

---

RELATORE

---

CANDIDATO

## **TABLE OF CONTENTS**

<b>Introduction .....</b>	<b>5</b>
<b>CHAPTER 1: CREATIVITY .....</b>	<b>7</b>
<b>1.1 Creativity .....</b>	<b>7</b>
1.1.1 <i>Definition of creativity</i> .....	7
1.1.2 <i>Creativity at an individual level</i> .....	9
1.1.3 <i>Group Creativity</i> .....	11
<b>1.2 Creativity in business .....</b>	<b>12</b>
1.2.1 <i>Creativity and Innovation</i> .....	13
1.2.2 <i>Creativity in organizations</i> .....	15
<b>1.3 Attention Restoration Theory.....</b>	<b>27</b>
<b>CHAPTER 2: OUTDOOR.....</b>	<b>30</b>
<b>2.1 Outdoor Education.....</b>	<b>30</b>
2.1.1 <i>The regenerative power of nature: psychological well-being</i> .....	31
2.1.2 <i>Experiential learning: a new approach to developing managerial skills</i> .....	33
2.1.3 <i>Outdoor Training in organizations</i> .....	34
2.1.4 <i>Outdoor Team Building</i> .....	36
<b>2.2 Outdoor and creativity .....</b>	<b>38</b>
<b>CHAPTER 3: “THE IMPACT OF OUTDOOR ACTIVITIES ON THE CREATIVITY PROCESS” .....</b>	<b>40</b>
<b>3.1 Literature Review .....</b>	<b>41</b>
3.1.1 <i>Creativity</i> .....	41
3.1.2 <i>Interactions with nature</i> .....	43
<b>3.2 Research Model.....</b>	<b>45</b>
3.2.1 <i>Variables</i> .....	45
<b>3.3 Research Methodology .....</b>	<b>49</b>
3.3.1 <i>Data Collection process and measurement development</i> .....	49
3.3.2 <i>Data analysis</i> .....	50
<b>3.4 Discussion .....</b>	<b>53</b>
<b>3.5 Conclusion, limitations, and implications for future research .....</b>	<b>55</b>
<b>References.....</b>	<b>57</b>

## *Acknowledgments*

First, I would like to thank my Supervisor Luigi Nasta. He is an excellent professor, perfectly able of engaging students during his Creative Industries and Business Model Innovation course. I only met him during the first semester of my fifth year, but I knew immediately that he would be the right person to work on an experimental project that would fit my passions and interests. In this respect, I am very grateful to him for the trust he had in my capabilities, for encouraging me to write this thesis on a topic of my personal choice and, of course, for the help he provided during these months.

Now, I would also like to thank Luiss Guido Carli. During these years it has offered me a rich and stimulating environment full of interesting people and exciting opportunities. I have had the chance to experience a six-month international exchange, several internship experiences, and I have been able to engage in group work activities where I have learned a lot.

I wish to thank all the people who helped make this experiment possible: Professor Daniela Di Cagno and Professor Gary Charness for their valuable suggestions, Roberto Speranza for welcoming me to his scout camp and allowing me to administer the test to the boys under his responsibility, Andrea Lombardi for supporting me in the definition stage of the experiment and Federico Neri for the great support he gave me during the statistical analysis of the results.

I would also like to thank my lifelong friends who have been there for me all these years, both in the university and outside.

Finally, I owe my biggest debt of gratitude to my parents, Enrichetta and Mario, who gave me the opportunity to study at LUISS, always allowing me to freely pursue my passions. I also thank my sisters Carlotta and Carolina, who always encouraged and supported me when I needed it. It is thanks to my family if I have reached such achievement, because they have been able to instill in me serenity, confidence and strength. For this reason, I dedicate this work, my commitment and the efforts of these five years to them.

## *Abstract*

The relationship between the natural environment and human creativity is a very important issue. Nowadays, our society needs creative people who are able to come up with ideas that, hopefully, will become solutions, products, and services that underlie innovation. Encouraged by research that highlights the positive effects of nature on cognitive performance, the current study examined convergent creativity among a group of boy-scouts following a 7-days naturalistic summer training camp. An indoor control group was also subjected to the same experiment. To this end, convergent creativity was assessed using a Remote Associated Test (RAT) at the beginning and at the end of the naturalistic summer training camp. The participant taking the training camp had considerably more correct solutions on the RAT compared to the indoor group. Moreover, three control variables were added to the study: gender, previous outdoor experience and the Big Five traits of personality. Although some limitations have been found, especially in regard to external variables, the resulting analysis will demonstrate that outdoor has the potential to increase creativity in individuals. Future studies are necessary to further clarify the role of other creativity- enhancing features of nature in order to arrive at core features or patterns.

