from the meaning of different facial expressions when we experience a variety of emotions to the ability to speak, see and find something subjectively beautiful. However since this is all considered normal behavior, it is also something that we take for granted, causing what evolutionary psychologists call "instinct blindness", and precisely what they are trying to correct based on the understanding that the mind is heterogenous (Cosmides & Tooby, 2009).

The development of these instincts is closely linked to our evolutionary history. In fact, our human ancestors spent 99% of historical time as hunter-gatherers, where they lived a nomadic lifestyle that consisted of gathering plants and fruits as well as hunting animals within a natural environment. This type of lifestyle lasted 10 million years, during which the human brain was carefully wired to solve everyday problems which were occurring in such a society. If we use this timescale as a reference, our modern way of life has existed for an extremely short period, and definitely not long enough for new natural selection to take place and rewire our brain to the point where it is drastically different (Cosmides & Tooby, 2009). Natural selection itself ensures that the brain has many different programs, most of which are specialised to solve a specific adaptive problem. Evolution itself does not produce a general mechanism that can be applied to multiple problems (Cosmides & Tooby, 2005). The reason why evolutionary psychologists

emphasize the hunter-gatherer lifestyle is because each program has evolved to produce specific behavior geared towards the survival and reproduction of the human species. Although evolution theory is about origins and change, and selection could variate over time (Buss, 1995), The evolutionary process itself is slow, and it can take thousands of generations to build a complex program. Therefore, modern day revolutions, namely industrial and agricultural, have been too brief to make a significant change or impact to allow for a new set of cognitive programs (Cosmides & Tooby, 2005).

On the other hand, most adaptive problems that humans face are social. Scholars have argued that this can be considered a primal survival strategy, and the selected adaptations are those who are more suited for cooperative living, and could explain our current fear of social exclusion (Buss, 1995). Psychological mechanisms help explain this as they include a specified motive, which can be seen in the human desire for specific foods, landscapes and even mates. As Buss (1995) puts it, "these mechanisms are activated by correct manifestations of ancestral cues", for example the smell of food, a painting of a landscape or an interaction with a person that exhibits cues of kindness. These adaptations are present in modern day, regardless of whether or not they serve to inhibit reproductive success. Buss (1995) continues to argue that humans are living fossils, and are "collections of mechanisms produced by prior selection pressures operating on a long and unbroken line of ancestors", which means that consciously or unconsciously, we strive to maximize passing down our genes relative to those of our competitors.

One of the most prominent psychological mechanisms are preferences, which help individuals seek out things rich in resources which facilitate survival and reproduction. A table of ten different evolved psychological mechanisms is shown in *Table 1*. What is most of interest and relevant to the thesis is that of landscape preferences. Research has shown that humans tend to prefer savanna like environments, especially landscapes that are capable of providing basic resources such as food, water, safety and protection from hazards and predators (Buss, 1995). What is even more interesting, people prefer places where they can "see without being seen", such as those which provide multiple points of surveillance and passages to move through different habitats safely. Different landscapes trigger different sets of cognitive responses that help determine whether or not this landscape is inhabitable, allowing behavioral decisions to take place which allow individuals with landscape preferences to survive and reproduce.

*Table 1: Evolved Psychological Mechanisms, Buss, 1995*

| Psychological Mechanism | Function | Author(s) |
|---|---|---|
| 1. Fear of Snakes | Avoid poison | Marks (1987) |
| 2. Superior Female Spatial-Location Memory | Increase success at foraging/gathering | Silverman and Eals (1992) |
| 3. Male Sexual Jealousy | Increase paternity certainty | Buss, Larsen, Westen, and Semmelroth (1992)<br>Daly, Wilson, and Weghorst (1982)<br>Symons (1979) |
| 4. Preference for Foods Rich in Fats and Sugar | Increase caloric intake | Rozin (1976) |
| 5. Female Mate Preference for Economic Resources | Provisioning for children | Buss (1989a, 1989b) |
| 6. Male Mate Preferences for Youth, Attractiveness, and Waist-to-Hip Ratio | Select mates of high fertility | Buss (1989a, 1989b)<br>Singh (1993) |
| 7. Landscape Preferences for Savanna-Like Environments | Motivate individuals to select habitats that provide resources and offer protection | Kaplan (1992)<br>Orians and Heerwagen (1992) |
| 8. Natural Language | Communication/manipulation | Pinker and Bloom (1990) |
| 9. Cheater-Detection Procedure | Prevent being exploited in social contracts | Cosmides (1989) |
| 10. Male Desire for Sexual Variety | Motivate access to more sexual partners | Symons (1979) |

The psychological mechanisms depicted above thrive on information, which is perhaps the most valuable resource out there. Contrary to food, safety or even access to mates, the most important factor for survival and reproduction which makes all of it possible is the information required to make adaptive behavioral choices (Buss, 1995, Cosmides & Tooby, 2005). Where information is lacking, we possess innate cues that can deter us from certain situations in the form of instincts, and when we encounter similar situations, information that has been stored as memory helps us navigate decision making (Cosmides & Tooby, 2009). In fact, the brain's main function is to process and transmit information through highly organized neural pathways, in order to solve adaptive problems, and it is precisely being able to do so that has allowed us to survive for such a long period of time (Cosmides & Tooby, 2005).

### 2.2.1 Biophilia Hypothesis

Biophilia, a combination of the Greek words "bio" meaning life and "philia" meaning highest form of affection, is sociobiologist Edward.O.Wilson's idea that humans have an innate urge to "affiliate with other forms of life". Wilson's central claim was that due to evolution, humans have a tendency to focus on life and all of its processes, and that being connected to nature should be considered a basic human need materially, intellectually and spiritually (Wilson, 1984 as cited in Johnson, 1994).

Evolutionary psychologists indicate that as humans have been living in East African savannas for most of our evolution, certain features that remind us of these landscapes are aesthetically pleasing to us now as they used to enhance our chances of survival. These are characterized by bodies of water and an array of animals and plants, which give resources, tall grasses and trees with wide canopies which are good for hiding and hunting, and a wide open view which helps us surveil our surroundings (Buss, 1995). Today, our societies are changed by technological advances immensely different compared to how our ancestors

lived, and we become increasingly anthropocentric, and far removed from nature as well as other sentient beings. Wilson (1993, as cited in Gullone, 2000) argued that our current advances are diminishing our human evolutionary experience, which was a defining factor of our human psyche, and that our constant destruction of nature is a potential loss to human psychological well-being.

The central concept of the hypothesis is that our ancestral history has shaped our cognitive and emotional responses, and we have an evolutionary basis which favors biophilic propensities. Wilson states that humans have an inherent set of rules which range from positive to negative, and through history, those who understood which natural settings were dangerous and which provided a better chance for survival were able to have their genes passed down. Consequently, when humans are removed from natural settings, these rules remain and are not replaced or adapted through recent history. For the most part, the human brain developed in a biocentric world, and these rules cannot be erased by just a couple generations of people living in urban environments (Wilson, 1993, as cited in Gullone, 2000).

Indeed, accounts of humans expressing the desire to stay close to nature are present throughout history. Elaborate gardens and courtyards are accounted in ancient Egypt, Persia and China, all showcasing immense effort people went through to maintain their contact with natural settings. Moreover, current day preservation of parks and forests has been connected with both psychological and physical well-being (Ulrich, 1993). These places, including zoos where people pay to view different types of animals are often crowded and popular destinations, and tourists will travel great lengths to go and visit them. On a more personal scale, people often get pets, which again shows a human desire to stay close to sentient beings that originate from nature (Ulrich, 1993). Going back to human evolution in the savanna, its landscape was most suited to bipedal humans as it provided ample ground for foraging and surveilling. Our love for this type of landscape is evident today, as the way we construct parks as well as the natural settings which we favor possess qualities of spatial openness, small groupings of trees and grass covers as opposed to dense woodlands or deserts (Ulrich, 1983 and Kaplan and Kaplan, 1989 as cited in Gullone, 2000).

Building on Wilson's work, social ecologist Stephen.R.Kellert proposed nine perspectives (as seen in *Table 2*) which describe the relationship humans have with nature, stating that they come from complex rules with a biological bases (Kellert, 1996 as cited in Lutz & Srogi, 2010).

*Table 2: Kellert's Nine Perspectives, Kellert, 1996 as cited in Lutz & Srogi, 2010*

| | | |
|---|---|---|
| **Utilitarian** | Practical and material exploitation of nature. | Physical sustenance, security. |
| **Naturalistic** | Direct experience and exploration of nature. | Curiosity, discovery, recreation. |
| **Ecologistic/Scientific** | Systematic study of structure, function, and relationship in nature. | Knowledge, understanding, observational skills. |
| **Aesthetic** | Physical appeal and beauty of nature. | Inspiration, harmony, security. |
| **Symbolic** | Use of nature for language and thought. | Communication, mental development. |
| **Humanistic** | Strong emotional attachment and "love" for aspects of nature. | Bonding, sharing, cooperation, companionship. |
| **Moralistic** | Spiritual reverence and ethical concern for nature. | Order, meaning, kinship, altruism. |
| **Dominionistic** | Mastery, physical control, dominance of nature. | Mechanical skills, physical prowess, ability to subdue nature. |
| **Negativistic** | Fear, aversion, alienation from nature. | Security, protection, safety, awe. |
| **Theistic** | Nature reflects the will of supernatural forces or deities who govern destiny; fatalistic belief. | Order, meaning, security, awe. |

Within the nine perspectives, "humanistic" is particularly relatable to the biophilia hypothesis, as it describes a deep emotional connection. Kellert's explanation of this aspect is that from an evolutionary perspective, humans needed extensive bonding and cooperation in order to survive, and so our affiliation with other species may have an adaptive trait that strengthened our altruism and sharing. For example, our companion animals such as dogs are often assigned the same importance and status equal to humans, as it increases social interaction as well as social attractiveness among humans, and often carries a therapeutic aspect. This is likely derived from the evolutionary basis where cohabiting with other species increased likeliness of survival, such as dogs or wolves serving as guards (Kellert, 1993 as cited in Gullone, 2000).

This is further proven in the study by Wolf et al. (2017), where preference towards species richness was examined. Applying the biophilia hypothesis, the study assumed that humans prefer high biodiversity environments because they are closest to where we evolved. Thus, the loss of biodiversity is important because environments with high species richness will have better mental wellbeing effects on humans compared to those with a low species richness. Wolf et al. (2017) devised two studies, where participants were asked to watch short videos of nature, with study 2 contrasting these videos with ones of the urban environment, as well as short descriptions of songbirds on the screen. The videos containing nature had varying degrees of biodiversity which were shown to different participants. After viewing, vitality and

positive or negative feelings were examined by asking participants to rate short phrases or words which describe different emotions on a scale of 1 to 5. The results showed that people who viewed higher biodiversity videos felt more vitality, positivity and less anxiety. In general, viewing natural environments showed less anxiety compared to those who viewed urban environments, and overall the well-being effects diminished shortly after the study, with the exception of those who viewed videos of high biodiversity retaining positive effects for a longer period (Wolf et al., 2017).

The connection between nature and humans has also been documented by many writers and journalists such as George Monbiot, who is considered to be one of the more influential columnists that studied the concept of rewilding, a conservation approach that advocates letting natural processes take over in order to repair current damaged environments. In his book *Feral*, Monbiot talks about his experience of rediscovering closeness to nature, and focuses on the evolutionary aspect of how nature provides fascination to our ancestral brains. He says: “Here, genetic memories reawaken, ancient impulses are unearthed, age old patterns of play and discovery recited" (Monbiot, 2013, p.169). Monbiot also outlines how we have distanced ourselves from rich biodiverse landscapes that are most suited for personal well-being, and talks about a sense of enlightenment that comes with experiencing closeness to nature. He remarks in his book that he experiences feelings of delight through nature’s richness and its “limitless capacity to surprise”, specifically the sense of freedom which comes which roaming a landscape unaware of what he might see or if he is being seen by other animals. He exclaims that “it is the sense that without these animals the ecosystem is lopsided, abridged, dysfunctional. I can produce reasons scientific, economic, historic and hygienic, but none of those describe my motivation” (Mobiot, 2013, p. 107).

## 2.3 Cognitive Psychology

Cognitive psychology has its roots in behavioral science, and is a product of psychology, anthropology and linguistics meeting computer science and neuroscience during the 1950s (Miller, 2003). By branching away from behaviorism, cognitive psychology came into being through the “cognitive revolution”, which marked the most important period of defining the discipline. The cognitive revolution was a counter revolution against behaviorists influenced by Pavlov, who believed that the internal state which is not observable cannot be taken into evidence, and that instead behavior which is observable should be emphasized. Cognitive psychologists on the other hand argued that internal responses are just as important as external ones, and that mental events should be included in data in order to better understand human psychology (Miller, 2003).

The changes that the cognitive revolution brought on influenced prominent figures within the field such as George.A.Miller, B.F.Skinner and Noam Chomsky who set the ground works for cognitive psychology (Miller, 2003). By the 70s, the growing use of computers allowed scientists to compare the human mind to an artificial program, to better understand how information is being processed within the brain (McLeod, 2020). Scholars identified that the brain processes through different "schemas" which are packages of information that grow more sophisticated as one gets older. These schemas help us process information quickly based on prior experience, in order not to overwhelm the brain (McLeod, 2020). These findings widely influenced how cognition was applied to other disciplines throughout the 80s and 90s, and set the groundwork for scientists and scholars who started using cognitive psychology in order to understand the relationship between human cognition and the natural environment, as well as how nature influences information processing within the brain. These studies drew on the works of Henry.D.Thoreau and William.H.H.Murray, where images, sounds and exposure to nature as well as urban environments were compared to assess their effect on cognitive behavior (Schertz & Berman, 2019).

Specifically, these studies drew on the core elements of cognitive psychology, linking behavior with evolutionary responses—namely reproduction and survival—and arguing that human behavior is dependent on gathering and processing information which is rooted in our evolutionary history (Todd, Hertwig & Hoffrage, 2015, p. 885). Therefore, memory, attention as well as our reasoning abilities are shaped and influenced by our environment, as our behavior is rooted in adaptation in order to survive (Todd, Hertwig & Hoffrage, 2015, p. 886). Following this argument, the environment we are in will also determine how well we keep our attention and reasoning abilities, and whether there is a difference between our capabilities to function. Attention restoration theory and stress reduction theory study this difference and are of particular relevance to this thesis, as they focus on understanding how nature influences our cognitive responses.

### 2.3.1 Attention Restoration Theory

Attention Restoration Theory was developed by cognitive psychologists Rachel and Stephen Kaplan, who studied how the ability to concentrate can be restored by exposure to nature. Specifically, cognitive psychology states that direct attention is needed in order for us to complete a task, however overtime this direct attention diminishes and we experience mental fatigue. As Ohly et al. (2016) point out, fatigue is most commonly experienced when we are doing tasks that have little to no intrinsic motivation, in other

words, we are only completing them because they are necessary, not because we enjoy them, such as the act of filing taxes. Prolonged attention fatigue is associated with poor decision making, low levels of self-control as well as physical and mental health issues such as obesity (Ohly et al., 2016).

Kaplan and Kaplan reviewed multiple fields of research, and found that neurologists confirmed deficits in direct attention cause damage to the prefrontal cortex, an important part of the brain that is associated with mental functioning and impairs information processing (Kaplan, 1995). Direct attention itself is achieved through inhibition, which means getting rid of any distracting stimuli in order to focus on the task at hand. Though this may help the individual in accomplishing the task, it also results in mental exhaustion due to the depletion of certain stimuli, such as students studying for their final exams (Kaplan, 1995). Drawing on evolution theory, Kaplan and Kaplan suggest that this could be a mechanism developed to protect us from vulnerability and surprises, as focusing on single tasks for too long would have led our ancestors to experience sudden attacks. The modern human however draws an extreme distinction between the important and the interesting, and must exert a lot more mental energy to do something important while resisting the interesting, making fatigue a “recent vintage” (Kaplan, 1995).

Direct attention is important for various reasons. Namely, it allows us to behave properly when we are faced with uncomfortable situations, as well as make level-headed decisions based on our past experiences (Kaplan, 1995). It facilitates problem solving, and allows for patience and reflection when faced with a complex task or life situation. Lastly, it suppresses emotions such as irritability and irrationality, allowing us to better navigate high stress situations (Kaplan, 1995). While sleep seems to be a direct solution to resting direct attention, it is not always enough. Kaplan and Kaplan (1995) identified how natural environments are able to sufficiently reduce fatigue and restore direst attention, which are listed below:

- Fascination: fascination refers to any activities consisting of involuntary attention which are interesting and help the individual recuperate. Fascination can be soft or hard, with hard fascination characterized by activities such as watching car races and soft fascination as walking through a natural setting. The second is particularly useful as it allows for reflection, which can further reduce fatigue. Nature itself is filled with fascinating objects such as clouds, sunsets or even the motion of leaves. Looking at them is quite effortless, and provides space to think about other things one might need to process.

- Being away: people often go on vacations and getaways because they are restorative. The act of being away offers a break from old problems and allows a conceptual shift to happen. Natural settings are often preferred when choosing a location, such as the seaside or the mountains which are not normally available in urban settings.

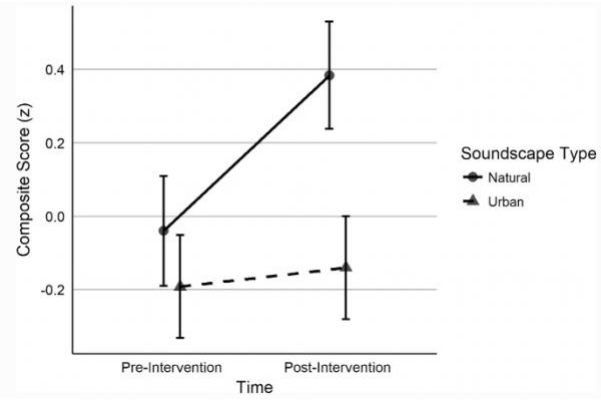
- Extent: the environment in which individuals seek restoration must have enough extent that it offers a different world that has fascinating stimuli. It has to take up a substantial portion in the mind by offering enough to see and think about. The wilderness provides extent naturally, but even small Japanese gardens are able to meet this criteria as they allow depth in dimension, which allows for an inner connectedness to a much larger world.

- Compatibility: the environment and the individual's purpose should be compatible, where one can feel comfortable without struggle and stress. A compatible environment is a responsive one, one that does not require a lot of selectivity or direct attention. Nature in itself offers very high compatibility, and most find it effortless to function in nature compared to the urban environment. Nature allows for different roles, such as the predator (hunting, fishing), the locomotion (walking, biking), the domestication (gardening, farming), and the observation (bird watching, sunset watching). Though we might not find all of these roles in one place, Kaplan and Kaplan give the example of an exhausted factory worker, who outside of his mundane workplace, may seek to find a shaded tree so he could have a peaceful lunch break.

Kaplan and Kaplan's theory has been proven by many studies, both past and recent, that outline the benefits of natural environments within an increasingly urbanized world. For example, a study by Van Hedger et al. (2018) analyzed the effects of nature sounds on cognitive performance. The experiment had two study groups, one which was exposed to sounds such as moving water, bird chirping and crickets, while the other was exposed to urban sounds such as those of traffic, car honking and cafes. Participants were asked to rate adjectives describing the sounds as well as whether they liked or disliked them. Cognitive performance was assessed through DNB and BDS tests, which are scientifically proven cognitive trials to assess direct attention. Participants took these tests before and after they were exposed to the natural/urban sounds, and the cognitive scores were calculated afterwards. Results show that cognitive

performance had a drastic increase for those hearing nature sounds, and that direct attention has been restored through the means of soft fascination, which is shown in Figure 1 (Van Hedger et al., 2018).

*Figure 1: Cognitive Performance Nature vs. Urban Sounds, Van Hedger et al., 2018*




Another study by Lee et al. looks at the effects of forty second views of two city scenes on 150 students and how it affects their sustained attention. Sustained attention falls under direct attention, and specifically impacts the abilities of learning and memory (Lee et al., 2015). SART was used to assess cognitive ability, which is a test studying response by asking participants to respond to a number of digits except the number three. The two groups were asked to complete the test with breaks, and during these breaks one group was given a view of a concrete rooftop while the other group had a view of a green roof. The results supported attention restoration theory, as the participants allowed to view the green roof had much better attention and response time compared to their counterparts. In fact, the group that viewed the concrete roof between breaks had a worsening attention span (Lee et al., 2015). The importance of this study is that traditional literature on attention restorative theory emphasizes the benefits of green spaces for prolonged periods of time, such as taking an hour long walks or sitting in the garden and reflecting. However, Lee et al.'s study showed that nature boosts attention even if it is just a short forty second view, outlining the surprising effects it has on our cognitive behavior.

### 2.3.2 Stress Reduction Theory

Stress is a response process that can happen both psychologically and physiologically, and is often accompanied by negative feelings such as fear, anger and sadness. Different bodily systems are required to help an individual cope with stress, all which require immense energy and resources which if depleted,

lead to fatigue. Extended fatigue caused by stress has been proven to lead to behavioral problems such as drinking, smoking and drug use, making it an important factor with regards to well-being (Ulrich et al., 1991).

Stress Reduction Theory was founded by professor and landscape architect Roger.S.Ulrich, who carried out studies to better understand the connection between nature and stress. Similar to Kaplan and Kaplan, Ulrich often chose hospital patients as his research subjects. He would study patients that were disabled by accidents or illnesses and compare those who had a natural view versus those who had an urban view outside of their hospital room window. His findings showed that those who had a natural view, even if it was just a mural hanging on the wall reported less stress and a lowered heart rate compared to their counterparts (Ulrich et al., 1991). However, it differs from Kaplan and Kaplan as it shifts away from cognitive performance and uses a new framework which includes emotional responses to better encompass a broader variety of factors.

Stress Reduction Theory is rooted in evolutionary psychology, as it suggests that our complex ancestral brains visually favor landscapes containing lust vegetation and clear water as it signifies an abundance of resources crucial for our survival (Sullivan, 2014). Therefore, such landscapes help reduce and moderate states of arousal and negative thoughts and are able to reduce both psychological and physiological stress (Sullivan, 2014). Scholar Wohlwill (1983, as cited in Ulrich, 1991) suggested that since sensory systems evolved in natural environments, humans are much less accustomed to urban settings and can therefore be easily overstimulated and stressed out. The notion of associating urban settings with stress and natural settings with recovery stemmed from 19th century landscape architect Frederick Law Olmsted, who associated cities with stress and talked about the restorative benefits of viewing nature, stating that it “gives the effect of refreshing rest and reinvigoration to the whole system (Olmsted, 1865, as cited in Ulrich, 1991)”. Olmsted’s intuitive view gave justifications for the preservation of American wilderness, such as Yosemite National Park and Central Park, and paved the way for scholars such as Ulrich to perfect their theory.

Different from Kaplan and Kaplan, Ulrich argues that restoration is much more complex, and that certain environments are favored compared to others, and the effects of restoration should therefore also be examined in terms of emotions and physiological responses. In his work *Stress Recovery During Exposure to Natural and Urban Environments*, Ulrich (1991) asked 120 participants (60 males and 60 females) to

watch a stressful movie before exposing 20 of them to tapes of different natural and urban settings. He then monitored different physiological aspects such as skin conductance, heart rate, muscle tension and pulse alongside the participants' verbal communication on how they felt to assess their stress levels and how quick they recover. Findings showed that recovery was faster for those who were exposed to nature compared to those exposed to urban environments as shown in *Figure 2*. In fact, exposure to nature raised a possibility that there might be a salient parasympathetic nervous system component, as it shifted participants to a positive emotional state. There was a high correlation between exposure to nature and recovery rates, as seen from the participants' physiological results.

*Figure 2: Ulrich et al.'s Results on Stress Reduction, Ulrich et al., 1991*

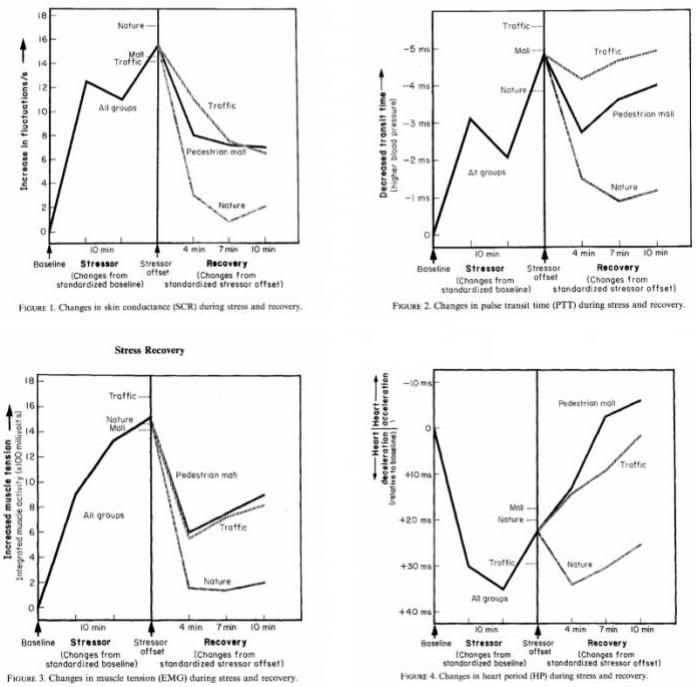



FIGURE 1. Changes in skin conductance (SCR) during stress and recovery.

FIGURE 2. Changes in pulse transit time (PTT) during stress and recovery.

FIGURE 3. Changes in muscle tension (EMG) during stress and recovery.

FIGURE 4. Changes in heart period (HP) during stress and recovery.

Ulrich's theory has been studied in depth by multiple scholars that have furthered his research. For example, Hedblom et al. (2019) studied multi-sensory effects when comparing urban and natural environments, in order to understand which factors have the biggest effect on stress reduction. The study had three groups of participants who were exposed to a mild electric shock as a stressor, before being placed in either a dense urban environment, a park or a forest. They were then asked to rate their experiences in terms of visual, auditory and olfactory pleasantness. The results showed that the highest stress levels can be recorded in urban environments, where there were loud traffic noises and unpleasant odors associated with cityscapes. In terms of visual restoration, a park was sufficient to reduce stress just as much as a forest, however what was most important to participants was the sound of birds and other

natural auditory stimuli (Hedblom et al., 2019). Cognitively speaking, smell is a unique sense as its neural pathway differs from that of other senses. While all other sensory systems connect to cerebral areas via a thalamic relay, olfactory receptors are only two synapses away from the amygdala and hypothalamus, which are key to stress responses. Therefore, smells associated with natural environments were the most efficient in reducing stress levels (Hedblom et al., 2019).

## 2.4 Ecopsychology

Ecopsychology, as defined by scholar Andy Fisher in his book *Radical Ecopsychology*, is the combination of Greek words eco, meaning home; psyche, meaning soul and logos, meaning the study, order or speech. Thus, ecopsychology is an approach to the psyche with relations to our natural home or environment, and to observe any shifts and patterns to our identity and relationships when we connect to the "web of life" which is essential to our well-being (Fisher, 2013, p.4).

The origins of ecopsychology can be traced back to Sigmund Freud, who in his book *Civilisation and its Discontents (Das Unbehagen in der Kultur)*, first explored the idea that there is a strong connection between the internal and the external, and that there is a more "intimate bond between the ego and the world" (Freud, 1929, p.2). In the early 60s, Robert Greenway furthered this concept and created the study of ecopsychology, stating that it was a language to understand the relationship between humans and nature in order to perpetuate healing (1995). Greenway was interested in the works of Carl Gustav Jung—a supporter of Freud—and his works on the ego and self, seeking to understand the psychological shifts which happen in people by taking them out on wilderness excursions as experiments and detailing the results. His research project, which involved around 700 participants as well as subsequent surveys, interviews and longitudinal studies found that 90% of participants felt more alive and more energy and that the experience helped them break addiction. 77% found that life afterwards underwent big shifts in all avenues, with 53% reporting depression after returning to urban life (Greenway, 1995). The most interesting finding perhaps is how people's dreams changed, where it was reported that it took on average 72 hours for participants to experience more vivid dreamscapes, and that at first the dreams involved urban scenarios, yet after four days would involve only natural landscapes, which prompted Greenway to suggest, partly in jest, that our cultures are only "four days deep" (Greenway, 1995).

These research results which indicated a letting go of cultural constraints and instead connecting to one's evolutionary history which was linked to both an internal and external wilderness was coined by

Greenway (1995) as “the wilderness effect”. Linking his findings back to psychology, Greenway remarks how the traditional understanding of the mind is considered in terms of the human psyche and mental processes, suggesting that the mind is tied to a separate individual. However, long before this thinking ever emerged, Buddhist philosophy defined the mind as a sum of all natural processes, and that it is a property of the universe rather than an isolated part. The mind in this regard is not limited to just a brain, but is rather more fundamental than consciousness, “encompasses all consciousness” (Fisher, 2013 & Greenway, 1995). Western culture experiences consciousness as separate from the mind, creating a sense of dualism that guides our understanding towards culture and the world. Ecopsychology on the other hand promotes holism, and seeks to bridge the gap between individuals and nature (Fisher, 2013).

### 2.4.1 Ecopsychology & Shinrinyoku

One of the more popular concepts often associated with the field of Ecopsychology is that of Shinrinyoku (森林浴), which translates to “forest bathing”. The concept originated in Japan, and was first coined by the Japanese Ministry of Agriculture, Forestry, and Fisheries in 1982, defining it as “taking in the forest atmosphere or forest bathing” in order to improve one’s mental state and achieve relaxation (Tsunetsuga et al., 2009 & Park et al., 2009). The concept was founded on the basis of research conducted on Japanese citizens. The Japanese Ministry of Health, Labor and Welfare found that 54.2% of the population rates their stress as very high, with 60-70% reporting it to be moderate or relatively high, accompanied by 42.3% stating that they felt their health was poor or mediocre, despite not having any illnesses (Tsunetsuga et al., 2009). Parallel to these results, the link of evolutionary preference has long been made, with the idea that our modern “artificial society” is inherently stressful, whereas the natural environment aids relaxation and comfort naturally due to our ancestral past (Tsunetsuga et al., 2009 & Park et al., 2009).

With this in mind, the Association of Therapeutic Effects of Forests was established in Japan in 2004, using Shinrinyoku as a basis to facilitate therapeutic recovery. Similar efforts were later made across the world, such as the COST Action E39 on forest and human health from 2004 to 2008 in Europe, and the International Union of Forest Research Organizations (IUFRO) on a global level. In 2007, the Japanese Society of Forest Medicine was established, with the goal of researching how green spaces can be used medically, which included Shinrinyoku as a core factor that promoted natural walks in order to combat different health issues (Park et al., 2009). Shinrinyoku became increasingly popular due to its cost-effectiveness, as it does not have any negative side effects to date while significantly reducing stress (Markwell & Gladwin, 2020). Indeed, a survey in Europe had found that in the 2018/2019 fiscal year, 12.8

million working days were lost due to stress, anxiety and depression across the continent, which averages to costing 188 billion Euros annually (Markwell & Gladwin, 2020).

Shinrinyoku, which is typically done in silence, involves spending time in natural settings such as woodlands or forests in quiet contemplation, often wandering aimlessly with the removal of all distractions (Markwell & Gladwin, 2020). A study conducted by Park et al. (2009) which studied human reactions in twenty-four Japanese forests and compared them to those of walking in the city have found that " forest environments promote lower concentrations of cortisol, lower pulse rate, lower blood pressure, greater parasympathetic nerve activity, and lower sympathetic nerve activity than do city environments". Their study mainly focused on the endocrine system, which involves two broad components: sympathetic adrenal-medullary (SAM) axis and hypothalamic-pituitary-adrenal (HPA) axis. The SAM axis stimulates an immediate activation which prepares an individual to deal with stress, resulting in increased heart rate and blood pressure; in response to the stress, cortisol is then released by the HPA axis. Shinrinyoku has found to decrease the reactions posed by these axes, thus effectively relaxing the body and mind, as seen in *Figure 3*. While the study is highly scientific, the effects felt by participants translate to not just physical relaxation but also prompt a more stable emotional and philosophical state of mind.

*Figure 3: Findings of physiological effects of Shinrinyoku, Park et al., 2009*

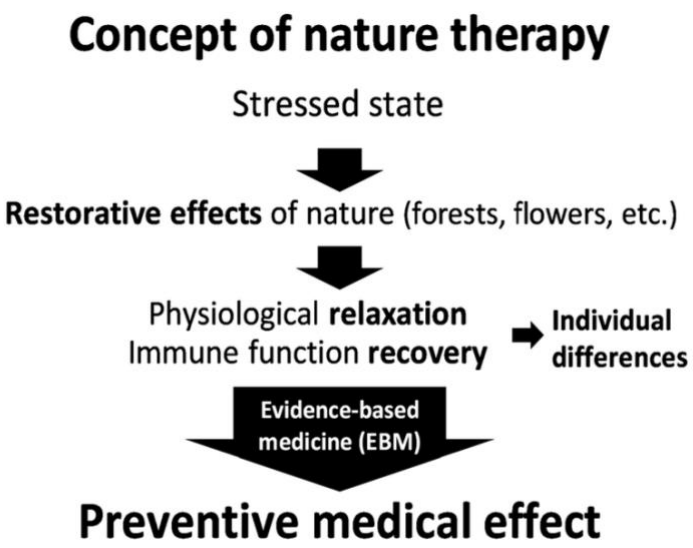
| Authors | Stimuli versus control | Results of *Shinrin-yoku* |
|---|---|---|
| Park et al. (2008) [17] | FV versus UV | Decreased PR and SC<br>Enhanced HF |
| Tsunetsugu et al. (2007) [19] | FW versus UW or FV versus UV | Decreased PR, SBP, DBP, SC, and LF/(LF + HF)<br>Enhanced HF |
| Park et al. (2007) [13] | FW versus UW or FV versus UV | Decreased SC and TH |
| Furuhashi et al. (2007) [40] | FW versus UW or FV versus UV | Decreased PR, SBP, DBP, SC, and LF/(LF + HF)<br>Enhanced HF |
| Tsunetsugu et al. (2006) [18] | FW versus UW or FV versus UV | Decreased SC and IgA |
| Park et al. (2006a) [15] | FW versus UW or FV versus UV | Decreased LF/(LF + HF)<br>Enhanced HF |
| Park et al. (2006b) [16] | FW versus UW or FV versus UV | Decreased SC and IgA |
| Yamaguchi et al. (2006) [41] | FV versus UV or FV versus UV | Decreased SAA |
| Ohtsuka et al. (1998) [25] | FW versus Non FW | Decreased BG |

HF, HF of HRV; LF/(LF + HF), LF/(LF + HF) of HRV; LF/HF, LF/HF of HRV

*PR* pulse rate, *SBP* systolic blood pressure, *DBP* diastolic blood pressure, *SC* salivary cortisol, *IgA* salivary immunoglobulin A concentration, *SAA* salivary amylase activity, *BG* blood glucose, *TH* total hemoglobin concentration in prefrontal areas, *FW* forest walking group, *FV* forest viewing group, *UW* urban walking group, *UV* urban viewing group

A study by Markwell and Gladwin (2020) who examined the effects of Shinrinyoku on cultural groups outside of Japan have found that the effects are unanimous and cross-cultural, with participants reporting feelings of inner peace and joy when walking in nature. This is further supported by Hansen, Jones and Tochini (2017), who reviewed Shinrinyoku literature across multiple electronic databases, and found that human health can benefit from nature immersion as presented in *Figure 4*. Specifically, it has a direct effect on the parasympathetic nervous system, aiding in relaxation and a reduction of stress, as well as preventing and lessening the severity of physiological ailments. For example, the research by Tsunetsuga et al. (2009) has found that Shinrinyoku applied as a therapy can act as a treatment to diabetes mellitus, lowering blood glucose levels in patients from 179 to 108 mg/dL, which in essence reverted patients to a pre-diabetic state. Shinrinyoku has also been found to stimulate the senses, which can result in positive emotions being transmitted to aid physiological functions (Hansen, Jones & Tochini, 2017). The different senses are stimulated by scenery (vision), smell of wood (olfactory) and sound of running streams or the rustle of leaves (audition). Furthermore, people were found to have a decreased heart rate and blood pressure when placed in living accommodations with a higher ratio of wood, testing for higher vitality and vigor (Tsunetsugu et al., 2009)

*Figure 4: Concept of Shinrinyoku as Nature Therapy, Hansen, Jones & Tochini, 2017, p.2*




### 2.4.2 Ecopsychology and Mental Wellbeing

Ecopsychology focuses on the relation humans have to nature. As such, it emphasizes the positive benefits nature has on human wellbeing. Over the years, multiple studies have discussed different aspects of how

natural environments benefit us both mentally and physically, and their results have been consistent in saying that collectively, exposure to nature is extremely beneficial. Interestingly, most sources also mention a connection to the biophilia hypothesis, and that modern lifestyles contribute to environmental destruction both through excessive consumption and modern disconnection from nature (Zelenski et al., 2015, Pritchard, 2019 & Cartwright et al., 2018).

Zelenski et al. (2015) points out that even without the backing of evolutionary psychology, it is clear that the gap between our evolutionary environments and modern living results in suboptimal wellbeing. The fact that most urban dwellers live away from nature fosters a psychological disconnection, making us less likely to reap the benefits as well as protect the natural environment. Zelenski et al. (2015) experiment found that exposure to nature increases cooperation, which can facilitate better solutions for both social dilemmas and environmental protection. By manipulation nature exposure with photographs over three separate studies, the experiment found that there was an increase in intrinsic aspirations and generosity among individuals, and a decrease in materialistic leanings, suggesting that nature causes people to value others over valuing commodities such as wealth and fame. This in turn has led to greater happiness, longevity, as well as better moods and cognitive functions.

Related results are presented by Cartwright et al. (2018), who found that people with low social connectedness still expressed high levels of well-being if they are situated close to nature, and vice versa if they live far from nature with the added negative consequence of suffering from depression. This provides a basis that nature offers more isolated and less social individuals a pathway to happiness as well as encouragement for socialization, contributing to higher subjective wellbeing which is how people think and feel about their individual lives. Cartwright et al. (2018) argues that this “connectedness” to nature may prompt individuals to feel a broader sense of connection, thus seeking further socialization with other individuals. Exposure to nature creates a “buffering effect” from work and everyday stress, resulting in lower rates of depression or antidepressant use, especially among socially isolated individuals. Individuals who are brought up in more natural settings also exhibit far less social stress on a neural level than those brought up in urban areas, suggesting that nature exposure provides a steady bases for good mental health (Cartwright et al., 2018).

Last but not least, Pitchard (2019) found that exposure to nature increases eudaemonic wellbeing, drawing from Aristotle’s theory which describes that one must live according to ones’ “daemon”, or true

self, thus achieving self-realization in accordance to one's values. Individuals with high eudaemonic wellbeing will have higher rates of personal growth, and are more likely to flourish and function in life. Nature connectedness, which is considered an emotional bond between humans and their environments is associated with eudaemonic wellbeing indicators, such as those of "autonomy, vitality, meaning, and personal growth" (Pitchard, 2019). This type of connectedness, as studied by scholars promotes a sense of relatedness which is distinct from social connectedness, making nature a distinct indicator of happiness in its own right (Zelenski & Nesbit, 2014 as cited in Pitchard, 2019). Nature connectedness was also found to help individuals gain a sense of self and escape from feelings of dissatisfaction caused by extrinsic factors, and rather focus on their own intrinsic values and goals that results in feelings of inspiration (Pitchard, 2019). Similarly, it has been linked to feelings of awe, which allows the development in individuals' mental structures as well as their frame of references. People that have a strong sense of nature connectedness have reported that these experiences gave them a sense of perspective on their life, goals and purposes, allowing for accommodations of new experiences related to self-change and self-improvement (Pitchard, 2019).

### 2.4.3 Intrinsic Value of Nature

The intrinsic value of nature comes from the field of conservation, and was popularized in the 1980s as scientists began to see the serious degradation which was taking place called for a more holistic approach towards viewing nature. The Society of Conservation Biology (SCB) publicly argued that: "there is intrinsic value in the natural diversity of organisms, the complexity of ecological systems, and the resilience created by evolutionary processes" (Piccolo, 2017). Western philosophy on the other hand was considered to be more individualistic, and its basis in neoclassical economic thinking has prompted a valuation based on monetary terms. As Greenway has previously stated, humans have a century old idea that we are above nature (Greenway, 1995). Indeed, with the popularization of the neoclassical economic theory, the focus on utility has argued that the essence of valuation lies in consumer choice, which is associated with the commodification of wants and needs (Gowdy & Mayumi, 2001). However, this idea has been greatly criticized as it does not adequately reflect human behavior, and does not reflect the biological basis of nature valuation.

Indeed, recent human development has prompted an anthropocentric view of the world, which is based in dualistic thinking separating individuals from the natural environment (Piccolo, 2017). While valuation is relation to three specific questions: "what is true, what is right and what is beautiful", the anthropocentric view considers something to be valuable if positive consequences of an action outweigh

the negative (Swart et al., 2001). In terms of nature management, while it can provide us with a number of amenities such as recycling of nutrients, fresh air and resources, negative consequences of preserving these benefits are that nature imposes limitations of human economic development (Swart et al., 2001).

This type of view creates a mismatch between theory and reality, rooted in neoclassical thinking. In fact, the idea that we can measure monetary costs of oil spills or degradation are inherently flawed as surveys cannot necessarily reflect how humans act in real life, nor are the real consequences of natural degradation explained in full (Gowdy & Mayumi, 2001). The consumer choice axiom operates on the basis of which we are free to choose what we want. However, this is inconsistent with what we need to survive, such as a certain amount of CO2, or a certain temperature and other natural gasses that if too much or too little would threaten every single species on this Earth. These biophysical aspects along with environmental services cannot be adequately weighed in monetary terms, nor can they be characterized by a single saturation point. Individual preferences must be grounded in reality, and cannot be independent from biophysical factors. Economic valuation assumes that there is a common sentiment of all wants, which creates a "mono-dimensional definition of utility" neglecting any non-monetary aspect despite its significance (Gowdy & Mayumi, 2001).

Of course, this is not to argue that human wants and needs don't hold value. For instance, Piccolo (2017) points out that no one argues about the good of a dragonfly catching a fly being equal as that of someone having a good life. However a dragonfly operates within its ecological boundaries that exist in the same circle of intrinsic value pertaining to all life on Earth. This means that their good is objective and ecocentric, and thus warrants our moral consideration above anything else. When humans engage in actions that shut down this good, such as through extinction, this is what makes those actions "morally wrong" and exactly why having intrinsic value promotes a collective conservational thought pattern which can help us curb this trend (Piccolo, 2017). We as humans are unique in the sense that we are a moral species, and we have the ability to recognize good outside of our existence. The idea of intrinsic valuing is recognizing that we did not create this good, but that we have a duty to uphold it. The concept pf intrinsic valuation states that nature is valuable on its own, and that we should respect its autonomy, self-organization and self-directness; in essence, it comes down to doing what is right and conserving what is inherently good. (Swart et al., 2001 & Piccolo, 2017).

## 2.5 Conclusion

The goal of this section is to show both scholarly and real life evidence of how connectedness to nature has been proven across different disciplines. Through the lenses of biology (evolutionary psychology), psychology (cognitive psychology) and philosophy (ecopsychology), it becomes clear that human wellbeing is strongly tied to our natural environments on multiple levels encompassing both physical and mental aspects. Primal evolutionary instincts that have not changed overtime may lead us to find it increasingly difficult to fit into an ever urbanizing society, whereas our visits to nature have proven to lower stress and improve overall functionality. That is not to say that we are primitive, as our advanced cognitive development and spiritual earning which is not present in any other species has come to the same conclusions—that nature is inevitably the basis of our survival. The three disciplines mentioned do not stand alone, but rather echo one another's sentiments. They should not be looked at through a dualistic lens but rather as a whole which describes different aspects all present throughout every individual. That is to say, we are all connected to nature on a biological, psychological and philosophical level.