## *Introduction*

While it is true that modern society is becoming increasingly complex, it is also true that countless tools to make life easier are now within arm's reach. For instance, we use phone cells to keep track of what our friends are doing and to check our work appointments: but at the same time, we are required to develop very good technological skills to be able to use these tools. It would be more accurate to say that we have many more opportunities available to us, but at the same time more is required of us. Complexity is increasing, and technological innovations seem unstoppable. All of this implies that creativity is more important today than it has ever been. Creativity is defined as the ability to be able to solve problems (Mumford et al. 1991, Runco 1994, Torrance 1971, Wallas 1926) and the ability to be flexible (Flach 1990; Runco 1986,1994). This is why creativity is that quality that allows to respond effectively to evolution. This view implies that creativity itself is the engine of evolution and contributor to development and innovation (Hennessey, 2010). The term "engine of evolution" refers to the fact that it is expressed in reaction to everyday's problems and challenges. While it is defined as "contributor to development" because it is also defined as the ability to generate new and original ideas which may prove of use. These reasons allow to recognize the importance of stimulating creativity in young people, especially students, so that they are ready for the future. Indeed, research shows that creativity facilitates late-life adaptations and growth (Cohen 1989; Cohen-Shalev 1986, 1989; Dudek & Hall 1991). Regardless of the importance of creativity for some specific groups of individuals, it should be noted that creativity benefits everyone: as mentioned earlier, creativity stimulates progress in technology, but also in social sciences and humanities (such as art and music). Creativity has also become a subject of great interest in the corporate sphere because of its impact with innovation and entrepreneurship.

This paper will be structured in the following way: the first and second chapters will explore the topic of creativity and outdoor. Subsequently, in the third chapter, an experiment that will try to investigate the link between these two variables will be proposed.

# CHAPTER 1: CREATIVITY

## 1.1 Creativity

### *1.1.1 Definition of creativity*

Creativity is a quality that underlies innovation and progress while innovation is defined as the successful implementation of innovative ideas (Amabile, 1996). This highlights the importance of creativity and its relevance in research. (Woodman et al., 1993). Despite all these positive implications, there is still much difficulty in defining creativity and its components. In fact, there are numerous definitions of creativity and each one sheds light on specific aspects. The definition proposed by Sawyer (2012) defines creativity as "a new mental combination that is expressed in the world." From this definition, two key elements emerge. The first is that an idea, no matter how innovative, is nothing more than the combination of several existing ideas. The more distant from each other are the original ideas which have been put together, the more original the resulting idea is. The second is the fact that creativity needs to be shared to the world through communication. Without communication, representation, or formalization, one cannot disseminate the results that arise from creativity.

Researchers have established that there are two types of creativity, the first understood as the ability of some people to solve ordinary problems. The second type, on the other hand, is associated with those people who are able to revolutionize an entire discipline from an idea. The multiplicity of perspectives has meant that the concept of creativity is very different depending on where it comes from. For example, in Western culture, creativity has always been considered an innate quality that only certain individuals possessed. This perspective has led to the creation of the myth of the creative genius, a person capable of revolutionizing the world

through his or her creativity. In recent years, this view was challenged, and people began to look at creativity as a process. During the nineteenth century, a French-born mathematician defined the structure of the creative process.

1) *Preparation*: the stage in which individuals observe and analyze a problem and try to understand what inspires them.

2) *Incubation*: stage during which the individual does not think rationally about the problem, although their mind unconsciously rethinks the problem.

3) *Enlightenment*: a turning point in which the solution to the problem is found.

4) *Verification*: in this stage, the appropriateness of the problem is verified.