# Part B: COVID-19 and Psychology

## 2.6 Introduction

In 2019, an outbreak in Wuhan, China identified a new virus which would eventually spread throughout the world, resulting in a pandemic that would lead to various extreme measures in order to stop its spread. The virus, identified as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), or more commonly known as COVID-19, is a cluster of highly infectious and diverse single strand RNA viruses which lead to ailments in respiratory, enteric, hepatic and neurological systems with varying severity among individuals (He et al., 2020). The virus was identified to have a unique genetic sequence, and there was no distinguishable target population based on age, gender or medical history (He et al., 2020). The transmission occurs via inhalation and contact with infected droplets, and the incubation period ranges between two and fourteen days (Singhal, 2020). The symptoms range from asymptomatic to death with no current effective treatments other than vaccines, making it a highly volatile pathogen.

Perhaps the most daunting feature of COVID-19 is how fast it spreads. The first reported cases in Wuhan are thought to have been in December of 2019, and by April of 2020, a total of 220 countries were infected (Singhal, 2020 & Mahmoudi et al., 2020). Hospitals and government resources were quickly overwhelmed, and the public fell into mass hysteria as there was no clear indication of how to treat COVID-19. Preventative methods were applied according to the World Health Organization (WHO) guidelines, with Polymerase Chain Reaction (PCR) tests carried out to identify positive cases in patients, followed by a two week quarantine to ensure the patient does not infect others during the incubation period. This was followed by contact tracing, with individuals asked to leave their address and contact information in stores, restaurants and other facilities in order to advise quarantine for those exposed (Alvi et al., 2020). Social distancing of at least one meter was advised in all public and private spaces to prevent close contact infections, and protective gear such as gloves and respiratory masks (FFP2, FFP3 & N95) became mandatory in many countries. Lastly, periods of lockdowns started to take effect across the globe, characterized by nightly or even daily curfews, a closure of all facilities and stores other than grocery shops, pharmacies, public transportation and hospitals, with people asked to stay at home and refrain from meeting personnel outside of individual households (Alvi et al., 2020).

The sudden change in the everyday lives of people, especially the constant lockdowns and isolation resulted in psychological stress that later became known as “quarantine fatigue” (Zhao et al., 2020). This

resulted in feelings of depression, anxiety and suicidal ideations, followed by a decreased adherence of rules, and rebellion against mask mandates, lockdown protocols and other regulations in place (Zhao et al., 2020). The effect was found to be universal, and presented a unique social situation that pertains to the mental wellbeing of individuals during isolation. This section explores the effects on mental health COVID-19 has on people, with a specific focus on the effects present within the study region, since regulations vary across countries and the severity of mental effects is dependent on the laws in place, accessibility to supplies and government aid as well as financial stability among other factors.

### 2.6.1. Background of Study Region

The study region for this thesis has been outlined as the Balkans, with the respondents being relatively evenly split between Serbia, North Macedonia and Bosnia and Herzegovina (BiH). For the purpose of this thesis, it is important to acknowledge that while the world was unanimously impacted by COVID-19, regional measures and the amount of distress varied greatly based on local political and economic circumstances. The above mentioned countries specifically have been criticized for their authoritarian tendencies and severe restrictions that infringe on human rights (Orlović, 2020, Kolozova, 2020 & Tzifakis, 2020). A study by Tzifakis (2020) outlined that these countries feature an "ineffective rule of law institutions" coupled with "weak parliaments" and an absence of independent media. In Serbia and North Macedonia, the situation escalated with the dissolution of their parliaments during the pandemic (Kolozova, 2020 & Orlović, 2020), whereas disputes between governing entities in BiH also contributed to political turbulence and public unrest (OSCE, 2020). All three countries were criticized to have ignored institutional procedures while simultaneously abusing political power through imposing severely restrictive measures (Tzifakis, 2020). In fact, their reaction to the pandemic was described by the EU as lacking "basic democratic values", and the regimes as "soft authoritarianism" or "illiberal democracy" (Kolozova, 2020). The repressive measures which were upheld by steep penalties instead of direct communication and education reveal that the relationship between these countries' governance and society is built upon mutual distrust (Kolozova, 2020). The implementations of these regimes, as discussed below, seeks to highlight that their restrictive nature can be seen as a factor which directly influenced the emotional wellbeing of local citizens.

- **Measures:**

  In both Serbia and North Macedonia, state of emergency declarations followed by martial law were exercised without parliamentary deliberation, and they remained alongside Hungary the only countries in Europe that functioned without a parliament during the pandemic (Orlović, 2020, Miljojković, 2021 &

Kolozova, 2020). In Serbia, a complete lockdown started on March 16th, and on March 18th a movement ban was imposed on all citizens between 8PM and 5AM (Orlović, 2020, Helsinki Bulletin, 2020 & Lazic et al., 2020). The international border as well as airports were closed the following day, followed by the disconnection of public transport on March 22nd (Lazic et al., 2020). Citizens over 65 years of age were not allowed to go out under any circumstances with the exception between 3 to 8AM on Sundays for grocery shopping, followed by the extension of curfews for all citizens from 3PM until 5AM which started on March 28th. In April these restrictions worsened, with citizens asked to stay at home without exception for the entire weekend starting on Friday and ending on Monday, during which they were not allowed to run basic errands such as grocery shopping or going to the pharmacy, which lasted until May (Lazic et al., 2020, Helsinki Bulletin, 2020 & Orlović, 2020).

North Macedonia followed Serbia's example in imposing overtly restrictive measures, including a military curfew which consisted of complete lockdowns lasting 60-86 hours during weekends and holidays, and a segregation in the right of movement for both the elderly and minors, who were sometimes only allowed to leave for two hours a day during workdays (OSCE, 2020). This narrow time slot resulted in the overcrowding of public spaces such as banks, grocery stores, hospitals and pharmacies, which was counter-productive in terms of social distancing. Not only were these measures both physically and psychologically harmful, but they were also "an affront to human dignity" (OSCE, 2020).

In BiH, measures started to be implemented early on as of March 12th, with the complete lockdown for individuals under 18 and above 65. Measures included strict curfews between 6PM to 5AM which were age discriminative, border closing and isolation with individuals asked not to access public areas, coupled with the disconnection of both regional and local transportation on March 18th (Hukic et al., 2021 & Lazic et al., 2020). These strict restrictions resulted in eventual protests in May, and the complex governing structure resulted in the restriction of communication and coordination, which then added additional risks that contributed to the spread of the virus (Hukic et al., 2021).

- **Media:**

In Serbia, the government showed little to no concern regarding the early stages of the pandemic, yet quickly changed their discourse as the situation escalated (Orlović, 2020, Helsinki Bulletin, 2020, Miljojković , 2021). The media became extremely censored, with false information being spread and citizens unaware of the severity with regards to infection rates (Milutinović, 2020). All COVID-19 related information was selectively distributed, and the right of public access to free information limited with the

reason given as to “stop the panic from spreading” (Milutinović, 2020). Analysis showed that the COVID-19 media discourse in Serbia was overwhelmingly political, with little to no expert and medical engagement on the situation. The transparency of the information was also extremely low (13%) with one third of all texts taken from other domestic or foreign media agencies. Critical reviews during this time were found to be only 5% (Milutinović, 2020), and pressure on journalists led to several arrests of professionals who wrote independent columns (Orlovic, 2020). The mandatory press conference was held with tightly screened questions, and no journalists were present during the event itself. When citizens expressed fear and criticized the unjust treatments towards the elderly, the president’s official statement was “glad” and “they should be afraid” as well as “if [the elderly] do not listen then there will not be enough graves left for them in Serbia“ (Orlovic, 2020, Helsinki Bulletin, 2020).

Similarly in North Macedonia, the government was criticized to be “Intersectionally blind”, and news outlets were selectively distributed based on the information they contained rather than showing full transparency (Kolozova, 2020 & Marusic, 2020). In fact, the Society Information Ministry in the country was accused of “hijacking” information in the name of censoring fake news, and only allowing selected media employees to continue working during curfews and banning all others from returning to work (Marusic, 2020). Furthermore, the country lacks independent media outlets and sources, and current journalist associations are largely made up of members from the former corrupt VMRO DPMNE party that is still exercising its control over information censorship (Marusic, 2020).

Last but not least, an independent research by the Organization for Security and Co-operation in Europe (OSCE) found that in BiH, a decree prohibiting the incitement to panic and disorder during a state of emergency was published by one of the country’s governing entities Republika Srpska on April 6th, which stated that the media as well as the general public is forbidden from spreading false information that leads to panic; this resulted in the severe restriction of media and information censorship, followed by arbitrary and disproportionate fines that were imposed on those who disobeyed (Tzifakis, 2020 & OSCE, 2020). The OSCE concluded that this decree had “undermined fundamental human rights of freedom of expression” (2020).

- **Economy:**

In Serbia, the overall mortality rate is expected to keep rising, and though the total number of deaths are unknown due to falsifications, independent studies have found that 25% of current reported deaths are

in the age group of 20-40, which leads economists to speculate that there will be a decrease in valuable workforce (Cvetkovic & Miljkovic, 2020). Unemployment will continue to rise, similar to the rest of the world, and Serbia's GDP will continue to fall 4-5% each year if optimistic. If unregistered workers are taken into account, a forecast of 50,000 to half a million people will likely lose their jobs, though these figures do not reveal those much more significant, long-term consequences that Serbia will face, further deepening inequality among its citizens. Lastly, the dissatisfaction of the public regarding governing tactics as well as credibility towards official data had already led to protests in early July of 2020, where thousands of young people marched the streets and were faced with police brutality. This will likely lead to further destabilization of the society, which overall points to a very pessimistic economic picture following COVID-19 (Cvetkovic & Miljkovic, 2020).

Similarly in BiH, the disconnection and distrust between the governing entities and public interest is present, as highlighted in the study by Tzifakis (2020). For example, the authorities of the Federation in BiH signed a $5.8 million contract to import 100 ventilators from China, which were overpriced and not sufficient for what was needed in the country at the time. The same could be seen with Republika Srpska, where public procurement procedures were not followed and a mobile hospital was built via a company which was not registered for selling medical equipment. These types of grey investments were also found to be present in Serbia, and have all deepened public unrest and disbelief towards their governing structures (Tzifakis, 2020).

In North Macedonia, almost all sectors within the economy were hit strongly (Pollozhani, 2020). In the second quarter of the year 2020 alone, the country experienced a 12.7% contraction, and overall shrank by 4.9%. Not only that, the government was forced to make medical investments along increasing the income of medical staff, all which delivered yet another heavy blow to the economy (Pollozhani, 2020). Specifically, the strict measures contributed to such a large decline, which the country could not properly mitigate as it historically did not have large annual economic growths or adequate savings, and is overall considered to have a "fragile economy" (Pollozhani, 2020). Imports and exports declined by 38% and 33% respectively, with investments decreasing by 25.6% and household consumption falling by 11.6%. Though the country tried to mitigate these economic shocks through lowered interest rates, free loans and subsidies, they were insufficient to aid in the overall economic recovery (Pollozhani, 2020).

## 2.7 Social Theory

While COVID-19 is characterized as an ailment of the body, its connection to the mind is not to be ignored. Specifically, the way we interact with society and our behavior has changed drastically during lockdown and the implementation of different rules. The best framework which can be used to analyze these changes is social theory, which is defined as elements and structures used to examine how societies form, change and develop overtime, essentially a study of social phenomenon (Harrington, 2005). While the origins of social theory date back to Confucius and Saint Augustine, the modern idea of it was only popularized after the 1900s. Modern social theory is interested in collective movements that are cultural and political, but it arises from everyday contexts and conversations that prompt interactions between ordinary people, and encompasses a wide range of analytical and explanatory concepts (Harrington, 2005).

COVID-19 provides a new paradigm with regards to social theory, raising fundamental questions about social justice as well as individual relationships within a pandemic stricken world (Walby, 2020). On a broader sense, the spaces which we inhabit have collectively become a 'risk society' where the virus can affect anybody anywhere, to varying degrees depending on a group's social, political and economic situation (Ward, 2020). Furthermore, it creates an opening where freedom and democracy can be easily undermined (such as in the study region), as governments introduce different measures in order to flatten the curve. Given the invisibility of the virus, COVID-19 essentially created an 'era of anxiety' where we are constantly in a state of heightened uncertainty and panic as fear looms over us from every direction (Ward, 2020). The uncertainty was mainly circulated around 'when the pandemic would end', and when we could 'get back to normal' as a society, gradually becoming what the 'new normal' would look like and whether the current restrictions we have will continue to be implemented in the future (Ward, 2020).

Given how infectious the virus is and how quickly medical institutions around the world were overwhelmed beyond capacity, the only non-pharmaceutical intervention that had proven to be useful is isolation, either in terms of separation, lockdowns or curfews (Walby, 2020). In some cases, COVID-19 became a reason to legitimize a state of emergency, where an executive power could seize control of a society via authoritarian measures and surveillance (Walby, 2020). Philosopher Slavoj Žižek (2020, as cited in Walby, 2020) argued that COVID-19 is generating a social struggle which presents "a potential turning point between barbarism and communism", in other words between freedom and authoritarianism. Other opinions, such as those of Giorgio Agamben (2020, as cited in Walby, 2020) argue that a society

cannot be free as long as it is in a state of emergency, and that freedom has been sacrificed due to ongoing security reasons, making it easier for governments to normalize a new way of executing power.

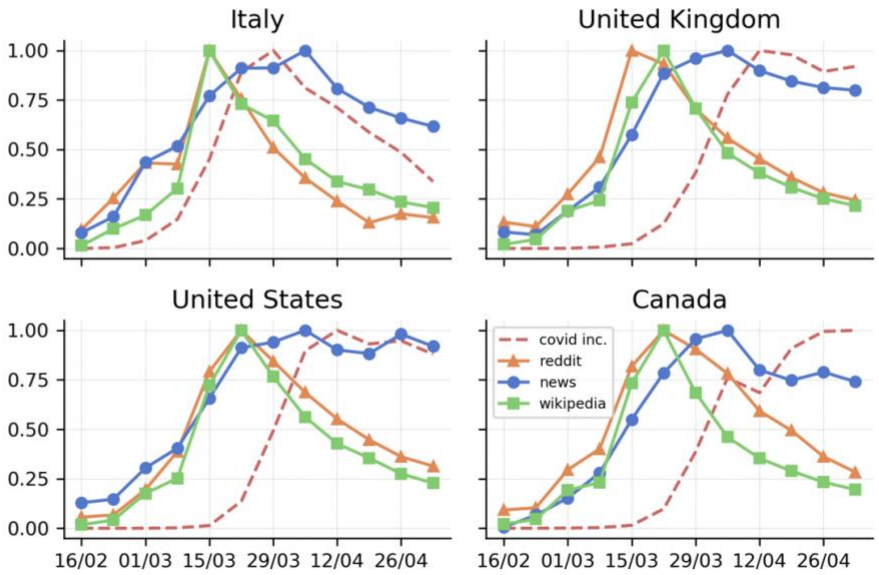
Apart from political divisions, the digitalization of the modern era created new challenges and platforms for information sharing, where people engaged in different pathways to access knowledge which was often times highly disputed with regards to its credibility. As historian John.M.Barry (2009, as cited in Gozzi et al., 2020) wrote during the H1N1 pandemic in 2009: "the single most important weapon against the disease will be a vaccine. The second most important will be communication". This is especially true now during COVID-19, as platforms like Twitter, Facebook, YouTube and Wikipedia today are far more popular than what they were ten years ago. In fact, research has shown that these platforms are instrumental pieces that facilitate both national and international news circulation, and are the primary sources of information for the public; thus, they are fundamental drivers that influence perceptions, opinions and behaviors which then impacts the global health trend when it comes to combating the virus (Gozzi et al., 2020).

Indeed, Google searches for the term "coronavirus" in the US increased exponentially right after the confirmation of a first case in each state, and misinformation spread quickly via Twitter before local outbreaks even began, boosting irrational, unscientific and dangerous behaviors (Gozzie et al., 2020). The timing and framing of the media has been shown to affect the attention span of its audience, as shown in *Figure 5*, where it is evident that as cases spread, media coverage and public interest grow whereas public attention decreases after peaking despite of the number of cases (Gozzi et al., 2020). Therefore, public respond can be controlled by timed releases which can shift individual behavior, creating concern as public obedience is the main strategy when it comes to combating infection rates.

False information which is spread through media sources has been shown to create mass hysteria during COVID-19 (Bagus et al., 2021). Mass hysteria occurs when a large group of people believe that they are facing a severe threat, in this case a virus, which leads them to feel collective anxiety or even physical symptoms that are a psychological manifestations of their fears (Bagus et al., 2021). For example a distortion of risk perception, where people suffering from mass hysteria are biased in the information they consume, and exhibit fears and an inability to understand statistics which leads them to have poor judgement. This manifests through actions such as massive hoarding of toilet paper, masked single drivers, or people refusing to leave their house even for a walk despite the risk of getting infected outside with

social distancing is slim (Bagus et al., 2021). Mass hysteria results in a loss of psychological control, creating what is called an 'emotional contagion'. When the emotional contagion spreads, other people in the group are forced to behave the same way due to social pressure and a desire for conformity. In extreme cases, mass hysteria leads people to inflict harm on themselves and others, including damaging public and private property (Bagus et al., 2021).

*Figure 5: Media Consumption Trends During COVID-19, Gozzi et al., 2020*




News coverage was also a source of emotional contagion, which prompts people to respond to one another with similar emotions influenced by those around them, which can eventually also impact political outcomes. A study by Belli and Claudia (2020) outlined how emotional contagion can occur without physical co-location through virtual networks, and that there is a broader social phenomenon happening during COVID-19 where individuals tend to focus on informational that reinforces their existing views, creating echo chambers that are then further reinforced by family and friends around them. In fact, negative events like a pandemic had been shown to generate emotions quicker and are more powerful, which then lead to behavioral responses that cause more division among groups. News coverage during COVID-19 has been shown to bombard different groups with opposing views, which led to collective rage or joy about the same event. Negative emotions also spread through close contacts on social media

platforms, which leads to clusters of people within these networks sharing the same negative believes (Belli & Claudia, 2020).

## 2.8 Isolation Study

One of the most evident methods used to prevent further infections as mentioned above was the use of isolation or quarantine. These two words, though being used interchangeably in many situations have slightly different meanings, where isolation refers to keeping those who are sick separated from those who are healthy, and quarantine meaning those who might be sick isolating for a number of days to make sure they are healthy (Paliga, 2020). In terms of COVID-19, both words have been used to describe the loss of sociability and outdoor access, and have been referenced interchangeably even among scholarly articles, given that the mental stress felt from being asked to stay at home regardless of sickness has had the same negative effects overall.

The term “quarantine” actually signifies major human breakthrough in terms of treating infectious diseases, dating back to 1377, when a rector from the Ragusa (currently Dubrovnik) seaport issued a thirty day mandated isolation for ships and travelers in order to avoid the spread of Black Death, which was later increased to forty days (Nie, 2015 & Mackowiak & Sehdev, 2002). As similar laws were introduced around Europe during that time, the official name of this procedure became known as “quarantino”, derived from the Italian word for forty, which was “quaranta” (Mackowiak & Sehdev, 2002). In present day, the amount of days an individual should quarantine is based on regional laws and regulations, and the amount of PCR testing done during this time is also variable. The effect of quarantine spreads across mental, physical and regulatory realms, as once placed under quarantine, it is considered a breach of law if one is to exit, thus placing legal restrictions on individual access rights (Huremović, 2019).

The history of isolation is closely connected to that of quarantine, where it was first implemented for those that suffered from Leprosy to self-isolate for a certain period during the fifth and sixth century (Paliga, 2020). Later in 1423, Venezia built a hospital on the island of Nazareth, where those who were sick were isolated from the rest of the population to prevent different epidemics from spreading (Paliga, 2020). The root of the term comes from the Latin word “insula”, meaning “island” (Merriam Webster, n.d). Apart from its medical connotations, isolation was also used as a torture method during war or in prisons as a penal measure on the incarcerated. Researchers studied war veterans from Vietnam as well as prisoners from former Yugoslavia who were subjected to different periods of isolation, finding that

their brain scans showed the same damage as if they received a traumatic blow (Finkel, 2017, p.145). Prisoners in the US penal system had referred to solitary confinement as “a hell to yourself” and “continuous silent screaming”, where after ten days of solitary confinement many of them developed clear signs of mental harm, with one third eventually developing psychosis. Research also found that the majority of men and 25% of women would rather receive mild electric shocks than sit alone for fifteen minutes (Finkel, 2017, p.135). Interestingly, Ulrich et al. (1991) found that prisoners who had a natural view outside of their window reported much less illness which was induced by stress, such as headaches and digestive issues.

While most of these circumstances can be considered involuntary and inhumane, COVID-19 has essentially thrusted the world into one of the largest isolation experiments as we are faced with the century’s largest international emergency (Choukér & Stahn, 2020). From an evolutionary biology perspective, scholars believe that the reason why early humans were able to thrive was because they knew how to effectively work together. In other words, human brains were wired to connect, and so for those who do not choose to be alone, the sudden loss of a way to express their socially cultivated identity can be a “plunge into madness” and ontologically insecure, making individuals feel as if though they are losing a grip on who they are (Finkel, 2017, p.145). The effects isolation has on human beings is reflected in space research, where astronauts preparing for their spaceflight mission are put in isolation for long periods of time in order to better equip them for the extreme environment they will be in when they leave Earth (Choukér & Stahn, 2020). The study found that two systems were profoundly challenged by stress responses during isolation: the brain and the immune system. Specifically, the hippocampus which is pivotal for memory formation and mapping spatial relations had decreased its function, and participants were more prone to bodily ailments due to an “absence of environmental stimulation”. This manifested in sleep disruptions and impaired cognitive functions, which led the researchers to conclude that during COVID-19, the psychological implications of prolonged isolation result in post-traumatic acute stress symptoms, confusion as well as anger towards quarantine (Choukér & Stahn, 2020).

Emotional studies have also already been done to assess the impact of isolation, such as that of Lopez-Carral et al. (2020), who conducted an online experiment assessing 112 participants who were asked to provide emotional ratings during COVID-19 quarantine. The findings also show indications of post-traumatic stress disorder, and an increase in anxiety, depression and mood regulations as well as insomnia, all having possible long term effects on individuals and society. The results showed that

compared to the same ratings and study done pre-COVID-19, participants responded far more negatively to neutral stimuli, and those who lived alone were more negative than those who were isolating together, making loneliness a significant factor (Lopez-Carral et al., 2020). As scholars Banerjee and Rai (2020) further point out, loneliness, which by many is regarded as a primary indication of wellbeing is something most will do anything to avoid, has been linked to autoimmune and cardiovascular disorders increases the risk of frailty and fractures, perhaps both in individuals and society (Banerjee & Rai, 2020).

The type of isolation present in COVID-19 is not a phenomenon previously experienced by the masses. The restriction of movement through forcing people to stay at home creates a psychological burden that is emphasized through vast boredom and loneliness, which the modern world knows little of in an age of constant communication and travel. Our social lives up until now have been filled with constant outings to eateries, cinemas and hangouts, yet the sudden "cataclysmic turn of events" had led individuals to be faced with living with oneself, which for a generation that is so digitalized is perhaps more frightening than dealing with any other catastrophe (Banerjee & Rai, 2020). COVID-19 has essentially brought a speeding society to a sudden halt, and has limited the unlimited amount of social interaction present before. Individuals were never readied by society for the terrible reality of isolation that they have been forced to reconcile with, and the idea of boredom and loneliness leads to feelings such as anger and frustration which then prompts people to defy restrictions due to general emotional unpreparedness, which in a biological disaster leads to worsened consequences (Banerjee & Rai, 2020).

In a study by Bagus et al. (2021), a survey conducted in the US showed that 40.9% of participants reported at least one negative psychological condition, and 10.7% reported having considered suicide. Overall, 14% of US citizens have shown an increase of alcohol consumption during lockdown. A similar trend is reflected in Serbia, where the National Line for Psychosocial Support reported that 32.8% of callers expressed feelings of extreme anxiety, depression and uncertainty due to COVID-19 and subsequent measures (Stašević-Karličić et al., 2020). Social distancing and the mask mandate also prevent people from maintaining strong social ties, or even showing friendliness through facial expressions (Bagus et al., 2021).

Another dominant emotion expressed by the masses was the fear of falling ill, either pertaining to ourselves and our loved ones, which is coupled with the anxiety of losing jobs and the declining economy. Among these emotions, a new type of grief emerges: the absence of mourning during COVID-19 (Belli & Claudia, 2020). As we are isolated, there are restrictions which pertain to grieving those we have lost

either due to COVID-19 or some other ailments. As Belli and Claudia (2020) point out, “grief is a narrative and social process”, and during COVID-19 we are devoid of that process and instead have to deal with it alone. Even visitations to hospitals are limited, with many having no chance of closure during a traumatic death. The psychological pain, fear and loneliness can be summed up as devastation, which is then transmitted via social media to the masses (Belli & Claudia, 2020). In this context, we are also mourning the loss of our everyday life, as well as how our common perception and experience of time has changed, not knowing when the pandemic will end. We as a society are now constantly experiencing emotions that do not normally surface, and the absence of mourning with our friends and family in this case amplifies the already detrimental rise of devastation (Belli & Claudia, 2020).

Last but not least, a study by Jeftic (2021) revealed that severe restrictions and isolation during the pandemic has caused residents in BiH to exhibit PTSD symptoms due to the amount of stress and loneliness they were experiencing. The PTSD symptoms were related to their post war trauma, and led to an increased level of concerns regarding COVID-19. In fact, strict measures such as curfews, isolation coupled with social and economic instability can serve as trauma reminders which trigger intense emotions, flashbacks and somatic sensations as they are similar to what the residents have gone through during the 1992-1995 war period (Jeftic, 2021). Furthermore, the contradictory media statements and suppression of freedom of expression can aid in the population’s feelings of fear and helplessness; this is amplified by the removal of organic social support networks such as family and friends due to the restrictions, which is a key form of resilience that helps individuals cope with trauma responses (Jeftic, 2021).

The removal of social networks can be seen as an important stressor which results in loneliness, an emotion shown to amplify PTSD and stress symptoms (Tzifakis, 2021). In fact, loneliness, alongside social isolation results in a higher risk of mortality, and is a “risk factor for negative psychological and physical outcomes” (Tzifakis, 2021). Though this study focused on the residents in BiH, the war during this period of time impacted multiple countries within the Balkans, where residents in Serbia as well as North Macedonia have faced similar traumatic incidences that could have left them with PTSD symptoms. To conclude, due to its turbulent history, people from the Balkan region are more at risk of experiencing negative psychological effects due to their country’s respective histories coupled with strict measures which infringe on human rights.

## 2.9 Relative Deprivation Theory

Relative deprivation (RD) is a sociological theory that suggests an individual or a group of people may feel that they are worse off compared to others, either through a lack of emotional fulfilment or access to amenities (Smith et al., 2011 & Walker & Smith, 2002). The idea of RD can be seen mentioned in Karl Marx's *Wage, Labour and Capital (Lohnarbeit und Kapital)* where he exclaims that the houses in a neighborhood can be big or small as long as they are of an equal size, they fulfil the "social requirements" of that neighborhood. However if there was a palace next to a house, the house is then reduced to a hut and loses its social position (Marx, 1847 as cited in Smith et al., 2011). RD is therefore a psychological mechanism which influences our emotions and cognitive behavior, and thus becomes one of the driving theories when it comes to understanding protests, since their basis lies in a community feeling unsatisfied due to a lack of rights, amenities or access compared to others (Smith et al., 2011).

The most important aspect of RD is that it is contingent on the comparisons that people do or do not make, and when the current situation is compared to past experiences, people are more likely to feel alienated, either on an emotional or political level and so much more likely to participate in collective action such as protests (Smith et al., 2011). In the case of COVID-19, RD can be understood as manifesting in terms of individuals comparing their misfortunes during lockdown with those around them, such as in terms of financial burdens, job losses, or sickness; or a community comparing their region's or country's regulations and number of cases with neighboring countries, unions, or even continents. And as it was evident, this comparison did indeed lead to protests, and feelings of frustration, anger and devastation. People in general have felt like they were relatively deprived of amenities, everyday activities, and their rights to abide to regulations they deemed necessary or unnecessary. The world as a whole experienced mass hysteria based on the perceived disadvantages we now face in a pandemic ridden world. According to Smith et al. (2011), people who experience RD feel that a situation is unfair, and that it is not likely to change without their intervention. In this case, COVID-19 has been perceived as a phenomenon without end, and there is no guarantee of when it will be over.

As Walker & Smith (2002) point out, people that feel deprived will seek action in order to maintain their previous privilege, or to demand the privilege that is present in another group. In the case of COVID-19, it has been proven that the pandemic brought out systematic injustices that have previously existed, and consequently provided a negative emotional climate which motivated people to protests (Grant & Smith, 2021). In the US, for example, protests were not limited to just the anger towards COVID-19, but also

racial violence and police brutality. This is partly because the pandemic is also more likely to damage groups which were already at a disadvantage, either from a racial or socio-economic point of view, thus it brought out dissatisfaction in other areas that were amplified by the virus (Grant & Smith, 2021). A study by Calnan and Douglas (2021) confirms this, finding that the more deprived an authority is, the higher mortality rates are associated with COVID-19. The reasoning behind this is the difference in regulations during lockdown which contributed to further inequalities, and have inflicted negative psychological problems on the public due to the intensified difference in social disposition. Unfair treatment was found among certain groups of people such as women, children and the elderly, which all exhibited increased signs of depression compared to others (Calnan & Douglas, 2021). This finding is directly linked to the fact that these are groups most likely to stay at home for a longer period of time due to their vulnerability, and that younger people or women taking care of children are more likely to lose their jobs, thus are deprived of previous socio-economic opportunities (Calnan & Douglas, 2021).

As Grant and Smith (2021) point out, the pandemic intensified the relationship individuals have in their specific groups and communities, and reflect the sudden economic problem that further provokes powerlessness among disadvantaged communities. Echoing the sentiments present in the previous section regarding isolation, collective grief also perpetuates RD as individuals who perceive that they have suffered more distress are likely to engage violently (Grant & Smith, 2021). Similarly, the emotional contagion which helps spread negative feelings across social media sites becomes a tool that amplifies RD, which is then closely linked to government reactions. Grant and Smith (2021) found that governments which tried to unite their citizens in a collective effort during COVID-19 were able to use nationalism to their advantage and promote safer practices, whereas governments that acted carelessly and downplayed the severity of the pandemic (such as in the study region) contribute to higher distress and RD as the people that are particularly affected will feel alienated from governmental support, and thus feel closer to their own cultural or ethnic group and their suffering. The ones most affected have low paying jobs such as grocery store workers or janitors, that are placed in a position where they can either risk contracting the virus at work, or lose their job\survive of minimal paid leave. On the flip side, even though protests also increase exposure to the virus, these individuals may feel as if they are engaging in something worthwhile that can alleviate them from their current situation (Grant & Smith, 2021).

The most important aspect of RD with regards to this thesis is its link to green spaces. A study in Italy by Ugolini et al. (2021) looked at the effects COVID-19 had on red zones and those visiting nearby parks and

forests. The study found that during lockdown, visitation to these green spaces significantly reduced, and the motivation changed from relaxation and physical exercise to mostly walking the dog or taking a swift stroll. The study concluded that those who lived in areas which were further away from green spaces as well as those who did not have a green view felt that they were deprived, and that they missed the activities they use to do in those green spaces. Interestingly, those who did not normally utilize parks and public green spaces were found to access them more during the lockdown. The aspects participants missed the most during this time were "spending time in nature" and "observing nature" (Ugolini et al., 2021). The deprivation felt by participants could not really be alleviated by similar activities, such as observing nature from a window unless they lived in an area that was generally green and not very urbanized. The authors conclude that it is important for sustainable development to consider high-rises or urban spaces to have more green views in order to help alleviate deprivation during extreme circumstances such as COVID-19 (Ugolini et al., 2021).

## 2.10 Conclusion

This section strives to give an overview of the mental consequences following COVID-19 and its lockdown measures. Though humans have previously applied quarantine and isolation during past pandemics, we have never as a society been this connected through social media and global communications. The availability of information, or lack thereof in authoritarian governments has produced mass hysteria around the world as many set out to critique government interventions. Without trust towards the authority, there is evidence that people have experienced negative emotions and mental illnesses during this time. In the study region specifically, the inhumane actions imposed on its citizens and the denial of access towards amenities puts its community at a higher risk of mental unpreparedness along with increased depression and anxiety that received no mitigation from the government whatsoever. The long term consequences of this extreme isolation may therefore be dire and in need of future intervention.

## 2.11 Summary of the Literature Review

The literature review was divided into two parts; Part A provided an overview on nature and psychology which stated our inherent connection to green spaces and how they improve our mental health, whereas Part B focused on the psychological effects brought upon by COVID-19 and the general hysteria which was a byproduct of isolation and other underlying socio-economic disadvantages. The aim is to allow the reader to understand how individuals, especially those in the Balkan region have found themselves in a precarious disposition, where an inherent need existed which all humans have to connect to nature—

especially during a time of high stress—yet were unable to do so because the high stress situation did not allow them to step outside of their own homes for an extended period of time. Thus, the psychological consequences brought upon by these regulations are hypothesized to have substantially lowered the quality of life and mental wellbeing of those affected, since the lack of access to green spaces can be considered in this framework to be unnatural.

According to Part A, there is substantial evidence which suggests that nature alleviates stress and negative emotions, and facilitates wellbeing on multiple dimensions no matter if it's a walk in the park or a brief green view from a window. This leads me, the author to assume that during a situation like COVID-19, green balconies and gardens have a potential to provide great comfort and better wellbeing compared to urban concrete and those who had no access to any of these spaces. It prompts me to wonder whether negative emotions such as deprivation, devastation, grief and even mass hysteria are less common in those who had gardens and green balconies, and how the access to these private green spaces allowed participants to mitigate their disadvantages and suffering during a pandemic. After reviewing the literature present in Part A and Part B, the thesis gains a premise of operation which can be summarized as two core beliefs: one is that people are inherently connected to nature which facilitates improvement in mental wellbeing, and two is that COVID-19 is an extremely stressful situation which facilitates decline in mental wellbeing. Thus, the literature review supports the hypothesis being explored, which is that those who had access to private green spaces during lockdown were better off than those who did not.

# 3. METHODOLOGY

## 3.1 Introduction

The purpose of this section is to present the research methodology and how the data will be gathered and analyzed. The aim of this thesis is to understand whether the presence of green spaces had an effect on psychological well-being during the 2020 COVID-19 lockdown, with a focus on differences between garden owners, balcony owners and those who had neither. The interest of the research section is therefore to observe whether there are significant differences in terms of mental well-being between these different groups, and to analyze whether there are correlations between having more access to green spaces and a reduction in negative emotions as a consequence of COVID-19.

## 3.2 Selection of Methodology

This study has chosen the mixed methods approach which combines both preliminary interviews as well as surveys in order to better understand and analyze research findings. As Johnson et al. (2007) states, mixed methods is an approach which considers a plethora of different perspectives and viewpoints by utilizing both qualitative and quantitative methods while fully accepting the wisdom of both these approaches. Specifically, using mixed methods can enhance validity of results by integrating findings from both a qualitative and quantitative aspect (Johnson et al., 2007). This is particularly useful during the data analysis stage, where qualitative data can be used to clarify quantitative results, and vice versa quantitative data can be used to deepen the understanding of generalized qualitative results (Johnson et al., 2007).

The study itself is explorative in nature, as it is trying to uncover the importance of green spaces with regards to mental well-being during the COVID-19 lockdown period. Preliminary interviews are carried out in order to better understand the mental state as well as participants' overall perceived importance towards green spaces, and create a bigger picture on what underlying factors could influence research outcomes. This in-depth information extracted from the interviews in then used to serve as a basis for the survey. This in turn provides a large population of respondents whose answers are used to generate statistical information that is then analyzed and interpreted through the SPSS software.

Both qualitative and quantitative research in the case of this thesis will be classified as non-probability sampling, which denotes a purposeful selection of samples and an absence of randomization (Vehovar et al., 2016). Specifically, quota sampling is chosen for interviews as it is cheap and requires less respondents;

and snowball sampling is chosen for the surveys as it is cost effective and easy to reach a large amount of people alongside uncovering rare characteristics which can be interesting for the results.

## 3.3 Research Instruments

### 3.3.1 Interviews

The purpose of conducting interviews is to explore "the views, experiences, beliefs and/or motivations of individuals on specific matters" in order to gain a deeper understanding of the phenomenon being studied (Gill et al., 2008). Interviews can be divided into structure, unstructured and semi structured; for the purpose of this study, structured interviews were conducted, which are characterized by predetermined questions that do not contain much room for variation, allowing for a very controlled and effective approach for the researcher to ask specific questions (Gill et al., 2008 & Alsaawi, 2014).

As Gill et al. (2008) points out, a structured interview is done best when the interviewer starts out with easier questions in order to make the interviewee feel comfortable, before continuing with harder and more intense inquiries. Thus, the interview questions for this thesis start out by asking the interviewees more generalized information such as overall lockdown rules in their area, community restrictions etc. before following up with more in-depth questions concerning their emotional well-being and usage of gardens and balconies. The interviews were conducted in person, and lasted about 20-60 minutes depending on the respondents. A total of three people were interviewed, one for each category.

### 3.3.2 Surveys

Surveys can be defined as research instruments that help the researcher collect data on a specific subject (Dalati & Gomez, 2018). For the purpose of this research, self-administered surveys were conducted, meaning that the researcher was absent when the respondents filled out the surveys. The advantage of this approach is that there is less bias while also maintaining low cost and time spent, while offering greater anonymity (Dalati & Gomez, 2018). The survey had a total of 54 questions, and was sectioned into four parts. Part I included a set of background questions that every single respondent had to fill out, whereas Part II, III and IV were sectioned for garden owners, balcony owners and neither respectively, and respondents were asked to fill out the section which corresponds to their individual situation. Snowball sampling was employed, which can be defined as a "convenience sampling mechanism" that uses links of the initial wave of respondents to then connect to other individuals within the population

(Handcock & Gile, 2011). The advantages of this approach is that there is less effort required by the researcher while also being cost effective.

The format of the questions consisted of mainly ordinal and interval scales, where respondents were asked to rate in terms of intensity and frequencies. The rest of the survey consisted of mainly yes and no questions, which fall under the nominal scale. Lastly, there were a couple of open-ended questions which were not mandatory, and allowed respondents to express whether they feel certain aspects have been neglected within the survey questions. While not every respondent filled these questions out, they will still be analyzed in the following chapter.

The survey was distributed through different social media platforms such as FaceBook, WhatsApp, Viber and E-mail. The initial respondents were then asked to share the survey on their pages and among different chats, which then contributed to a further reach of respondents of different cities and towns within the study region. The survey was available in two languages: Serbo-Croatian which had both a Latin and Cyrillic version, and Macedonian which was in Cyrillic. A total of 182 responses were received in the end, in which 21 responses were discarded due to missing and incorrect values, leaving 161 responses that were used in this study.

### 3.3.3 Data Analysis

The survey data was analyzed using Statistical Package for the Social Sciences (SPSS), which is a software used to interpret and understand results of research through the conduction of statistical analyses (Arkkelin, 2014). This allowed for a more accurate interpretation of the data itself, while simultaneously organizing and simplifying the data into easy to read tables and figures that show different correlations as well as the reliability of the samples (Begum & Ahmed, 2015). Additionally, SPSS is useful for interpreting large sample sizes, distribution, reliability and representation within the data (Begum & Ahmed, 2015).

The analyses conducted in this study include descriptives of background information, followed by a reliability study using Cronbach's Alpha to determine whether there is good internal consistency between different sets of questions within the survey, followed by a correlation matrix and Kruskal-Wallis non-parametric tests to determine how different questions relate to one another. The combination of these

tests was used to reach the conclusion on which hypothesis is rejected and accepted, as well as the significance of the study itself.

## 3.4 Limitations

The most apparent limitation of this study is that the research of psychology often remains subjective in nature, and the interpretation of results can therefore lead to certain biases. Though preliminary interviews were used to better determine which questions would encompass and provide the most information on the research subject, it is hard to gauge whether they can fully express the complex set of emotions felt by respondents during COVID-19.The use of quantitative data analysis, especially surveys, can be rigid in nature, and fail to capture the intricacies of human emotions. Furthermore, the validity of answers is highly dependent on the accuracy with which respondents filled out the survey (Queiros et al., 2017). Furthermore, online surveys and snowball sampling allow for a specific population to be selected, which is not controlled by the researcher and poses questions on the representation of a certain population (Andrade, 2020).

In terms of data analysis, while SPSS is useful in finding correlations that can contribute to the discussion of results, correlation does not equal causation, leaving room for other possible variables being the underlying influence which can often be neglected (Queiros et al., 2017). Lastly, the survey and research subject deals with the set timeframe of the first lockdown within the study region which occurred sometime prior to when the respondents were asked to fill out the surveys. This can lead to memory gaps and a difficulty remembering the exact emotions felt. Studies have shown that individuals generally have a hard time recalling certain past events, and suggestibility poses an issue when it comes to the reliability of recounting past events (Hope et al., 2011 & Cassel & Bjorklund, 1995).

# 4. RESULTS AND DISCUSSION

## 4.1 Introduction

As stated in the previous chapter, this study employed mixed methods consisting preliminary interviews followed by quantitative data analysis. While the interviews provided crucial information regarding how the survey should be structured, the study does heavily rely on the quantitative part to draw its conclusions. Therefore, while findings from both methods will be discussed, it is important to note that there is an emphasis on quantitative data analysis.

## 4.2 Qualitative Results

A total of three interviews were conducted, one for each category (garden owners, balcony owners and neither). The interviews were done in person and in the native language of the individuals interviewed. The distribution was made up of two females and one male, with the garden owner living in a rural area and the rest in an urban center. Two were of Serbian nationality and one of North Macedonian. The interviews were structured and used convenience sampling, and consisted of six questions in total. The questions covered a range of topics including background information such as the COVID-19 regulations in the individual's area, why they chose to live in a place that has a garden, balcony or neither, followed by how these spaces were used during lockdown and whether there was a change in perception towards the importance of having/not having these spaces. It is important to note that all three respondents had the same lockdown restrictions which were described in the literature review.

### 4.2.1 Category 'Garden Owner'

The respondent that had a garden stated that she "could never live without a garden" whether or not there was a pandemic, and added that "there is nothing better than drinking coffee in the garden during spring time" as a positive aspect felt especially during lockdown. The garden contributed to her feeling more relaxed, as well as dedicating time to tend to the garden when there was nothing to do. "My garden has never been prettier than during that period" shows just how much time was spent in the garden and how it became a core element in her life during lockdown. She continued to say that it would have been "unimaginable" to not have a garden during lockdown, and that the garden "meant a lot" to her personally. If she did not have a garden, then she would have "most probably been depressed".

When asked whether or not she felt an increase in overall importance of nature, she responded that nature has always been important to her, and while she does believe COVID-19 changed people's

perspectives towards green spaces, she is unsure whether this sentiment is long term. Perhaps the most interesting segment of the interview was when the respondent told the story of how her garden served as a meet up space for her and her neighbors, family and friends during lockdown, when martial law forbade such gatherings from happening. The respondent said that she secretly met with others in her garden where they would celebrate various birthdays, holidays and have barbecues. She also stated how "what we did would not have been possible without a garden".