Two different types of reasoning are involved during these stages: in the preparation and verification stage the rational part of reasoning is involved. On the other hand, in the incubation and enlightenment phase subconscious instinct is involved. Creative thinking is the result of the combination of rational thinking and subconscious instincts. The concept of creativity understood as the combination of two patterns of thought has been taken up by other scholars over the years. In the examples described by De Bono (1982), Weisberg (1983), Sternberg (1988) who first stated that creativity is the result of the combination between conscious and sub-conscious thought. With “conscious” we refer to that part of thinking that is rational and logical, while sub-conscious thought refers more to intuition and the ability to have original ideas in any situation. Ultimately, research states that creativity is a combination of these two ways of thinking.

Over time, a great number of researchers have proposed different definitions of creativity: one example is the definition offered by Woodman et al. (1993) who states that creativity is "the creation of valuable, useful new product, service, idea, procedure or process by individuals working together in a complex social system." Another example is by Amabile (1996) who states that creativity is "the production of novel and useful ideas or solutions in any domain." Additionally, Stenberg and Lubart (1999) stated that creativity "produces work that is novel and appropriate". Another very interesting definition is offered by Drazin, according to whom creativity is a process that occurs on different levels: individual, group and organizational level. It investigates into the mental processes and psychology of the person to investigate in detail how mental structures influence creativity. Then there is the group level, which can in turn be divided into two processes: idea generation and idea testing. It consists of an initial phase of individual level creativity and then to collaboration with others. Finally, there is the organizational level, which refers to the process of discussion among multiple groups.

### *1.1.2 Creativity at an individual level*

Individual creativity investigates the ways in which creativity functions at the level of the individual. More specifically, it investigates the mental processes that influence creativity by also focusing on all the external and internal variables involved. Much of the literature on creativity has focused on the importance of mediating elements that would make an individual creative. At the same time, however, some studies have investigated the personal characteristics of an individual that make him or her creative. According to Barron and Harrington (1981), these characteristics are as follows: high self-confidence, high energy level, many diverse interests, autonomy, freedom in judgment, intuition, and the ability to resolve contradictions. According to Amabile (1988), intellectual honesty, determination and curiosity are the basis of

individual creativity. These studies made it possible to find that there are many individual characteristics that are related to creativity and, at the same time, brought out aspects that negatively influence it instead. One example is related to the negative and pessimistic mood of some people: negative and pessimistic people are less likely to be creative, since it is widely agreed that focusing on the 'worst case' scenario drains the resources needed to think creatively. A further contribution was made by McFadzean (2000), who stated that creative individuals have the following characteristics: tolerance for ambiguity and uncertainty, a curious mind that constantly seeks new stimuli, and the need for autonomy and diversity. George and Zhou (2001) offered their opinion regarding the subjective characteristics of a creative individual: openness to new challenges and experiences, tolerance of uncertainty, and nonconformity.

Over time, thanks to the contributions of many researchers, many characteristics and elements that make an individual creative have been identified. However, there is one fundamental quality that we have not yet discussed: divergent thinking. When the characteristics associated with creative individuals have been mentioned, the ability to generate ideas "out of the blue" has not been mentioned. It was called "Emergenative Creativity" by Taylor (1959) and consists in the ability of generating completely new ideas. In contrast, psychologist Torrance (1988) described the concept of "Innovative Creativity": the ability to create new ideas to improve pre-existing ideas.

In conclusion, for an individual to be creative, he or she must possess both forms of thinking.

### *1.1.3 Group Creativity*

So far, we have seen what are the main conclusions reached by the literature regarding the relationship between the individual and creativity. It must be emphasized, however, that particularly within organizations, the topic of group creativity is something that is becoming increasingly important. Organizations of all kinds now rely on teams to ensure that their effectiveness increases over time. Teams are created so that all members collaborate creatively and contribute equally. A widely recognized definition of group creativity is as follows: "the generation of novel and appropriate ideas, solutions or processes in the context of team objectives" Collins (1999). It has been shown that there are many factors that contribute to the development of creativity within teams, for example, group structure, size, and available resources. However, there is one element that is crucial: the composition of the group. King and Anderson (1990) have shown that teams consisting of people from different geographical areas, having different cultures and different experiences are the most likely to be creative. The more diverse the team is (e.g. in terms of age, gender or ethnic origins), the more the creativity within the group is increased. Hennessey (2010) explained the reasons why group composition is so important. The creative process consists of two phases: the first is the cognitive process of idea generation, and the second is idea testing. The first stage is the product of the individual's imagination while the second is the result of all group members' evaluation of the idea. It is in this second phase where the aspect of diversity matters a great deal: the more numerous the points of view present in the group, the more likely it is that different considerations will emerge.

Many researchers have investigated the role of other mediating variables influencing the relationship between diversity and creative performance. For example, it has been shown that

groups within which there is a larger turnover, that is, those in which there is a greater replacement of new people, are those with the highest level of divergent thinking. This is because the group is constantly enriched by new approaches and perspectives (Choi and Thompson, 2005). According to Borghini (2005), another variable that influences the relationship between diversity and creative performance is cultural integration. Essentially, the more culturally integrated group members are, the easier some processes such as knowledge transfer and sharing of mental patterns will be. Another key element that fosters creativity within a group is the relationship that exists among all members. With serene climate, friendly relationships and shared goals, performance increases. This is because the perception of the workplace strongly influences the mood of individuals and thus their level of engagement (George and Zhou, 2001). Knowledge is also another key element within groups in order to promote creativity. In conclusion, the literature explains that the creativity of a group depends on the composition, characteristics, and relationships among group members thus, individual creativity and group creativity are two strictly connected concepts.

## **1.2 Creativity in business**

Today we operate in a highly competitive and global environment, thus making creativity crucial. But what does creativity do for a business or organization? It is precisely creativity that fosters business growth, by means of new ideas. Companies that understand the importance of growing and nurturing creative talent realize that it is a vital part of the corporate culture. Creative thinking is a skill that can be developed but cannot be imposed, and providing the right environment helps stimulate creativity in the workplace and encourage a nontraditional approach to problem solving. It prospers in environments that are inclusive, adaptive, safe,

trust-based, that welcome experiments and encourage people to be curious and explore. Another great benefit of corporate creativity is that it helps increase productivity. It allows to reach unknown territories, and this motivates each team member to do their best and push themselves to the next level in a rewarding way. Additionally, it makes people feel valued and helps their personal and professional growth, knowing that they are exceeding their limits and expectations when they invent something new and exciting. But the best thing about corporate creativity is that it encourages healthy feedback generation. Without feedback, it can be very difficult to know what you are doing right and where you are going wrong.

Creative thinking as a problem-solving skill helps find opportunities and see challenges. Creativity becomes a catalyst for innovation, when linked with a mindset devoted to growth and genuine curiosity. Creative problem solving is a well-defined process that helps navigate from problem definition to solution implementation using imaginative and innovative approaches, helping to see the challenge from a different angle and often turning it into a solution. However, this does not mean that the process is easy; it requires a great deal of effort, time, and collaboration to come up with ideas that are not only original and unique, but at the same time useful and feasible.

### *1.2.1 Creativity and Innovation*

Nowadays, the words creativity and innovation are often used as synonyms: being creative is the same as being innovative. In fact, we can talk about a creative (or innovative) person or an innovative (or creative) idea without much difference. However, creativity does not necessarily refer to innovation. Indeed, we can have creativity without innovation, but we cannot talk about innovation without talking about creativity. As indicated earlier, according to the contemporary

approach to creativity, “creativity is the production of novel and useful ideas in any domain” while “innovation is the successful implementation of creative ideas within an organization” (Amabile, 1996).

Although creativity and innovation are commonly used as interchangeable terms, they have long been two concepts associated with two separate worlds. Creativity has historically been associated with art and, therefore, with the ability to paint or make works of art (Guilford, 1967). In contrast, innovation has always been a concept associated with science and the ability to create new products and technologies (Ekvall, 1996). These two different ways of viewing creativity and innovation have been further supported by the link between technological innovation and productivity in economic terms. In essence, innovation has historically been funded by private and public interventions as opposed to the creative arts, which have remained tied to public funding alone.