It is therefore evident that the garden not only served as a tool for relaxation, but also became a safe space to carry out social interactions. It can therefore also be deduced that garden owners had less restrictions in a sense that their gardens offered them leeway to break certain rules that were in place, and could have contributed to feeling less depressed and isolated overall.

### 4.2.2 Category 'Balcony Owner'

The respondent who had a balcony lived alone in a city center, and stated that she initially felt a lot of fear during lockdown since there was an overall lack of information. She also felt a lot of anxiety towards not being able to leave her home, especially during prolonged hard lockdown periods where the government had asked residents to stay home for two to four days in a row, forbidding them to go outside completely, not even for necessities. She recalled seeing yellow tape around her local green spaces, and military patrol along the Danube where she would usually frequent. When asked about whether or not she is happy to have a balcony, she responded that she would have preferred a garden since her balcony does not have a natural view, but rather adjacent buildings and streets that she does not find visually pleasing.

When asked about the usage of her balcony during lockdown, she stated that prior to COVID-19 she rarely used her balcony since she didn't care for the view, however during lockdown it became her only contact with the outside world. She started to sit out on the balcony regularly, something she had not done for four years since living in that apartment, and started to notice the nature in her surrounding area such as the trees on the side of the street, different birds and stray animals that would walk by. She also noted that the city she lives in is normally quite chaotic, however during lockdown she was able to see and hear a lot more animals which brought her relaxation. Interestingly, she stated she felt a sense of sadness. "I was sad because I knew this was temporary, and that once lockdown ended these animals will scatter away again." She put a strong emphasis on how for the first time, the roles were reversed were humans were locked up, and nature was allowed to take over.

Another interesting remark she made was how she bought a plant, which was something out of the ordinary for her to do, and tried her best to keep it alive and make sure it was well watered. She stated that she "grew emotionally attached to this plant" and that she was "obsessed" about not letting it die, and how it started to mean something significant to her whereas before lockdown she would not have cared about the state of a house plant.

Overall, the respondent stated that she missed going out on walks, feeling the sun and going to a park, and that during the hard lockdown periods she was on the verge of breaking the law and going out since she couldn't bear another day of sitting inside. She stated that "when we don't have something like that taken away we don't realize how much we miss it" and that "we need to be closer to nature and nature to us". She also noted how after the lockdown ended she immediately started visiting green spaces again, and how she started thinking about the development of her city and its contribution to deforestation.

Overall, this respondent had a very high level of awareness, where she was able to observe her actions and reflect on why she felt the way she did. It is interesting that compared to the first respondent, she felt a lot more frustration and anxiety towards the whole situation, and it was evident that she was much more restricted in movement and activity.

### 4.2.3 Category 'Neither'

This respondent not only lived without a balcony or garden during the lockdown period, but was also ordered to enter a two week quarantine due to exposure. During this time he was not allowed to communicate in person to anyone or step outside, meaning he was confined to his apartment. The respondent stated that he immediately established a strict routine for himself in order to uphold good physical and mental health, however it had proved difficult to exercise within a closed apartment, and therefore the restriction on freedom of movement was an aspect he felt the most, and was quite detrimental to his overall health. He constantly thought about going to a forest, or open green spaces and stated he felt "a sense of claustrophobia" in his apartment. He also stated he "really wanted to hug a tree". During quarantine, the respondent would look out the window a lot, and stated that he came to a realization that "no matter how beautiful an apartment is, it's too depressing when you are unable to leave" and that this experience has prompted him to consider investing in a house in the future in order to avoid another situation like this. Similar to the respondent who has a balcony, he stated that "once you don't have the possibility to access green spaces, you realize how much you miss them", and that a garden

"offers you something to do". He also stated that "there is an essential difference between having a garden or not that is detrimental to human wellbeing".

Once quarantine ended, this respondent was allowed to go back and forth between his apartment and office, where he remarked he noticed a lot of neglected plants. For the rest of the lockdown period, he spent a lot of time and effort taking care of these plants and bringing them back to life. "We essentially turned the office into a greenhouse" and "I had the realization that those plants were also life forms that required attention and that depend on you to take care of them". The respondent also remarked how "it's a natural life sequence to live in nature rather than being isolated" and "normal life cannot be dependent on its own without nature".

Similar to the balcony owner, this respondent also showed high levels of awareness, to the point where this experience has shaped his outlook on what type of future property to invest in. Overall, it is clear that when access to green spaces is restricted, a garden is the best option for refuge to offer activities that alleviate both psychological and physical stress.

## 4.3 Quantitative results

Drawing from the insights provided in the interviews, the survey was structured to include multiple sets of questions that are summarized in *Table 3*. Part I included questions with regards to COVID-19 and socialization in order to understand whether respondents' personal view towards the pandemic as well as their level of socialization impacts the severity of emotions felt. Respondents were given a list of emotions they had to rate which were repeated throughout the survey. They were also asked about their usage of spaces (gardens and balconies) and favorite aspects. While the survey was structured to have consistent and similar questions for Part II-IV, category 'neither' had slightly different questions as they did not have usage over a certain space. Instead, they were asked which aspects they missed the most and whether or not they would have liked to have a garden or balcony and why that is.

*Table 3: Summary of Survey Questions*

| **Part I** | **Part II (Garden Owners)** | **Part III (Balcony Owners)** | **Part IV (Neither)** |
|---|---|---|---|
| Background information (gender, marital status etc) | How restricted did respondent feel/how did the usage of garden change | How restricted did respondent feel/how did the usage of balcony change | How restricted did respondent feel |

| Part I | Part II (Garden Owners) | Part III (Balcony Owners) | Part IV (Neither) |
|---|---|---|---|
| Frequency of socialization (friends, family, colleagues) | Favorite aspects of garden (color green, fresh air etc.) | Favorite aspects of balcony (color green, fresh air etc.) | Which aspects does respondent miss the most about the outdoors (color green, fresh air etc.) |
| Severity and impact of COVID (whether someone the respondent knew was infected or died) | Which emotions did having a garden help with | Which emotions did having a balcony help with | Which emotions does respondent think having a garden/balcony would have helped |
| Areas of life impacted (buying groceries, going out etc) | Did having a garden change respondent's view on nature | Did having a balcony change respondent's view on nature | Did not having a garden/balcony change respondent's view on nature |
| Severity of emotions felt | Does respondent think those without a garden were less happy | Did respondent wish they had a garden instead | Does respondent wish they had a garden/balcony |

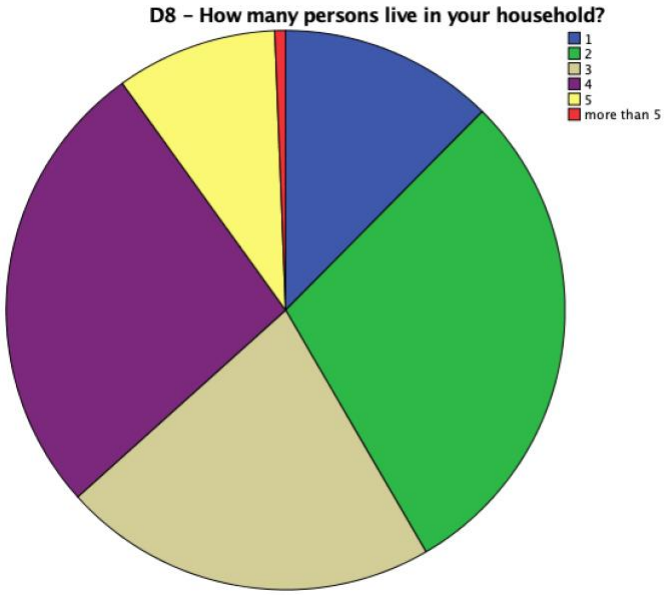
Out of the 54 questions within the survey, seven were open-ended and were excluded from the SPSS analysis given that they do not possess numerical numbers. The purpose of these questions was to fill in any gaps that the structuring of the survey might have missed, or important factors that could have possibly been neglected. These questions will be analyzed below following the SPSS data analysis.

### 4.3.1 Descriptives

The results show a quite uniformly distributed outcome among the three categories. Out of 161 responses, 53 were garden owners, 54 were balcony owners and 54 had neither a garden nor balcony. The majority of respondents were female (69.6%) and the rest were male (30.4%). Most of the respondents were married (64.6%) or in a relationship (14.3%), with the rest either being single, widowed or divorced. Most of the respondents were from the age group 35-44 (46.6%), and currently employed (83.9%). A large number of respondents stated they had to work from home (33.5%) whereas the rest either felt no impact (34.5%) or their business was suspended indefinitely (11.8%). Most respondents held at least a bachelor's degree (49.7%) and had a monthly income of over 500 Euros (59.6%) or between 300 and 500 Euros (23%).

The majority of respondents live in an urban area (91.3%) compared to rural (8.7%), with a relatively even distribution of two to four people per household as shown in *Figure 6.* This is important to note as social contact was listed as one of the major factors which contributed to emotional well-being as mentioned in the literature review. These findings suggest that even though all respondents couldn't go out for a period of time during lockdown, they were still able to have social contact to some degree within their household. The respondents were relatively well divided between regions, with most being from North Macedonia (38%), followed by BiH (36%) then Serbia (26%). A closer look shows that within these three countries, the majority of respondents come from big cities such as Sarajevo (36%) and Skopje (32.3%) as shown in *Figure 7*.

*Figure 6: Number of Persons per Household*




With regards to exposure to COVID-19, most respondents knew someone that had COVID-19 (64%), and out of the people that they knew but were not close to, a large percentage stated either singular or multiple persons have passed away (57.1%). Only four people (2.5%) chose the option "No, I don't know anybody who got COVID" as shown in *Figure 8*. This is also significant as it means that the vast majority of respondents was in one way or another affected by the pandemic, and has had either first had experience or close contact to someone who was exposed. When asked "How serious do you think COVID-19 is?" On a scale from one to ten, the majority chose eight or higher (as shown on *Figure 9*), indicating that most agreed COVID-19 was quite serious.

*Figure 7: Pie Chart on the Distribution of Respondents by Country and Region*

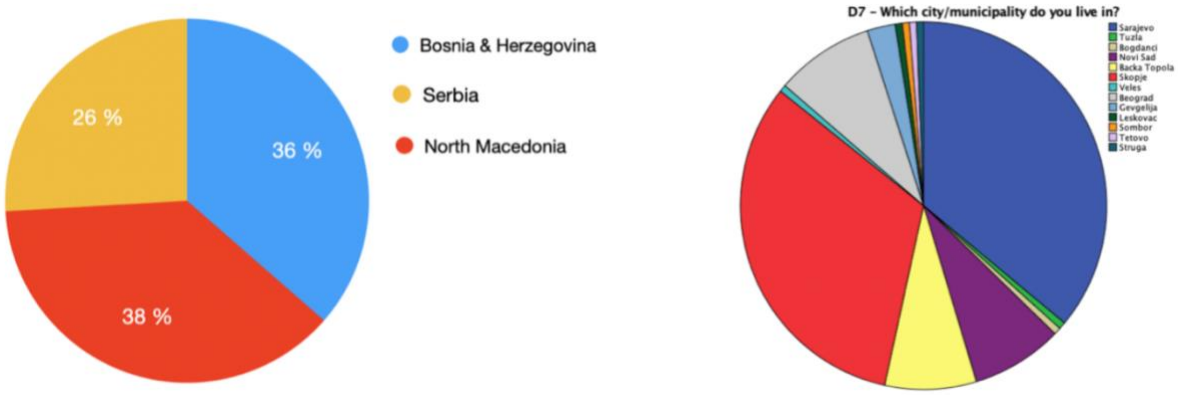



*Figure 8: Do You Know Anyone Who Got COVID?*

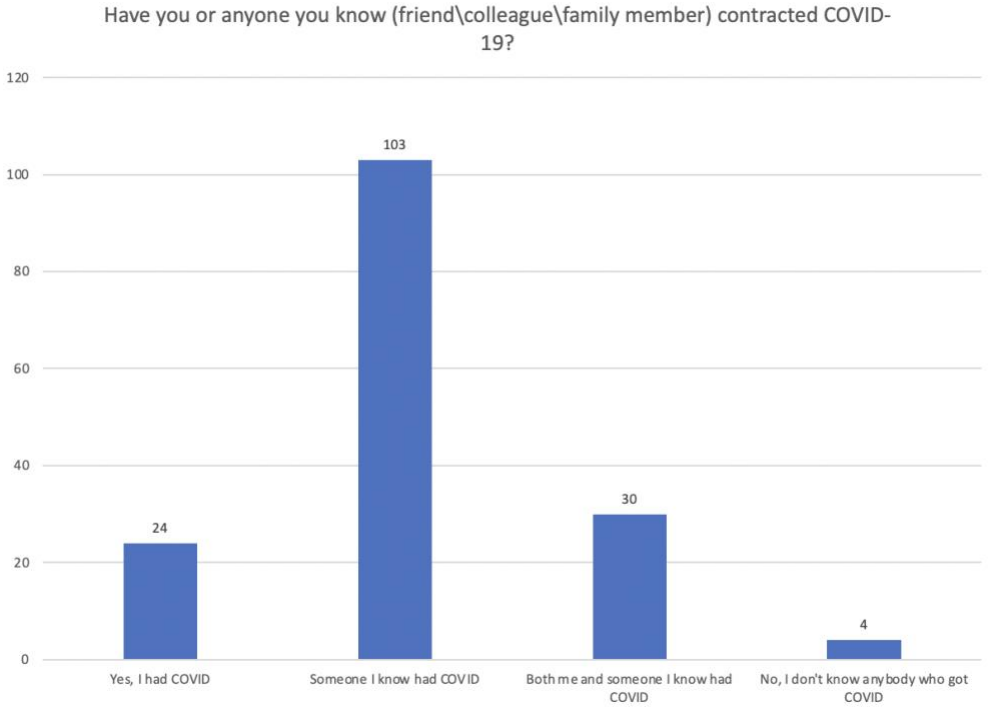
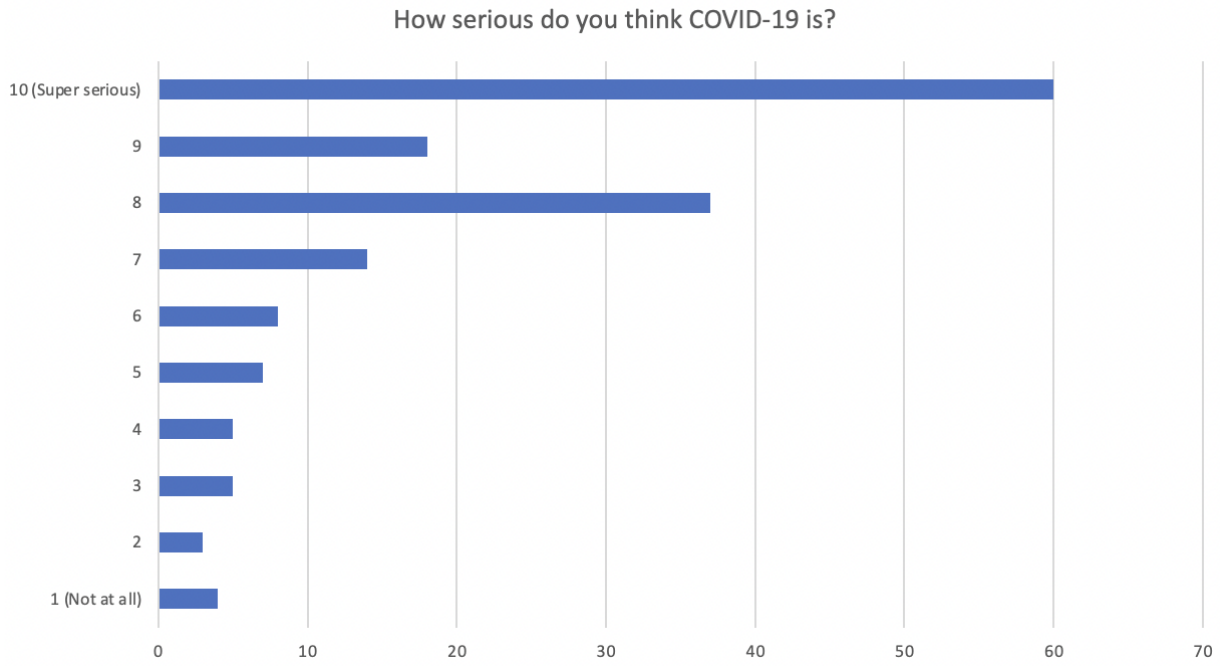
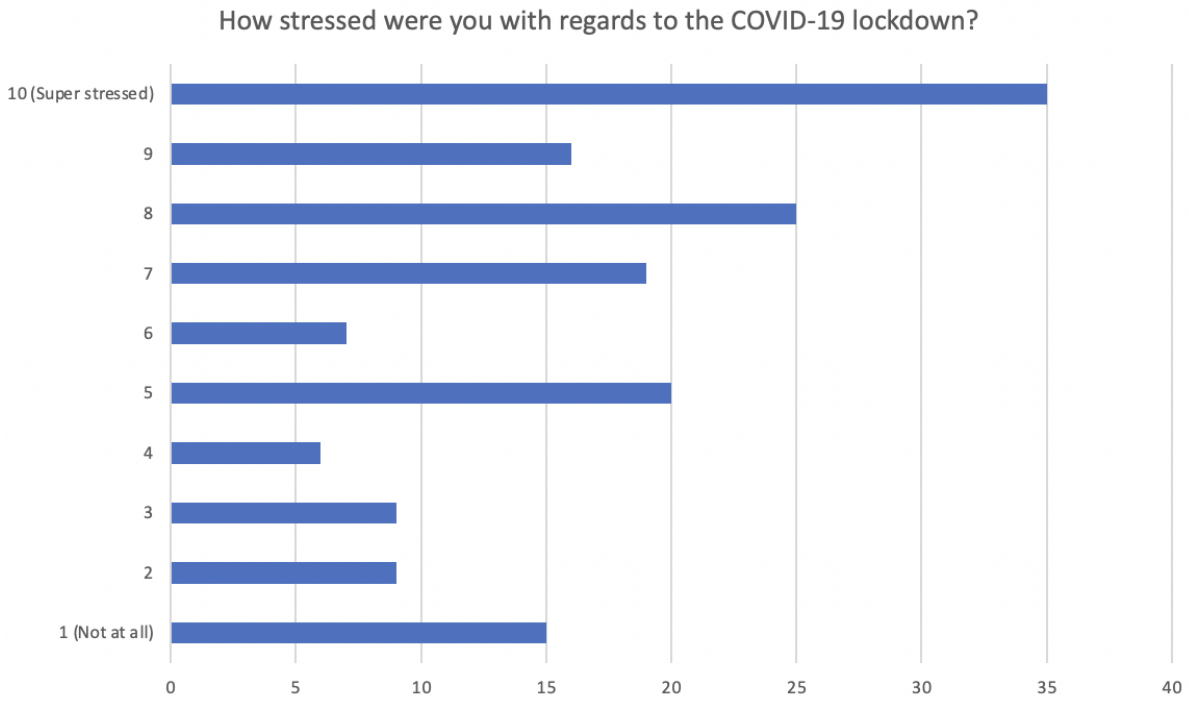


*Figure 9: How Serious Do You Think COVID is?*



Results on “How Stressed Were You With Regards to the COVID-19 Lockdown?” indicate slightly more diverse results as seen in *Figure 10*, where even though more respondents leaned towards being stressed, there was still a significant amount that only felt slightly stressed.

*Figure 10: How Stressed Were You With Regards to the COVID-19 Lockdown?*




### 4.3.2 Reliability

Cronbach’s α was computed for different sets of questions and showed satisfying outcomes in general. For the question set on “How would you rate the way you felt the following emotions during COVID-19”, α was 0.881, indicating high reliability. Similarly, the question sets on “How would you say your garden/balcony helped with the following emotions during COVID-19” and “Which feelings do you think having a garden or balcony would have helped you with during the COVID-19 lockdown” for the category ‘neither ’shows values of 0.973, 0.977 and 0.977, respectively. Questions sets on “What was your favorite aspect about your garden/balcony during the COVID-19 lockdown?” and “What did you miss the most about green spaces?” which was the equivalent question for the category ‘neither ’show alpha scores of 0.731, 0.614 and 0.761 respectively. Though these scores are slightly lower, Cronbach’s α is considered to be sufficient when it is above 0.6 (Doaei et al., 2013), meaning that these results are considered to have acceptable reliability. Lastly, the question sets on “Did you have social contact during the COVID-19

lockdown?" showed α scores of 0.630 for socializing via social media and phones, and 0.686 for socializing in person. Overall, it can be concluded that all the question sets have good reliability.

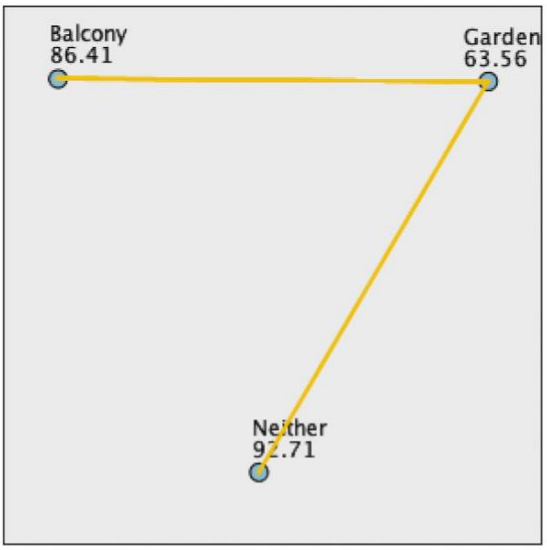
### 4.3.3 Well-being Differences and Correlations

The differences this study is most interested in are whether or not there is a difference in psychological well-being between garden owners, balcony owners and those who had neither. In order to arrive at these results, a Kruskal-Wallis test was run to determine whether or not there is a correlation with regards to the amount of stress felt and the three different categories. The Kruskal-Wallis test is a "non-parametric statistical procedure used to compare several populations" (Vargha & Delany, 1998), meaning that it identifies whether there is indeed a significant (on the 5%-level) difference between groups. The results showed a p-value of 0.003, meaning that there was indeed a difference in terms of stress felt between the three categories and the null hypotheses could be rejected.