In the last century everything has changed. The concept of creativity has begun to be associated with innovation. For example, a government report published in 2008 *Creative Britain: New Talents for the New Economy* stated that "creativity is an engine of economic growth for cities and regions". Moreover, the European Union declared 2009 the European Year of Creativity and Innovation. The aim was to "raise awareness of the importance of creativity and innovation for personal, social and economic development, disseminate good practices, stimulate education and research, and promote policy debate on related issues". One obvious reason why the relationship between creativity and innovation is discussed to such an extent is because in recent years the concept of a "creative economy" has become central in the public policy of many countries. For example, the Creative Britain report stated that the creative sector employs

two million people, contributes 60 billion to the British economy and has grown at twice the rate of the economy over the past 10 years (UK DCMS 2008). The report states that the creative sector consists of " advertising, architecture, the art and antiques market, crafts, design, designer fashion, film, interactive leisure software, music, the performing arts, publishing, software and computer services, television and radio" (2008, n. 1). On the other hand, the concept of creativity linked to that of innovation is also untied to creative industries. For instance, companies working in the high-tech industry, such as pharmaceutical, electronics, and energy companies that are always in search of new ideas to advance their growth and development process. The more innovative the ideas about products or services, the more successful the companies will be.

### *1.2.2 Creativity in organizations*

The reason creativity has become such an important topic is related to the fact that organizations have become increasingly demanding. It is no longer enough to meet daily production goals since, in a short time, one's work could be replaced by machines or relocated to countries where labor is cheaper. Nowadays you either work in a creative sense or you are unemployed. It is therefore evident how global competition has made creativity and innovation a crucial aspect of maintaining effectiveness unchanged over time. A common definition of innovation is the proper implementation of a creative idea within an organization (Yusuf, 2009). This is why, the term "organizational creativity" is so popular. Over time there have been numerous researchers who have investigated organizational creativity. Cummings (1965) focused on individual creativity and group creativity, which had been identified as inputs to organizational creativity. Specifically, Cummings' goal was to investigate the effects of the traditional organizational model on employees' creativity. His results showed that corporate settings with overly rigid

bureaucratic structures inhibited creativity. The result of this study may be an interesting starting point for thought. Indeed, many companies pursuing the goal of increasing the creativity of their employees should first consider changing their organizational structures, reward systems, and division of labor mechanisms. Cummings identified some aspects that the research believes would enable an organization to facilitate the creative process among all its employees:

- low level of formality.
- autonomy in choosing ways of working.
- freedom of work scheduling.
- effective and open communication channels.
- good level of discretion for all those people who seem to have a good level of creativity.

Numerous other researchers have investigated what are the characteristics that an organization must possess for the creative process to be supported. For example, Amabile (1996, 1998) proposed that creativity is truly enhanced when the whole organization is built to support it. Specifically, Amabile states that the employees' creative process is stimulated where they are interested and intrigued by what the company does and if their activities are not always the same. All this is possible only in organizations characterized by flat structure, where relationships are informal, and the flow of ideas is free to move. Another variable that plays a crucial role in enhancing creativity is organizational culture. Organizational culture refers to all the traditions, values of the company and employees, leadership style, and managerial practices. In other words, organizational culture is nothing more than the set of norms and values that profoundly influences the behavior of all people working in the organization (Alvesson, 2012). It has been shown by several researchers, that only companies with an organizational culture

that promotes employees' autonomy and independence allow for increased creative process (Robinson and Stern, 1997). Moreover, organizational culture is also the basis of "divergent thinking": when employees are stimulated to collaborate with people with different views and opinions, the development of innovative ideas takes place. This is precisely why companies should always promote collaboration between individuals and between teams. The last very important variable is the "work atmosphere". It refers to all those aspects that influence employees regarding their work environment. It has long been a subject of interest that organizational working atmosphere strongly influences the performance of teams. In particular, environments characterized by freedom of expression, multiplicity of stimuli, ease of interaction between people and informality in relationships. A very extensive study was conducted by Ceylan *et al.*, (2011) in which the relationship between the perception of the work environment and the creative process was analyzed. They therefore described some aspects of the work environment that strongly influence creativity in the organization:

- Encouragement of creativity

Employees are more likely to initiate creative activities, which are inherently riskier, if their supervisors and co-workers encourage this process.

- Autonomy

Creativity is always the result of autonomy in being able to choose how and when to conduct one's work. Having the feeling of being fully in control of one's work is a fundamental condition.

- Resources

The availability of resources, such as time, money, and information, make people more likely to feel that their work is important and, as a result, they will be motivated to work harder and more creatively on their tasks.

- Pressure

There are two types of pressure: the first is externally imposed and has a negative impact on creativity. The second is an inherent pressure that arises from the project and stimulates people to give their best.

- Organizational Impediments

All aspects related to excessive workload, a critical situation that prevents freedom substantially limit the creative process at the individual and team level.