Given that it was significant, a post-hoc test was then run to determine how the categories differed. The results showed that garden owners had the least stress with a mean rank of 63.56, followed by balcony owners who had a mean rank of 86.41 and those with neither who had a mean rank of 92.71 (*as shown in Figure 11*). This shows that while those who had balconies were marginally better than those who had neither, both were a lot more stressed compared to garden owners.

To further explore these results, a correlation matrix was then produced between the three categories and the list of specific emotions. This showed whether certain emotions were more prominent among the categories, as well as how they correlate to one another. These correlations were analyzed in terms of the Pearson Correlation Coefficient, where results are considered to have a low correlation when they are below 0.29, a medium correlation between 0.3 and 0.49 and a strong correlation above 0.5 (Bolboaca & Jäntschi, 2006 & Calkins, 2005).

*Figure 11: Post-hoc Test for Kruskal-Wallis*




Each node shows the sample average rank of Categories (Garden\Balcony\Neither).

| Sample1-Sample2 | Test Statistic | Std. Error | Std. Test Statistic | Sig. | Adj.Sig. |
|---|---|---|---|---|---|
| Garden-Balcony | -22.851 | 8.925 | -2.560 | .010 | .031 |
| Garden-Neither | -29.156 | 8.925 | -3.267 | .001 | .003 |
| Balcony-Neither | -6.306 | 8.883 | -.710 | .478 | 1.000 |

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.
Significance values have been adjusted by the Bonferroni correction for multiple tests.

For clarity and readability, *Table 4* shows a summary of results that contain high correlations. Upon first glance, it is evident that category 'neither' has the largest amount of correlations out of the three, which corresponds nicely to the results from the Kruskal-Wallis and post-hoc test. It is also evident that the numbers in this category are much higher, for example, the correlation between anxiety and depression for category 'neither' is 0.775, and correlation between anxiety and restlessness is 0.608, whereas it is slightly lower at 0.620 and 0.581 respectively for garden owners. This means that people who felt anxious in both of those categories also felt depressed and restless, with the correlation for category 'neither' being stronger than that of garden owners.

Given that there were much more frequent correlations for category 'neither', it indicates that respondents from this category were more prone to feeling strong negative emotions which were

interlinked and much more likely to occur together. It is therefore also evident that this category had the worst psychological well-being compared to the other two categories.

*Table 4: Correlation Matrix (Results < 0.5)*

| | Garden Owners | Balcony Owners | Neither |
|---|---|---|---|
| **Anxiety** | Depression (0.620)<br>Restlessness (0.581) | | Depression (0.775)<br>Restlessness (0.608)<br>Alarmed (0.613)<br>Devastation (0.624) |
| **Depression** | Anxiety (0.620)<br>Devastation (0.501) | Restlessness (0.502) | Anxiety (0.775)<br>Restlessness (0.699)<br>Alarmed (0.533)<br>Fear (0.567)<br>Devastation (0.614) |
| **Restlessness/Disturbed Sleep** | Anxiety (0.581) | Depression (0.502) | Anxiety (0.608)<br>Depression (0.699)<br>Alarmed (0.679)<br>Devastation (0.583)<br>Boredom (0.523) |
| **Suicidal Ideations** | | | |
| **Alarmed** | Grief (0.502) | Loneliness (0.504)<br>Frustration (0.588)<br>Fear (0.640)<br>Grief (0.545)<br>Boredom (0.504) | Anxiety (0.613)<br>Depression (0.533)<br>Restlessness (0.679)<br>Loneliness (0.561)<br>Frustration (0.639)<br>Anger (0.659)<br>Devastation (0.580) |
| **Loneliness** | Frustration (0.519)<br>Boredom (0.571) | Alarmed (0.504)<br>Boredom (0.545) | Alarmed (0.613)<br>Frustration (0.723)<br>Anger (0.661)<br>Boredom (0.554) |
| **Frustration** | Anger (0.807) | Alarmed (0.588) | Alarmed (0.639)<br>Loneliness (0.723)<br>Anger (0.661)<br>Grief (0.510) |
| **Anger** | Frustration (0.807) | | Alarmed (0.659)<br>Loneliness (0.661)<br>Frustration (0.826)<br>Grief (0.559)<br>Devastation (0.597) |
| **Fear** | Grief (0.582)<br>Devastation (0.581) | Grief (0.652)<br>Alarmed (0.545) | Depression (0.567) |

| | Garden Owners | Balcony Owners | Neither |
|---|---|---|---|
| | Disorientation (0.510) | | |
| **Grief** | Anxiety (0.502)<br>Fear (0.582) | Alarmed (0.545)<br>Fear (0.652) | Frustration (0.510)<br>Anger (0.559)<br>Devastation (0.625) |
| **Devastation** | Grief (0.499)<br>Fear (0.581)<br>Depression (0.501) | | Anxiety (0.624)<br>Depression (0.614)<br>Restlessness (0.583)<br>Alarmed (0.580)<br>Anger (0.597)<br>Grief (0.625) |
| **Boredom** | Loneliness (0.571) | Alarmed (0.504)<br>Loneliness (0.545) | Restlessness (0.523)<br>Loneliness (0.554) |
| **Disorientation** | Devastation (0.742)<br>Fear (0.510) | | |

Another interesting observation is that category 'neither' had high correlations for certain emotions that did not appear in the other two groups. For example, the feelings 'devastation', 'alarmed', 'anger', 'loneliness' and 'frustration' appear much more frequently in terms of high correlation when compared to the other two categories. Interestingly, none of the groups showed significant correlations for 'suicidal ideations' although 'depression' and 'anxiety' was present in every single category. On average, garden owners showed the least amount of correlations in terms of 'restlessness' and 'loneliness', whereas these two emotions appeared quite frequently for the category 'neither'. Both garden and balcony owners also showed significantly less correlations for 'depression' whereas it was repeated for the category 'neither'.

Interestingly, balcony owners had the least amount of correlations overall out of the three categories, meaning that the different emotions had less of a relationship between them, and did not have as high of a tendency to be felt together. However, balcony owners did have a strong correlation between feeling 'alarmed' and other emotions when compared to garden owners, where a high correlation only occurred between 'alarmed' and 'grief'. There was also no high correlations present for balcony owners when it came to 'anxiety', 'anger', 'devastation' and 'disorientation'. In fact, high correlation for 'disorientation' was only present for garden owners, where it correlated with 'devastation' and 'fear'.

In terms of low to medium correlations, garden owners and balcony owners had roughly the same amount of correlations present. On average, balcony owners had more frequent correlations in terms of 'boredom'. A simple computation of frequencies shows that garden owners engaged in a lot more activities that they were able to do in a garden compared to what was possible for balcony owners. *Table 5* shows the percentages of respondents that answered 'yes' to a series of questions on what aspects they enjoyed the most with regards to their gardens and balconies. 62.3% of garden owners responded 'yes' to their gardens giving them something to do compared to 25.9% of balcony owners. Similarly, 50.9% garden owners agreed that their gardens help take their mind off things, compared to only 20.4% of balcony owners. The difference which was most stark is for the aspect 'working with hands' where 49.1% garden owners answered 'yes' in comparison with only 3.7% of balcony owners. However, an interesting observation can be made where a larger amount of balcony owners responded 'yes' to the aspect 'observing nature (birds, plants etc.)' (57.4%), making it the only aspect that was higher in terms of positive responses compared to garden owners (50.9%). A possible explanation for this is that while a balcony does not allow for too much gardening compared to a garden, it does give an opportunity for people to sit and observe, making it an interesting activity during times of isolation.

Another interesting comparison is seeing the frequencies between how much having a garden or balcony helped individuals with each emotion. Respondents had the possibility to choose "did not help at all", "helped slightly", "helped quite a bit", "helped a lot" and "I was not affected by this emotion". Overall, the majority of garden owners chose "helped slightly" and "helped quite a lot" for every single emotion other than suicidal ideations and disorientation, where they mostly chose "did not help at all", with the exception that suicidal ideations was not found to be a prominent emotion is any single group. Balcony owners on the other hand chose "did not help at all" and "helped slightly" for everything except depression, where even though the majority chose "did not help at all" (48.7%), some still stated it "helped quite a bit" (28.2%). Overall, balcony owners had very high percentages for "did not help at all", whereas garden owners had very high percentages of "helped a lot". This shows that gardens were far more effective in mitigating negative emotions than balconies, which again fits in with the other results.

The favorite aspects for both garden and balcony owners was 'breathing fresh air', at 84.9% and 64.8% respectively. Consequently, this was also the one of the most missed aspect of category 'neither 'where 83.3% respondents answered 'yes 'to feeling a lack of opportunities to breathe fresh air. Other aspects that were most missed include taking a walk in nature (85.2%), seeing the color green (63%) and feeling

relaxed (68.5%). Once, again, this corresponds to the findings from the literature review, where spending time in nature and seeing the color green has been proven to reduce stress hormones, allowing individuals feel more relaxed. Although the results show balcony owners to have the least correlations in terms of negative emotions, their levels of stress were still comparative with category 'neither', proving that garden owners definitely had underlying advantages which helped boost their psychological well-being during lockdown. These advantages include the fact that a garden allows for much closer contact to nature and fresh air alongside many activities that are were not possible for the other two categories.

*Table 5: Comparison Between Favorite Aspects of Garden vs. Balcony Owners*

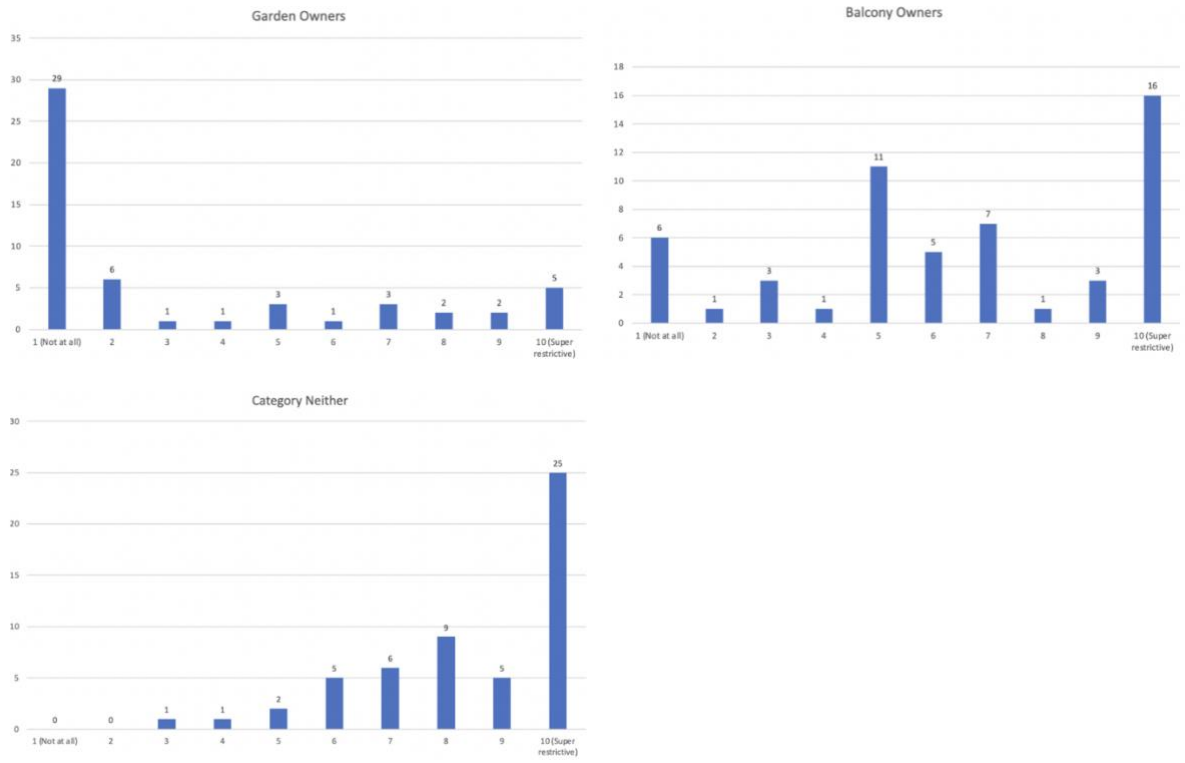
| Yes' Responses to Following Questions | Garden Owners (%) | Balcony Owners (%) |
|---|---|---|
| **It gave me something to do** | 62.3 | 25.9 |
| **It took my mind off things** | 50.9 | 20.4 |
| **It was relaxing** | 73.6 | 57.4 |
| **The sounds of birds chirping and leaves rustling** | 54.7 | 51.9 |
| **The color green** | 60.4 | 44.4 |
| **The smell of grass and flowers** | 43.4 | 24.1 |
| **Breathing fresh air** | 84.9 | 64.8 |
| **Working with hands** | 49.1 | 3.7 |
| **Observing nature (plants, birds etc.)** | 50.9 | 57.4 |

Some other interesting results include that of how restricted each category felt their access to green space was during lockdown from a scale of 1-10 (1 being not at all and 10 being super restrictive). Results show that garden owners felt the least restricted, with most respondents choosing either 1 (54.7%) or 2 (11.3%). Balcony owners and the category 'neither' both show opposite results, with balcony owners either choosing 10 (29.6%), 7 (13%) or 5 (20.4%). Category 'neither' felt the most restricted, with most respondents choosing 10 (46.3%), 8 (16.7%) and 7 (11.1%). A Kruskal-Wallis test was run for this question as well and showed a p value of 0.000, and a mean rank of 46.54 for garden owners, 84.81 for balcony owners and 111.01 for category neither.

The results are illustrated in *Figure 12,* and correlate in terms of how stressed the three categories felt. This goes to show that garden owners felt the least constricted amidst COVID-19 restrictions, and though

owning a balcony helped to slightly mediate negative emotions, the level of restriction felt was still similar to those that had neither gardens nor balconies. This is also reflected in the descriptives run for these questions, where skewness is shown to be 1.107, -0.354 and -1.032 for garden owners, balcony owners and category neither respectively, meaning that all three answers are highly skewed, with the one for garden owners being skewed to the left and the rest mainly to the right.

*Figure 12: Comparison of How Restricted Respondents Felt During Lockdown*

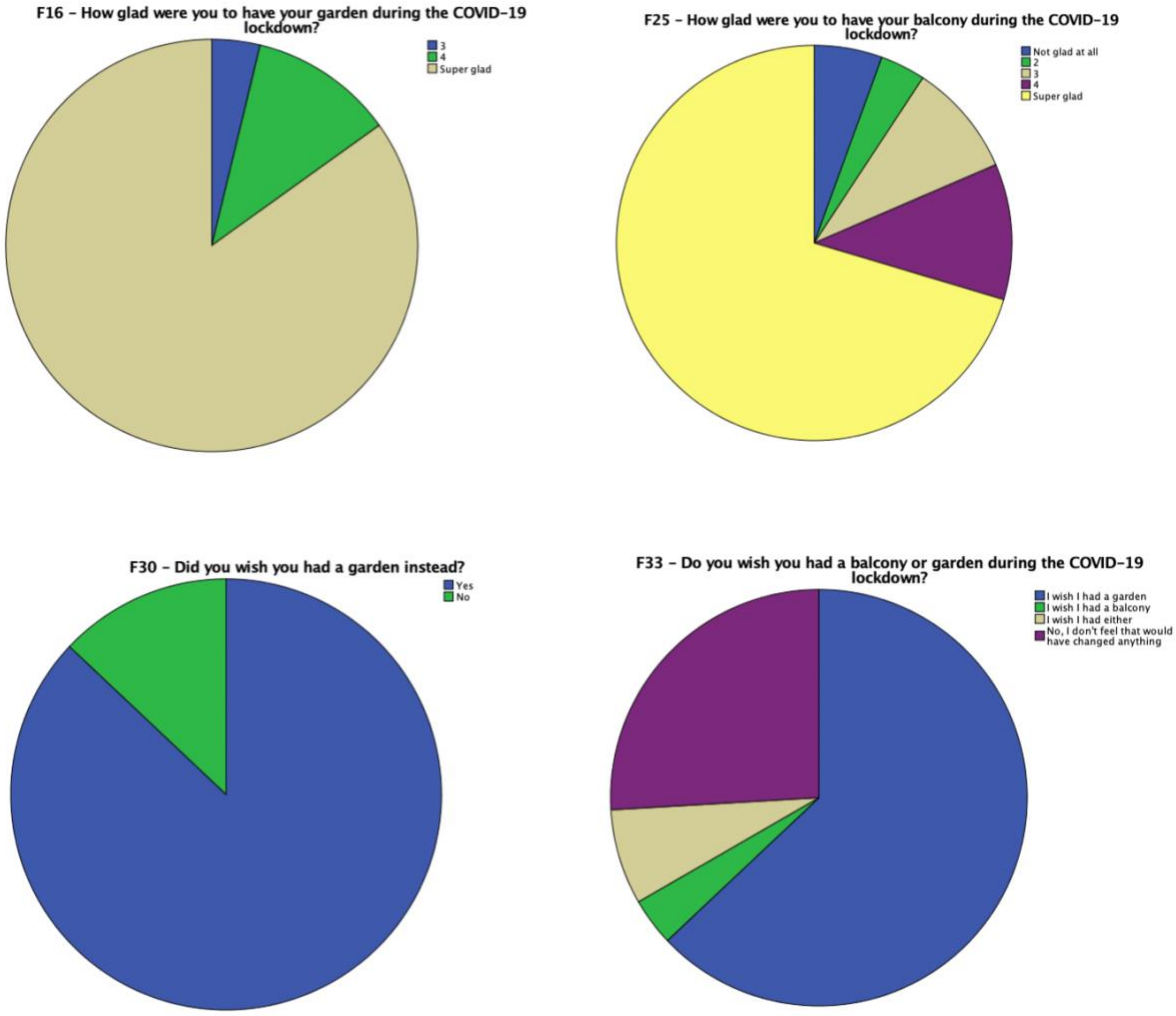



In terms of usage, both garden and balcony owners had a slightly higher amount of respondents who stated they began using their respective spaces more often. 56.6% respondents started to use their garden more whereas 55.6% started using their balconies more. Both groups had only 1.9% of respondents that stated they were not at all interested in their garden or balcony. When asked to rate how glad they were to have their garden or balcony from a scale of 1 to 10 (1 being not at all an 10 being super glad), the majority of garden and balcony owners chose the number 10 at 84.9% and 70.4% respectively. Similarly, 71.7% garden owners answered that they felt their garden was 'more special' to them, with 63% saying they felt the same way towards their balcony.

Corresponding to what was mentioned during the interview, 86.8% of respondents answered favorably to their garden serving as a meet up spot for seeing family and friends, whereas the majority of balcony owners (59.3%) responded 'no'. This goes to show that these spaces were not only a means to destress, but also served as secret meeting spots where people could socialize during a restrictive time. This can also explain why garden owners had the least correlations for the feeling 'loneliness'. Though balconies were also implemented for socialization to some extent, it is clear that the majority of garden owners had an upper hand compared to the other two categories where they were able to adapt and convert their green space to serve multiple purposes. This corresponds to the results where the three categories were asked individual questions regarding their preferences. Garden owners were asked whether they thought those without gardens during the lockdown were less happy, where 83% answered 'yes'. Similarly, balcony owners were asked whether they would have preferred having a garden, with 87% answering 'yes'. Category 'neither' was asked whether they would have preferred a garden or balcony, with the majority responding they wish they had a garden (63%) followed by either (7.4%), with only 3.7% stating they would have preferred having a balcony. When asked whether or not they thought those with gardens were happier, both balcony owners and the category 'neither' had an extremely low percentage of respondents who answered 'no', 3.7% and 9.3% respectively. Pie charts showing some of these results can be seen in *Figure 13*.

Last but not least, a consistent result among the three groups was when they were asked whether or not nature became more important to them after their experience with lockdown. From all three categories, the majority of respondents selected the option of 'no, nature was always important to me', at 73.6% for garden owners, 75.9% for balcony owners and 70.4% for the category 'neither'. The rest chose the option 'yes, I am more aware of how important nature is', at 26.4% for garden owners, 14.5% for balcony owners and 29.6% for the category neither. The category for balcony owners was the only one where there was a small percentage of people who responded to 'no, I don't think nature is more important', however overall, it is still evident that those with neither had a slightly bigger change of awareness compared to the other two groups.

*Figure 13: Pie Charts on Preferences and Gladness*




Though the results discussed above portray interesting findings, it is important to understand whether there are other underlying variables that could have contributed to the outcomes. In order to investigate these possibilities, more Kruskal-Wallis tests were run to find out whether or not there are other significant differences present. Factors that were investigated include age, gender, income etc., and total of four significant differences were found: the levels of stress and gender, the level of stress and whether respondents live in an urban or rural dwelling, the level of stress and level of gladness towards having a garden or balcony, and levels of stress and how serious respondents thought COVID-19 was. These four factors showed significant p values of 0.000, 0.005, 0.001 and 0.038 respectively. The found indicates that there is a relationship between gender and the level of stress during lockdown, however it is difficult to determine what kind of relationship it is. It is possible that there are stressors present that are not solely

due to the pandemic or related to green spaces, as another test run between gender the how restricted respondents felt during lockdown had an insignificant value. The second significance was found between urban and rural dwellings. Similarly, there was no relationship found between area of dwelling and how restrictive respondents felt.

Third significance was found between stress levels and how glad garden owners were to have a garden. Results show that those who were most stressed were also the most glad, however these results did not repeat when the same question was asked in the balcony category. An explanation for this would be that those who were the most stressed were also the most appreciative towards what they had, however given that a large number of balcony owners also responded that they wish they had a garden instead, it could be argued that they were not as moved by having a balcony than they could have been if they had a garden instead. The forth significance was found between levels of stress and how serious respondents thought COVID-19 is. For this result, while there are higher aggregates present for those that thought COVID-19 was more serious being more stressed, the highest result for stress is present at those who chose '4' for seriousness at a mean rank of 95.4. Again, it is possible that respondents had other underlying stressors that contributed to this result.