In essence, the perception of the work environment influences employees' motivation and, therefore, the level of creativity in their work.

In summary, we have seen how organizational structure, culture and work environment are key elements when we study creativity (Gidlow, *et al* 2016). It is for this reason that numerous solutions have been put in place in recent years to foster the best possible creative environment within companies. The next paragraph shows some interesting solutions that can affect creativity at organizational level.

### *1.2.3 Approaches to enhance creativity in organization settings*

So far, we have seen which are the main aspects that influence creativity within an organization. Now we will have a look at those methods through which companies seek to increase the creativity of their employees. In this context we must remember that a primary role is played by managers and that there is a broad consensus regarding the ability of managers to influence subordinates' creativity. An example is that of Amabile et al. (1996) who described factors that are under the control of managers and allow them to influence creativity, such as resource allocation and work group structure. Consequently, tools have been developed to teach to the managers themselves how to stimulate the creativity of their subordinates. First of all, however, we must ask ourselves the following question: can creativity really be taught? Research has shown that training programs can indeed create improvements in individuals.

- Brainstorming and culture

When dealing with enhancing your employees' creativity a well-known example is "brainstorming". It is an expressive methodology aimed at bringing out creative ideas that can solve a problem or provide insights for developing a project (Hurmuzan, 2018). At the basis of how brainstorming works is the concept of idea association. This is because the human brain is capable of creating images, sounds, words, and thoughts simply from an idea. Most importantly, the process of idea association occurs without bias of any kind. This is perhaps the most important aspect in a brainstorming session: there should be no judgment of any kind. Only then will many different, original, and even opposing ideas emerge from the discussion. No one will feel judged and will express themselves freely. Of course, there is always a moderator who will ensure that each person can freely express his or her creativity through ideas communicated verbally during the session. Each idea or thought is initially discussed among the group

members, then it is modified and elaborated by everyone, and only then the moderator will select the best and feasible ideas. In essence, the ideas that emerge from a brainstorming session are never the ideas or thoughts of a single individual: on the contrary, they will always be the result of reworking by all the creative minds of the people present. That is why the most innovative ideas arise from precisely this kind of approach. The three main phases of brainstorming are as follows:

### 1. Initial Phase

During the first phase, the goal is to explain the topic of the discussion in a clear and precise way to all participants. The moderator will be in charge of this initial briefing and will take care of guiding the discussion during all stages of the process.

### 2. Divergent phase

Once the moderator has explained all the details about the topic of the discussion, the most creative phase of the process begins. During this phase each participant will have the opportunity to express his or her ideas about the proposed topic. Hopefully, elements will emerge that will be used later to arrive at the final result.

### 3. Convergent phase

This is the final phase of the brainstorming session, and it consists of selecting the best ideas that emerged during the first phase. The aim of this moment is to arrive at the best result, that is, the most useful and most feasible idea. Critical and analytical thinking is very important here, while in the first and second phases the focus is on innovation and change of perspective.

Brainstorming is an extremely effective technique for promoting the development of new ideas, but it is important that there is an appropriate corporate culture within the organization. The concept of culture has always been a topic closely related to the concept of creativity, and the literature has discussed it extensively. An early view holds that organizational culture interacts directly with the individual or group and has direct effects on the determinants of creativity. (Montanari, 2018; Oldham and Cummings, 1996). As suggested by Flynn and Chatman (2001) "As a system of social control, organizational culture can influence members' focus of attention, behavior, and commitment." Regarding this perspective, various elements related to organizational culture have been proposed that can influence creative and innovative processes and results. Baer and Frese (2003) observed that an organizational climate that stimulates personal initiative and psychological safety (the perception of being able to display one's abilities without fear of repercussions on self-image, status, or career) strengthens the positive effect of process innovation on organizational performance. In addition, organizational culture can also have an indirect effect on the composition of an organization's population; for instance, it can attract and retain those people who have certain individual characteristics such as open-mindedness or those who foster creativity and implement practices (related to team management and leadership styles) that encourage creativity and innovation. Another perspective refers to the concept of national culture by recalling Western and Eastern cultural systems (Anderson, Potočnik, and Zhou, 2014). In this case, culture has the role of moderating the relationship between creative-innovative determinants and outputs at different levels. The literature has investigated various ways in which different cultural systems of norms and values can influence an organization's creative and innovative outputs. An example of different systems of norms and values are dimensions such as individualism and collectivism. According

to this, Flynn and Chatman (2001), creativity and innovation are favored in organizations with a collectivistic approach.

In conclusion, there are several aspects to consider when organizations want to encourage creativity within a work setting. First of all, they will need to ensure that corporate values coincide with employees' values. Then they will need to create an environment of psychological safety and finally they will have to ensure an high level of interpersonal relationships and many opportunities for communication.

- Innovative work environments

Companies have realized that creativity and innovation are crucial factors in the success of a business and its long-term survival and they have also understood that creativity can be developed if stimulated in the right way. This is why they have begun to develop innovative work environments for their employees. These new work settings are completely different from traditional work environments and, within this context, numerous companies have had great attention from the media, such as Apple, Google, or Facebook. Many researchers have investigated the importance of physical work environments (PWE) and, according to the findings, a direct relation between PWEs and creativity has been found (e.g., George, 2007; Shalley & Gilson, 2004). As an early example, Amabile (1996) said that creativity should be developed by creating "physical environments that are engineered to be cognitively and perceptually stimulating." Innovative workspaces are the result of numerous studies that have demonstrated the importance of certain elements within the work environment. the following elements will need to be reviewed when dealing with an innovative work environment aimed at boosting creativity among employees.

### 1. Sound

Sound can have a positive or negative impact on creativity. Sound levels that are too high reduce creativity. Interviews with workers (Alencar & Bruno-Faria, 1997; Stokols et al., 2002) found that environmental noise creates distraction and therefore limits creativity. In contrast, positive sound can increase creativity. In this context, Dul and colleagues (Dul & Ceylan, 2011, 2014; Dul et al., 2011) find that the absence of noise, music and silence are elements of PWE that contribute to increasing creativity.

### 2. Colors

Choosing appropriate colors in the work environment is an equally important choice (Steiner, 2006) although empirical results are contradictory. In fact, McCoy and Evans (2002) observed that cool colors (blue, green, or blue violet) negatively impact creativity, whereas warm colors (yellow, orange, or red) have no effect on creativity. In contrast, Ceylan et al. (2008) saw that offices with predominantly cool colors helped stimulate creativity while those with warm colors overstimulated creativity and consequently inhibited it. Haner's (2005), on the other hand, suggested that the use of different colors should be a function of the different stages of the creative process. Warmer colors for the divergent thinking stage and cooler colors for the convergent thinking stage. Hoff and Öberg (2015) and Lee (2016) concluded that the effect of colors on creativity depends on individual perception. Nevertheless, they showed that bare and colorless environments have a negative impact on creativity.

### 3. Light

Room lighting can also influence creativity but, again, the results are mixed. Good lighting according to (Alencar & Bruno-Faria, 1997; Ceylan *et al.*, 2008) is necessary to stimulate the creative process. Conversely, insufficient light inhibits it. In addition, other recent studies have shown that especially natural light positively influences creativity (Dul & Ceylan, 2011, 2014; Dul *et al.*, 2011; Hoff & Öberg, 2015). A different result was reached by other scholars, Steidle and Werth (2013), who conducted studies in contexts of darkness or very dim light. In these situations, the people involved felt less observed and consequently more conducive to being creative.

#### 4. Temperature

The effect of the temperature of a work environment on employees' creativity is another factor that has been investigated by the research. Several studies have confirmed that an environment with appropriate temperature, humidity and air composition positively impacts creativity (Dul & Ceylan, 2011, 2014; Dul *et al.*, 2011).

#### 5. Furniture

Many academics agree that appropriate furniture supports creativity. To mention a few, Dul and colleagues (2011), but also Alencar and Bruno-Faria (1997). They found that furnitures are able to stimulate human interaction and, consequently, the exchange of ideas, opinions and views.

#### 6. Plants

Findings from Shibata and Suzuki (2004) showed that the creative thinking of a group of women was significantly higher when a plant rather than an object was present in their room. Hoff and Öberg's (2015) conducted interviews with professionals from which they found that plants have the ability to inspire if placed in the work environment.

## 7. Window/View

It has been observed that windows and views can also positively influence creativity. McCoy and Evans (2002) but also Ceylan et al. (2008) and Hoff and Öberg (2015) have shown that especially living in a naturalistic environment has a positive effect on the creative potential that an office conveys to its employees.