Other correlations or significances were not found among different sets of variables, meaning that there is no correlation present between levels of stress and age, education, income, frequency of socialization, region and municipalities, number of persons in a household, whether someone the respondent knew had COVID-19 or has died from COVID-19, how effective the respondents thought government measures were, whether or not gardens and balconies were used as meeting spaces among others. Additionally, no correlations were found between income levels and type of households (whether those with higher income were more likely to own gardens), meaning that there was an even distribution and people of all levels of income were present within each category. Overall, the results are still significant in terms of how those who had gardens were the least stressed and those who had neither were the most stressed.

### 4.3.4 Open-Ended Questions

Seven open-ended questions were analyzed to understand whether or not there are missing gaps in the research as well as notable comments from respondents that should be taken into consideration. While only a handful of responses were given, these answers are still important to take into account in order to better understand the dataset. Furthermore, open ended questions are useful in capturing complex

emotions that are often neglected within quantitative research results. The findings of the seven questions are summarized in *Table 6.* In terms of job impacts, most stated they felt more restricted than usual, with projects and opportunities suspended due to the lockdown. For the second question, several respondents listed 'psychological stress' as a factor, with one respondent stating: "I survived the war in BiH and it was hard for me to think that my family and I would be hungry", which goes to show the severe impact COVID-19 had on mental well-being, and the level of shock and hardships it brought to some. This is in line with what was previously discussed by Jeftic et al.. (2021) in the literature review, where the lockdown has brought back trauma responses and PTSD symptoms in war survivors from BiH. Another common theme was that of reduced socialization and a restriction of travelling, with one respondent going as far as saying that their social life was "reduced to zero", and another saying "We have become antisocial apart from those closest to the family". A few also stated that they were left to take care and entertain their children all day, which impacted their work and time allotted to other activities.

*Table 6: Summary of the Open Ended Questions*

| Questions | No. Responses | Findings |
|---|---|---|
| **Has your job\income been impacted in ways not listed above? If so please write your answer here.** | 16 | Projects suspended; personal costs increased; reduced volume of work due to restrictions; loss of opportunities |
| **Were areas in your life impacted in ways not listed above? If so please write your answer here.** | 21 | Isolation; reduced social life; unable to see family and friends for long periods; restricted travelling; psychological stress; worsened education due to online classes; having to look after kids all day |
| **（was your garden more special to you during lockdown）If you answered yes, in what way?** | 30 | Fresh air; good for children; relaxing; sitting; gardening; projects; open space; socialization; spending time outside |
| **(Was your balcony more special to you during lockdown) If you answered yes, in what way?** | 31 | Reading; sitting; planting flowers; breathing fresh air; children playing; contact with outside world; only place to go out to |
| **(Do you wish you had a garden instead) If you answered yes, please explain why.** | 37 | Contact with nature; more plants and animals; greenery and openness; freedom of movement; balcony does not replace need for nature compared to a garden; for children to play |

| Questions | No. Responses | Findings |
|---|---|---|
| **If you chose you wish you had a garden\balcony or either, please explain why.** | 28 | Relaxing; to dedicate responsibilities; sitting on balcony and planting flowers; view of green spaces; going out; fascination; fresh air; sunshine; closeness to nature; help with enduring long hours; physical and psychological benefits |
| **(What did you miss most about green spaces) Is there anything else you missed that way not mentioned above?** | 10 | Socializing and exercising in nature; contact with wild animals; enjoying nature all year round; freedom |

For the question "Was your garden more special to you during lockdown?" multiple respondents once again mentioned fresh air even though it was an option to choose from, which goes to show just how important fresh air is as a factor. Another common answer was engaging in various gardening activities and projects such as "making benches". In general, respondents also talked about spending time outside and being able to sit in their garden, as well as how the garden was good for their children. One respondent stated: "It was the only safe zone for my child when he left the apartment" and another that their garden was "the only refuge at the time of lockdown". Respondents also said it helped them decrease their stress, relax and served as a space for socialization, once again alluding to the fact that garden owners had a less restricted lockdown given they could utilize their gardens to serve multiple purposes. A respondent stated "I could go out in the open whenever I wanted", which goes to show how the garden was able to give a sense of freedom during lockdown.

The same question was also presented to balcony owners, who responded that they used their balcony to plant flowers, read, play music or enjoy the silence. The balcony also served as a meeting space to some extent, with one respondent stating they conversed with neighbors from adjacent balconies. Many respondents stated that it was their "only contact with the outside world", with one responded saying "The balcony was my only contact with nature and life. Even when the weather was cold and ugly I felt that only on the balcony could I breathe fully and feel comfortable and calm", and another "the balcony is a place that has compensated for the natural environment. where you breathe clean air, you feel the sun …". Some respondents echoed the same sentiment as garden owners where the balcony was the only place they could leave the house and go to, as well as "I could go out in the open whenever I wanted to". One respondent stated "everybody that lived in my area suddenly remembered they had a balcony" which suggested that the balcony did in fact serve as a refuge to some extent. Another interesting response was

“I gained depth in my thinking and worldview, I saw everything more clearly” alluding to the balcony contributing to relaxation and peace of mind.

Last but not least, the balcony was a place where children could play. One respondent said “at one point, the balcony was the only place the children could go out to”, and another remarked “My child was playing on the small balcony because he couldn’t go to the parks. Unlike our family, the neighbors living downstairs used the garden and their children had an incomparable advantage over my child. They were playing football, chasing around, and my child was watching them sadly through the bars of the balcony”. This response is significant, as the majority of balcony owners responded that they wish they had a garden instead (87%). While the balcony does slightly alleviate negative emotions and stress caused by the COVID-19 lockdown, results show a garden to be far better equipped in offering psychological and physical benefits.

Continuing on the subject, when asked ‘Do You Wish You Had a Garden Instead?’ Most respondents stated “contact with nature” as the biggest reason, alongside seeing more plants, animals and having freedom of movement. Openness and greenery was also a reoccurring factor, as well as a space for children to play. One respondent stated “the balcony has only somewhat replaced my need for nature. Given the length of the lockdown over time, the balcony was no longer enough to have a beneficial effect on my mental state. I needed more frequent contact with nature” and another “the balcony is part of the building, so despite some advantages I felt locked in and restricted in movement compared to the garden”. One respondent even said ”A balcony is useless, whereas a garden offers more possibilities”.

Moving to questions that for asked in the category ‘neither’, for the question ‘If You Chose You Wish You Had a Garden\Balcony or Either, Please Explain Why’, fresh air was once again mentioned quite a few times, coupled with greenery, freedom of movement, feeling the sun, having more space and more opportunities to engage in various activities. It is important to note that the majority of respondents did choose having a garden as their preference (63%) so it can be assumed that a lot of these answers pertain to what could be done in a garden. Many mentioned that it would give them “somewhere to go out to” as well as a space to relax. Closeness to nature was a big factor, as well as having something to do such as planting plants. As one respondent put it, it would be “easier to endure the large number of hours we had to spend each day due to lockdown”. Another respondent said “I would most definitely had felt different during lockdown and my days would have been organized differently” suggesting that respondents from

this category did feel an overall lack of green spaces and would have benefited if they had access to them. One respondent stated “because a person who is surrounded by nature feels both physically and mentally better” which corresponds to previous results where people from this category did have the highest level of stress and correlations between negative emotions.

Quite a few respondents stated that having a garden would be more comfortable and relaxing, as well as give them somewhere to dedicate responsibilities to. However, there was also a number of respondents who said they would enjoy sitting on a balcony and drinking tea or planting flowers, but what was interesting is they all mentioned wanting to have a view of parks and green spaces. One respondent said “because I like to go out of the house even if it’s just a balcony” which definitely brings the level of restriction which was present in this category to light. Another respondent stated “would give me something to be fascinated with”, which ties into Kaplan’s (1995) factors of reducing mental fatigue as mentioned in the literature review. Though this response was not specified, what can be deduced from previous results is that a garden (more so than a balcony) can adequately reduce levels of boredom by providing different factors of fascination present in nature.

The last question ‘What Did You Miss Most About Green Spaces?’ only had a total of ten responses, in which five stated “socializing” as a factor, but specifically feeling the need to socialize in a natural setting. Two responded “freedom”, one with exercising in nature, one with “having contact with wild animals” and one with enjoying nature all year round. The frequent mention of socialization is in line with what was explored in the literature review, where both nature and social contact play a big role in psychological well-being.

## 4.3 Conclusion

In summary, the results support the hypothesis that those who had access to private green spaces reflected better psychological well-being than those who did not during the COVID-19 lockdown in the Balkan region, with those who had gardens being significantly less stressed compared to those who had balconies or neither. The majority of respondents were affected by COVID-19 in one way or another, having either gotten it themselves or known somebody who had, and also considered the pandemic itself to be quite serious. From the interviews, the garden owner expressed how meaningful the garden was for both psychological and physical relaxation, and served as a space to meet up. This was an important point that was also reflected in the quantitative data, where it became evident that the garden was a multi-

purpose space where individuals not only relaxed, but engaged in other activities such as meeting family and friends and doing outdoor projects—activities that were impossible for the other two categories due to an absence of space.

Balcony owners in comparison were quite limited in how they could utilise their space, and were most preoccupied with observing plants and nature or breathing fresh air. Individuals who previously did not use their balcony started to use it much more, yet it was still restrictive in nature—with the majority of respondents stating that they would have preferred a garden, and that while a balcony was the best they had at the time, it was not sufficient. When looking at correlations, balcony owners interestingly had the least amount of inter-relationships between negative emotions, however showed a high frequency when it came to 'boredom'. Despite this, the majority of both garden and balcony owners expressed that these green spaces became more special to them during the lockdown.

The category with the most correlations was category neither, where respondents showed high inter-related frequencies of emotions that were not felt in the other two categories. The interviewee reflected a yearning for deep nature, a sense of claustrophobia and depressing, followed by immediate attention given to greenery where it was available—in his case the office where he worked. The survey responses showed that category neither felt the most restricted, compared to garden owners who barely felt restricted and balcony owners who were in the middle—with most feeling restricted but quite a few outliers present. Those from category neither were also the most lonely, and reflected a need of socialising, but specifically a yearning for socialising in green spaces.

The majority of garden owners and those who had neither expressed that they would have preferred a garden, how it would offer more freedom and a less reduced social life. The most missed aspects as well as the most appreciated aspects of nature seem to be the colour green and breathing fresh air, along with socialising within a natural setting. Overall, it can be concluded that having a garden during lockdown was the most beneficial both in terms of reducing stress, negative emotions and restrictions, along with providing space for various activities. While balcony owners had the least correlations for negative emotions, their level of stress was still similar to category neither, and they still felt relatively restricted, though not as badly. Not having a garden or balcony has proven to be correlated with negative psychological well-being during lockdown, once again reflecting the inherent importance of green spaces to individuals.

# 5. CONCLUSION

Building on the foundations of other scholars, this thesis highlights the intrinsic value of nature which, though debated often throughout history, should not be questioned. The data clearly shows that even the most simple of green spaces—the garden—held great value during a time of crisis, and aided in the improvement of psychological well-being. Nature should be viewed as a basic right and a human need, as our deep yearning towards it is tied to our ancestral history. As discussed in the literature review, our connection to nature is instinctual. Not only do we have an inherent preference towards green spaces, our cognition and emotions have also been shaped by us evolving within a natural environment. The findings of this thesis reflect what was discussed in the literature review, accentuating the benefit of green spaces in reducing stress while simultaneously aiding in both mental and physical recuperation.

As Cartwright et al.. (2018) pointed out, being close to nature prompts a broader sense of connectedness, and individuals who have a smaller social circle exhibit higher levels of well-being if they have access to green spaces. The need for socialisation within a natural context was an important factor that was explored in the thesis, since socialisation—as mentioned in the literature review—is essential in ensuring our survival as a species, whereas loneliness has been proven to increase negative emotions. Prolonged periods of isolation can result in both physical and psychological ailments, which can be mitigated by having access to green spaces (Choukér & Stahn, 2020).

In the study region, repressive measures that limited freedom and rights of individuals resulted in a distrust towards the government and subsequent entities, which further amplified the fear and distress citizens felt towards the pandemic. The illiberal actions taken by authorities resulted in further unrest as well as protests and boycotts, and the discriminatory rules put in space only caused further division between citizens and the state. People more so than ever needed a safe haven where they could escape to that could have helped them heal from this collective trauma. Therefore, the access to green spaces also becomes an issue of management, and a question regarding fundamental human rights that were continuously challenged during the pandemic. The experiences of the people who participated in the survey and interviews for this thesis amplify the importance of nature in our everyday lives as well as the injustices which pose a threat to both psychological well-being and future green space management.
One of the questions that participants were asked in the completion of this thesis was whether or not they felt nature was more important after their ordeal, and whether or not COVID-19 had changed their outlook on the intrinsic value of nature. While the majority of participants agreed that nature has inherent

value, they also expressed that they do not think the world has learned its lesson, and that the constant deforestation and pollution will not cease despite the overwhelming evidence on how important nature is. Greenway (1995) expressed his wish in humans using nature to rehabilitate and heal; and a hope that we come to realise the rapid degradation and overuse of nature and its resources will only harm us in the long run. The interviewee with neither garden nor balcony also echoed the same sentiment when he exclaimed that even the most beautiful apartment becomes depressing if you cannot go outside; so what good is all the wealth in this world if we are disconnected from the very aspect which is detrimental for our survival?

This thesis highlights a very small aspect of nature's inherent value, yet it alludes to a bigger picture that human well-being has an undeniable link to green spaces, which are an important factor of everyday life. Future research should focus on ensuring rights of access, as well as focusing on sustainability efforts in order to prevent further deterioration. For example, the study by Reese et al. (2020) highlights that climate change may further exacerbate the spread of infectious diseases, and that the current crisis should serve as a motivation for people to mitigate challenges like climate change and biodiversity loss. The study also highlights how nature connectedness is an important factor not only for individual well-being during the pandemic, but also to strengthen willingness for action. In the opening line of my introduction I included a quote by Aldo Leopold (1949) who said: *"the last word in ignorance is the man who says of an animal or plant, 'What good is it?"* I would like to end this thesis with the witty remark by Piccolo (2017), who followed up the quote by asking: "*Perhaps the last word in arrogance is to ask What good is it to us?'"*

## 5.1 Limitations

Given that this thesis was done using a non-experimental design, one of the weaknesses is the possibility of having confounding variables, which influences both dependent and independent variables. While the data analysis did not find a correlation between income and the different categories, it is still hard to tell whether those who owned gardens were better off in general than those who did not. A third variable is hard to account for and there might be other relationships that were not sufficiently explored.

Other threats to validity include the selection of participants via the snow-balling method, which resulted in a pretty similar group of people where the majority was well-educated and had higher levels of income which is not representative of the entire region. The participants could easily have had better financial

stability which does not reflect the same amount of stress as those of a lower socio-economic background. Also, quite some time had elapsed between when the lockdown happened versus when the surveys were filled out, which could lead to biased results based on false memories as there is no way to check whether or not what the participants have answered is true.

Lastly, the thesis focuses on a specific region within the Balkans, which limits the understanding of whether the findings can be applied elsewhere. It would be interesting to see how this study compares to other regions, such as EU countries as well as countries from different continents, and whether or not there is a difference on how people felt. It should also be kept in mind that the study region had very strict and unfair measures that were enforced during ongoing political and economic unrest, which means the residents were also predisposed to a lot more stress than some other countries might have experienced. Therefore, there are many factors to be taken into consideration, of which this thesis did not have the capacity to explore.

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# 7. APPENDICES

## Appendix 1: Interview Questions

**Introduction:** I introduce who I am, the purpose of this interview and give a quick overview of my research question so the interviewee understands the basis of the questions being asked (ethics-interviewee's personal information will be kept anonymous). **the interview will be done in either English, Serbo-Croatian or Macedonian depending on the interviewee's language skills**

**Question 1:** can you tell me a little bit about the COVID restrictions in your area? For instance your curfew, your access to green spaces and general amenities, as well as the extent of your lockdown?
-elaborate: can you tell me how having these restrictions made you feel in general?

**Question 2:** I see you live in a space which has a garden/balcony/none. Was there a specific reason you chose this space?
-elaborate: and can you tell me some positives and negatives regarding these features?

**Question 3:** how did having a garden/balcony/none serve you during COVID? What were some emotions you associated with these spaces?
-elaborate: how did having a garden/balcony/none change your experience during COVID?

**Question 4:** do you feel a change in importance with regards to having a garden/balcony/none before and during COVID? Please elaborate on your thoughts. (i.e did having/not having a garden/balcony become a bigger deal or did it stay the same?)
-elaborate: what do you remember most distinctly/what was most important?

**Question 5:** do you feel more aware of green spaces after COVID? If yes in what way and how has your perception changed?
-elaborate: is that change long lasting? As in, did you only feel your perception change right after COVID for a short period of time or is this change forever?

**Closing question:** do you believe that green spaces have inherent/intrinsic value? Did COVID change that at all?

Thank you for participating, if you are interested, I can send you the results of my research at a later date. If you have any concerns or questions, please feel free to contact me.

## Appendix 2: Survey Questions

**How old are you?**

| |
|---|
| 0-17 |
| 18-24 |
| 25-34 |
| 35-44 |
| 45-54 |
| 55-64 |
| 65 |

**What is your gender?**

| |
|---|
| Male |
| Female |

**What is your marital status?**

| |
|---|
| Married |
| In a relationship |
| Single |
| Divorced |
| Widowed |

**What is your level of education?**

| |
|---|
| Elementary school |
| High school |
| Bachelors |
| Masters |
| PhD\Dr |

**What is your employment status?**

| |
|---|
| Currently employed |
| Unemployed |
| Student |
| Paid leave |

**What is your monthly income?**

| |
|---|
| 0,00 € |
| 50-100 € |
| 100-200 € |
| 200-300 € |
| 300-500 € |

| |
|---|
| 500,00 € |

**Which city/municipality do you live in?**

——————————————————————

**How many persons live in your household?**

| |
|---|
| 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 5 and more |

**Do you live in a rural or urban area?**

| |
|---|
| Urban |
| Rural |

**Have you or anyone you know (family member\friend\colleague) contracted COVID-19?**

| |
|---|
| Yes, I had covid |
| Someone I know had covid |
| Both me and someone I know had covid |
| No, I don’t know anybody who got covid |

**Has anyone you know (family\friend\colleague) died from COVID-19?**

| |
|---|
| Yes, someone close to me died |
| Yes, someone I knew died |
| Yes, multiple people I knew died |
| No, nobody I knew died |

**Has your job been impacted by COVID-19?**

| |
|---|
| I lost my job |
| I had to work from home but was paid the same |
| I had to work from home and was paid less |
| I became a part time worker |
| My business was suspended indefinitely |
| I am self employed and had a loss of income |
| No, it hasn't been impacted |

**Has your job\income been impacted in ways not listed above? If so please write your answer here.**

——————————————————————

**What areas in your life were impacted during the COVID-19 lockdown?**

| |
|---|
| Buying groceries |
| Seeing family/friends |
| Going to the doctor/pharmacy |
| Going out for a walk |
| Having to stay home and take care of your children |
| Having financial difficulties |
| Having health problems due to reduced exercise |

**Were areas in your life impacted in ways not listed above? If so please write your answer here.**

——————————————————————

**Did you have social contact (via social media\phone calls) during the COVID-19 lockdown? [I contacted my family]**

| |
|---|
| Never |
| Once per week |
| Few times per week |
| Once a month |
| Few times per month |
| Almost everyday |
| Everyday |

**Did you have social contact (via social media\phone calls) during the COVID-19 lockdown? [I contacted my friends]**

| |
|---|
| Never |
| Once per week |
| Few times per week |
| Once a month |
| Few times per month |
| Almost everyday |
| Everyday |

**Did you have social contact (via social media\phone calls) during the COVID-19 lockdown? [I contacted my colleagues ]**

| |
|---|
| Never |
| Once per week |
| Few times per week |
| Once a month |
| Few times per month |
| Almost everyday |
| Everyday |

**Did you have social contact (via social media\phone calls) during the COVID-19 lockdown? [I called a help line ]**

| |
|---|
| Never |
| Once per week |
| Few times per week |
| Once a month |
| Few times per month |
| Almost everyday |
| Everyday |

**Did the frequency of your contacts (via social media\phone calls) change at all during COVID?**

| |
|---|
| Yes, I started contacting more people |
| Yes, I started contacting less people |
| No, it didn't change |

**Did you have social contact (in person) during the COVID-19 lockdown? [I saw my family]**

| |
|---|
| Yes, I started contacting more people |
| Yes, I started contacting less people |
| No, it didn't change |

**Did you have social contact (in person) during the COVID-19 lockdown? [I saw my friends ]**

| |
|---|
| Never |
| Once per week |
| Few times per week |
| Once a month |
| Few times per month |
| Almost everyday |
| Everyday |

**Did you have social contact (in person) during the COVID-19 lockdown? [I saw my colleagues ]**

| |
|---|
| Never |
| Once per week |
| Few times per week |
| Once a month |
| Few times per month |
| Almost everyday |
| Everyday |

**Did you have social contact (in person) during the COVID-19 lockdown? [I met new people to socialise with ]**

| |
|---|
| Never |
| Once per week |
| Few times per week |
| Once a month |
| Few times per month |
| Almost everyday |
| Everyday |

**Did the frequency of your contacts (in person) change at all during COVID?**

| |
|---|
| Yes, I started contacting more people |
| Yes, I started contacting less people |
| No, it didn't change |

**How serious do you think COVID-19 is?**

| |
|---|
| Not at all 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 8 |
| 9 |
| Super serious 10 |

**How effective do you think government restrictions aimed at reducing COVID-19 infections were?**

| |
|---|
| Not at all 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 8 |
| 9 |
| Super effective 10 |

**How stressed were you with regards to the COVID-19 lockdown?**

| |
|---|
| Not at all 1 |

| |
|---|
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 8 |
| 9 |
| Super stressed 10 |

**How would you rate the way you felt the following emotions during the COVID-19 lockdown?**

| | None | Somewhat | Quite a lot | Extreme |
|---|---|---|---|---|
| Anxiety | | | | |
| Depression | | | | |
| Restlessness/Disturbed sleep | | | | |
| Suicidal ideations | | | | |
| Alarmed | | | | |
| Loneliness | | | | |
| Frustration | | | | |
| Anger | | | | |
| Fear | | | | |
| Grief | | | | |
| Devastation | | | | |
| Boredom | | | | |
| Disoriented | | | | |

**Section for Garden Owners**

**How restricted do you feel your access to green space was during the COVID-19 lockdown?**

| |
|---|
| Not at all 1 |

| |
|---|
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 8 |
| 9 |
| Super restrictive 10 |

**Did the usage of your garden change during the COVID-19 lockdown?**

| |
|---|
| Yes, I started using my garden more |
| No, my usage remained the same |
| No, I am not interested in my garden overall |

**Did your garden become more special to you during the COVID-19 lockdown?**

| |
|---|
| Yes |
| No |

**If you answered yes, in what way?**

——————————————————

**How glad were you to have your garden during the COVID-19 lockdown?**

| |
|---|
| Not at all 1 |
| 2 |
| 3 |
| 4 |
| Super glad 5 |

**What were your favourite aspects about your garden during the COVID-19 lockdown?**

| |
|---|
| It gave me something to do |
| It took my mind off things |
| It was relaxing |
| The sound of birds chirping and leaves rustling |
| The colour green |
| The smell of grass and flowers |
| Breathing fresh air |
| Working with my hands |
| Observing nature (plants, birds etc) |

**Did your garden serve as a space where you can meet up with family and friends?**

| |
|---|
| Yes |
| No |

**How would you say your garden helped with the following during the COVID-19 lockdown?**

| | Did not help at all | Helped slightly | Help quite a bit | Helped a lot | I was not affected by this emotion |
|---|---|---|---|---|---|
| Anxiety | | | | | |
| Depression | | | | | |
| Restlessness/ Disturbed sleep | | | | | |
| Suicidal ideations | | | | | |
| Alarmed | | | | | |
| Loneliness | | | | | |
| Frustration | | | | | |
| Anger | | | | | |
| Fear | | | | | |
| Grief | | | | | |
| Devastation | | | | | |
| Boredom | | | | | |
| Disoriented | | | | | |

**Did having a garden during the COVID-19 lockdown change your outlook on the importance of nature overall?**

| |
|---|
| Yes, I am more aware of how important nature is |
| No, I always thought nature was important |
| No, I don't think nature is more important |

**Do you think people without gardens were less happy during the COVID-19 lockdown?**

| |
|---|
| Yes |
| No |
| Maybe |

**Section for Balcony Owners**

**How restricted do you feel your access to green space was during the COVID-19 lockdown?**

| |
|---|
| Not at all 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 8 |
| 9 |
| Super restricted 10 |

**Did the usage of your balcony change during the COVID-19 lockdown?**

| |
|---|
| Yes, I started using my balcony more |
| No, my usage remained the same |
| No, I am not interested in my balcony overall |

**Did your balcony become more special to you during the COVID-19 lockdown?**

| |
|---|
| Yes |
| No |

**If you answered yes, in what way?**

**——————————————————————**

**How glad were you to have your balcony during the COVID-19 lockdown?**

| |
|---|
| Not glad at all 1 |
| 2 |
| 3 |
| 4 |
| Super glad 5 |

**What was your favourite aspect about your balcony during the COVID-19 lockdown?**

| |
|---|
| It gave me something to do |

| |
|---|
| It took my mind off things |
| It was relaxing |
| The sound of birds chirping and leaves rustling |
| The colour green |
| The smell of grass and flowers |
| Breathing fresh air |
| Working with my hands |
| Observing nature (plants, birds etc) |

**Did your balcony serve as a space where you can meet up with family and friends?**

| |
|---|
| Yes |
| No |

**How would you say your balcony helped with the following during the COVID-19 lockdown?**

| | Did not help at all | Helped slightly | Help quite a bit | Helped a lot | I was not affected by this emotion |
|---|---|---|---|---|---|
| Anxiety | | | | | |
| Depression | | | | | |
| Restlessness/ Disturbed sleep | | | | | |
| Suicidal ideations | | | | | |
| Alarmed | | | | | |
| Loneliness | | | | | |
| Frustration | | | | | |
| Anger | | | | | |
| Fear | | | | | |
| Grief | | | | | |
| Devastation | | | | | |
| Boredom | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Disoriented | | | | | |

**Did having a balcony during the COVID-19 lockdown change your outlook on the importance of nature overall?**

| |
|---|
| Yes, I am more aware of how important nature is |
| No, I always thought nature was important |
| No, I don't think nature is more important |

**Did you wish you had a garden instead?**

| |
|---|
| Yes |
| No |

**If you answered yes, please explain why.**

**Do you think those without a garden\balcony during the COVID-19 lockdown were less happy?**

| |
|---|
| Yes |
| No |
| Maybe |

**Section for Category Neither**

**How restricted do you feel your access to green space was during the COVID-19 lockdown?**

| |
|---|
| Not at all 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 8 |
| 9 |
| Super restricted 10 |

**Do you wish you had a balcony or garden during the COVID-19 lockdown?**

| |
|---|
| I wish I had a garden |
| I wish I had a balcony |
| I wish I had either |
| No, I don't feel that would have changed anything |

**If you chose you wish you had a garden\balcony or either, please explain why.**

——————————————————————

**Which feelings do you think having a garden or balcony would have helped you with during the COVID-19 lockdown?**

| | Did not help at all | Helped slightly | Help quite a bit | Helped a lot | I was not affected by this emotion |
|---|---|---|---|---|---|
| Anxiety | | | | | |
| Depression | | | | | |
| Restlessness/ Disturbed sleep | | | | | |
| Suicidal ideations | | | | | |
| Alarmed | | | | | |
| Loneliness | | | | | |
| Frustration | | | | | |
| Anger | | | | | |
| Fear | | | | | |
| Grief | | | | | |
| Devastation | | | | | |
| Boredom | | | | | |
| Disoriented | | | | | |

**How much did you miss going to green spaces during the COVID-19 lockdown?**

| |
|---|
| Not at all 1 |
| 2 |
| 3 |
| 4 |

| |
|---|
| 5 |
| 6 |
| 7 |
| 8 |
| 9 |
| Super restricted 10 |

**What did you miss the most about green spaces?**

| |
|---|
| Taking a walk in nature |
| It took my mind off things |
| It was relaxing |
| The sound of birds chirping and leaves rustling |
| The colour green |
| The smell of grass and flowers |
| Breathing fresh air |
| Touching grass and trees |
| Observing nature (plants, birds etc) |

**Is there anything else you missed that way not mentioned above?**

**————————————————————**

**Did having no garden or balcony during the COVID-19 lockdown change your outlook on the importance of nature overall?**

| |
|---|
| Yes, I am more aware of how important nature is |
| No, I always thought nature was important |
| No, I don't think nature is more important |

**Do you think people who had gardens and balconies were happier during the COVID-19 lockdown?**

| |
|---|
| Yes |
| No |
| Maybe |

# Appendix 3: Correlation Matrix

**Correlations**

| Categories (Garden\Balcony\Neither) | | | F12 - How would you rate the way you felt the following emotions during the COVID-19 lockdown? [Anxiety] | F12 - How would you rate the way you felt the following emotions during the COVID-19 lockdown? [Depression] | F12 - How would you rate the way you felt the following emotions during the COVID-19 lockdown? [Restlessness/Disturbed sleep] | F12 - How would you rate the way you felt the following emotions during the COVID-19 lockdown? [Suicidal ideations] | F12 - How would you rate the way you felt the following emotions during the COVID-19 lockdown? [Alarmed] | F12 - How would you rate the way you felt the following emotions during the COVID-19 lockdown? [Loneliness] | F12 - How would you rate the way you felt the following emotions during the COVID-19 lockdown? [Frustration] | F12 - How would you rate the way you felt the following emotions during the COVID-19 lockdown? [Anger] | F12 - How would you rate the way you felt the following emotions during the COVID-19 lockdown? [Fear] | F12 - How would you rate the way you felt the following emotions during the COVID-19 lockdown? [Grief] | F12 - How would you rate the way you felt the following emotions during the COVID-19 lockdown? [Devastation] | F12 - How would you rate the way you felt the following emotions during the COVID-19 lockdown? [Boredom] | F12 - How would you rate the way you felt the following emotions during the COVID-19 lockdown? [Disoriented] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Garden | F12 - How would you rate the way you felt the following | Pearson Correlation | 1 | .620** | .581** | .096 | .466** | .206 | .319* | .449** | .399** | .308* | .378** | .411** | .266 |
| | | Sig. (2-tailed) | | .000 | .000 | .493 | .000 | .144 | .020 | .001 | .003 | .025 | .005 | .002 | .054 |
| | | N | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .620** | 1 | .459** | .221 | .418** | .367** | .361** | .486** | .274* | .406** | .501** | .430** | .402** |
| | | Sig. (2-tailed) | .000 | | .001 | .111 | .002 | .007 | .008 | .000 | .047 | .003 | .000 | .001 | .003 |
| | | N | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .581** | .459** | 1 | .197 | .438** | .351* | .368** | .398** | .343* | .329* | .134 | .304* | .148 |
| | | Sig. (2-tailed) | .000 | .001 | | .157 | .001 | .011 | .007 | .003 | .012 | .016 | .340 | .027 | .292 |
| | | N | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .096 | .221 | .197 | 1 | .208 | .068 | .051 | .080 | .184 | .190 | .178 | .103 | .302* |
| | | Sig. (2-tailed) | .493 | .111 | .157 | | .135 | .630 | .715 | .570 | .187 | .174 | .202 | .465 | .028 |
| | | N | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .466** | .418** | .438** | .208 | 1 | .302* | .403** | .383** | .449** | .502** | .399** | .181 | .407** |
| | | Sig. (2-tailed) | .000 | .002 | .001 | .135 | | .030 | .003 | .005 | .001 | .000 | .003 | .194 | .003 |
| | | N | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .206 | .367** | .351* | .068 | .302* | 1 | .519** | .484** | .190 | .218 | .188 | .571** | .180 |
| | | Sig. (2-tailed) | .144 | .007 | .011 | .630 | .030 | | .000 | .000 | .176 | .120 | .182 | .000 | .202 |
| | | N | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .319* | .361** | .368** | .051 | .403** | .519** | 1 | .807** | .270 | .247 | .384** | .290* | .411** |
| | | Sig. (2-tailed) | .020 | .008 | .007 | .715 | .003 | .000 | | .000 | .051 | .075 | .005 | .035 | .002 |
| | | N | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .449** | .486** | .398** | .080 | .383** | .484** | .807** | 1 | .202 | .166 | .391** | .415** | .319* |
| | | Sig. (2-tailed) | .001 | .000 | .003 | .570 | .005 | .000 | .000 | | .148 | .234 | .004 | .002 | .020 |
| | | N | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .399** | .274* | .343* | .184 | .449** | .190 | .270 | .202 | 1 | .582** | .581** | .250 | .510** |
| | | Sig. (2-tailed) | .003 | .047 | .012 | .187 | .001 | .176 | .051 | .148 | | .000 | .000 | .071 | .000 |
| | | N | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .308* | .406** | .329* | .190 | .502** | .218 | .247 | .166 | .582** | 1 | .499** | .208 | .431** |
| | | Sig. (2-tailed) | .025 | .003 | .016 | .174 | .000 | .120 | .075 | .234 | .000 | | .000 | .135 | .001 |
| | | N | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .378** | .501** | .134 | .178 | .399** | .188 | .384** | .391** | .581** | .499** | 1 | .269 | .742** |
| | | Sig. (2-tailed) | .005 | .000 | .340 | .202 | .003 | .182 | .005 | .004 | .000 | .000 | | .051 | .000 |
| | | N | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .411** | .430** | .304* | .103 | .181 | .571** | .290* | .415** | .250 | .208 | .269 | 1 | .284* |
| | | Sig. (2-tailed) | .002 | .001 | .027 | .465 | .194 | .000 | .035 | .002 | .071 | .135 | .051 | | .039 |
| | | N | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .266 | .402** | .148 | .302* | .407** | .180 | .411** | .319* | .510** | .431** | .742** | .284* | 1 |
| | | Sig. (2-tailed) | .054 | .003 | .292 | .028 | .003 | .202 | .002 | .020 | .000 | .001 | .000 | .039 | |
| | | N | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balcony | F12 - How would you rate the way you felt the following | Pearson Correlation | 1 | .407** | .275* | .c | .399** | .223 | .329* | .352** | .321* | .172 | .113 | .384** | .219 |
| | | Sig. (2-tailed) | | .002 | .044 | | .003 | .106 | .015 | .009 | .018 | .214 | .415 | .004 | .112 |
| | | N | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .407** | 1 | .502** | .c | .393** | .331* | .452** | .112 | .239 | .444** | .365** | .240 | .337* |
| | | Sig. (2-tailed) | .002 | | .000 | | .003 | .014 | .001 | .421 | .082 | .001 | .007 | .080 | .013 |
| | | N | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .275* | .502** | 1 | .c | .387** | .401** | .267 | .169 | .141 | .096 | .250 | .288* | .322* |
| | | Sig. (2-tailed) | .044 | .000 | | | .004 | .003 | .051 | .222 | .310 | .488 | .068 | .035 | .018 |
| | | N | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .c | .c | .c | .c | .c | .c | .c | .c | .c | .c | .c | .c | .c |
| | | Sig. (2-tailed) | | | | | | | | | | | | | |
| | | N | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .399** | .393** | .387** | .c | 1 | .504** | .588** | .496** | .640** | .545** | .311* | .504** | .192 |
| | | Sig. (2-tailed) | .003 | .003 | .004 | | | .000 | .000 | .000 | .000 | .000 | .022 | .000 | .164 |
| | | N | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .223 | .331* | .401** | .c | .504** | 1 | .436** | .370** | .400** | .364** | .415** | .545** | .128 |
| | | Sig. (2-tailed) | .106 | .014 | .003 | | .000 | | .001 | .006 | .003 | .007 | .002 | .000 | .354 |
| | | N | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .329* | .452** | .267 | .c | .588** | .436** | 1 | .485** | .269* | .412** | .349** | .360** | .151 |
| | | Sig. (2-tailed) | .015 | .001 | .051 | | .000 | .001 | | .000 | .049 | .002 | .010 | .008 | .276 |
| | | N | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .352** | .112 | .169 | .c | .496** | .370** | .485** | 1 | .410** | .332* | .218 | .281* | .101 |
| | | Sig. (2-tailed) | .009 | .421 | .222 | | .000 | .006 | .000 | | .002 | .014 | .114 | .040 | .468 |
| | | N | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .321* | .239 | .141 | .c | .640** | .400** | .269* | .410** | 1 | .652** | .250 | .447** | .015 |
| | | Sig. (2-tailed) | .018 | .082 | .310 | | .000 | .003 | .049 | .002 | | .000 | .068 | .001 | .916 |
| | | N | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .172 | .444** | .096 | .c | .545** | .364** | .412** | .332* | .652** | 1 | .230 | .225 | .059 |
| | | Sig. (2-tailed) | .214 | .001 | .488 | | .000 | .007 | .002 | .014 | .000 | | .094 | .102 | .672 |
| | | N | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .113 | .365** | .250 | .c | .311* | .415** | .349** | .218 | .250 | .230 | 1 | .385** | .287* |
| | | Sig. (2-tailed) | .415 | .007 | .068 | | .022 | .002 | .010 | .114 | .068 | .094 | | .004 | .036 |
| | | N | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .384** | .240 | .288* | .c | .504** | .545** | .360** | .281* | .447** | .225 | .385** | 1 | .099 |
| | | Sig. (2-tailed) | .004 | .080 | .035 | | .000 | .000 | .008 | .040 | .001 | .102 | .004 | | .477 |
| | | N | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .219 | .337* | .322* | .c | .192 | .128 | .151 | .101 | .015 | .059 | .287* | .099 | 1 |
| | | Sig. (2-tailed) | .112 | .013 | .018 | | .164 | .354 | .276 | .468 | .916 | .672 | .036 | .477 | |
| | | N | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Neither | F12 - How would you rate the way you felt the following | Pearson Correlation | 1 | .775** | .608** | .370** | .613** | .392** | .457** | .460** | .479** | .418** | .624** | .324* | .287* |
| | | Sig. (2-tailed) | | .000 | .000 | .006 | .000 | .003 | .001 | .000 | .000 | .002 | .000 | .018 | .035 |
| | | N | 54 | 54 | 54 | 54 | 53 | 54 | 54 | 54 | 54 | 54 | 54 | 53 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .775** | 1 | .699** | .356** | .533** | .406** | .399** | .330* | .567** | .396** | .614** | .296* | .439** |
| | | Sig. (2-tailed) | .000 | | .000 | .008 | .000 | .002 | .003 | .015 | .000 | .003 | .000 | .031 | .001 |
| | | N | 54 | 54 | 54 | 54 | 53 | 54 | 54 | 54 | 54 | 54 | 54 | 53 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .608** | .699** | 1 | .316* | .679** | .484** | .433** | .453** | .418** | .398** | .583** | .523** | .336* |
| | | Sig. (2-tailed) | .000 | .000 | | .020 | .000 | .000 | .001 | .001 | .002 | .003 | .000 | .000 | .013 |
| | | N | 54 | 54 | 54 | 54 | 53 | 54 | 54 | 54 | 54 | 54 | 54 | 53 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .370** | .356** | .316* | 1 | .233 | .251 | .224 | .152 | .150 | .238 | .308* | .155 | .062 |
| | | Sig. (2-tailed) | .006 | .008 | .020 | | .094 | .067 | .104 | .272 | .279 | .083 | .023 | .268 | .654 |
| | | N | 54 | 54 | 54 | 54 | 53 | 54 | 54 | 54 | 54 | 54 | 54 | 53 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .613** | .533** | .679** | .233 | 1 | .561** | .639** | .659** | .414** | .494** | .580** | .336* | .354** |
| | | Sig. (2-tailed) | .000 | .000 | .000 | .094 | | .000 | .000 | .000 | .002 | .000 | .000 | .014 | .009 |
| | | N | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .392** | .406** | .484** | .251 | .561** | 1 | .723** | .661** | .263 | .364** | .452** | .554** | .151 |
| | | Sig. (2-tailed) | .003 | .002 | .000 | .067 | .000 | | .000 | .000 | .054 | .007 | .001 | .000 | .277 |
| | | N | 54 | 54 | 54 | 54 | 53 | 54 | 54 | 54 | 54 | 54 | 54 | 53 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .457** | .399** | .433** | .224 | .639** | .723** | 1 | .826** | .210 | .510** | .434** | .382** | .197 |
| | | Sig. (2-tailed) | .001 | .003 | .001 | .104 | .000 | .000 | | .000 | .127 | .000 | .001 | .005 | .154 |
| | | N | 54 | 54 | 54 | 54 | 53 | 54 | 54 | 54 | 54 | 54 | 54 | 53 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .460** | .330* | .453** | .152 | .659** | .661** | .826** | 1 | .282* | .559** | .597** | .401** | .236 |
| | | Sig. (2-tailed) | .000 | .015 | .001 | .272 | .000 | .000 | .000 | | .039 | .000 | .000 | .003 | .085 |
| | | N | 54 | 54 | 54 | 54 | 53 | 54 | 54 | 54 | 54 | 54 | 54 | 53 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .479** | .567** | .418** | .150 | .414** | .263 | .210 | .282* | 1 | .420** | .430** | .041 | .323* |
| | | Sig. (2-tailed) | .000 | .000 | .002 | .279 | .002 | .054 | .127 | .039 | | .002 | .001 | .769 | .017 |
| | | N | 54 | 54 | 54 | 54 | 53 | 54 | 54 | 54 | 54 | 54 | 54 | 53 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .418** | .396** | .398** | .238 | .494** | .364** | .510** | .559** | .420** | 1 | .625** | .240 | .275* |
| | | Sig. (2-tailed) | .002 | .003 | .003 | .083 | .000 | .007 | .000 | .000 | .002 | | .000 | .084 | .044 |
| | | N | 54 | 54 | 54 | 54 | 53 | 54 | 54 | 54 | 54 | 54 | 54 | 53 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .624** | .614** | .583** | .308* | .580** | .452** | .434** | .597** | .430** | .625** | 1 | .355** | .371** |
| | | Sig. (2-tailed) | .000 | .000 | .000 | .023 | .000 | .001 | .001 | .000 | .001 | .000 | | .009 | .006 |
| | | N | 54 | 54 | 54 | 54 | 53 | 54 | 54 | 54 | 54 | 54 | 54 | 53 | 54 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .324* | .296* | .523** | .155 | .336* | .554** | .382** | .401** | .041 | .240 | .355** | 1 | .147 |
| | | Sig. (2-tailed) | .018 | .031 | .000 | .268 | .014 | .000 | .005 | .003 | .769 | .084 | .009 | | .294 |
| | | N | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | F12 - How would you rate the way you felt the following | Pearson Correlation | .287* | .439** | .336* | .062 | .354** | .151 | .197 | .236 | .323* | .275* | .371** | .147 | 1 |
| | | Sig. (2-tailed) | .035 | .001 | .013 | .654 | .009 | .277 | .154 | .085 | .017 | .044 | .006 | .294 | |
| | | N | 54 | 54 | 54 | 54 | 53 | 54 | 54 | 54 | 54 | 54 | 54 | 53 | 54 |

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

c. Cannot be computed because at least one of the variables is constant.