### **1.3 The Relationship between creativity and nature**

In the previous paragraph we addressed the topic of innovative work environments and the role that nature has within them. In this section, the relationship between creativity and nature will be explored by making references to existing literature. It has been demonstrated that nature not only create pleasure and calm but also can stimulate creativity, something very important in environments where people work or study, such as schools or offices (Berto, 2005). Indeed, nature scenes such as mountain landscapes, waterfalls, forests, or hills have the capacity to create admiration (Chulvi et al., 2020). The admiration is due to their beauty and perfection, which is in no way possible to recreate artificially, as well as to their strength, which creates a feeling of weakness in the face of something so great compared to us (Hsieh et al., 2020).

Historically, nature has been an object of admiration: just think of how many poets, thinkers and philosophers have been inspired by the naturalistic environment. There are plenty of famous paintings, poems, novels, songs that tell us about the wonders one encounters while walking through a natural environment.

It seems strange that nature can help develop a quality that seems to have nothing in common with it, but there are many studies that have been conducted over the years that show that the relationship between nature and creativity exists (Korpela *et al.*, 2022). One study that tried to show that nature helps creativity was done by researchers at the University of Utah and Kansas. The experiment was quite unique. As many as fifty-six people were divided into eight groups and sent into the mountains, to camps in Alaska, Colorado and Maine. Deprived of every technological accessory, they had to live in the wild for four months. The ability to reason creatively and solve problems and carry out complex cognitive tasks had improved for 28 out of 56 people. "Exposure to the natural environment appears to have an impact on the prefrontal cerebral cortex, whose activity is associated with creativity and multitasking," the researchers said. The relationship between nature and creativity has also had a significant impact in management.

Some qualitative studies in this area have been conducted. One very interesting example occurred in Sweden, where an "outdoor office" was implemented. The results were surprising; in fact, employees reported feeling more creative and inspired (Pettersson Troije *et al.*, 2021). Another study, conducted by Jones (2013), reported similar results in a group of professors who took part in a week-long training session immersed in nature. Based on a self-report, the participants said they felt more creative at the end of the week. The results of these studies show

how the nature environment is related to increased creative performance. At the same time, quantitative studies have also been conducted, such as the study conducted by Atchley, Strayer, and Atchley (2012) on participants in a four-day experience in a naturalistic environment. The researchers administered a Remote Associates Test (RAT) to a group of people who did not participate in the experience and to a group who did. The group of participants, at the end of the outdoor experience, reported significantly higher results in the creativity test compared to the group that did not participate in the experience. Although the two groups were different, and this opens a compatibility issue, the result is surprising. Similar results were obtained by Ferraro (2015) who measured creativity through a RAT Test in a group that took part in an outdoor experience and in an indoor group, which served as a control group. It should also be noted that the nature activities mentioned by the above researchers include physical activities, such as hiking, walking and even handling plants. Korpela, de Bloom, Sianoja, Pasanen, and Kinnunen (2017) showed that outdoor physical activities are generative of well-being and self-reported creativity, unlike indoor activities.

Unfortunately, the amount of time we spend in contact with nature is getting smaller and smaller (Felsten, 2009). Our interaction with electronic devices now takes up much of our day, and digital content satisfies us far more than the outdoor activities. Our lives are increasingly sedentary and are consumed in front of the TV, computer, tablet or smartphone. All these habits do not contribute to stimulating creativity as we have become accustomed to having our minds always busy and tired. We are depriving our minds of the fertile ground that creativity needs.

### **1.3 Attention Restoration Theory**

According to the studies of Rachel and Stephen Kaplan, professors and psychologists at Michigan University, human exposure to nature, its observation and contemplation, does not cause cognitive fatigue, but rather allows the mind to concentrate and regenerate in a much more significant way than exposure to man-made environments. In particular, Attention Restoration Theory (ART; Kaplan & Kaplan, 1989; Kaplan, 1995) provides useful explanations for the supposed restorative qualities of nature. This theory hypothesizes that intensive use of directed attention (tasks that involve mental effort), decreases a person's ability to avoid distractions. Consequently, the person may show signs of directed attention fatigue, such as difficulty in concentration, increased irritability and increased rate of errors made in activities that require concentration. Kaplan (1995) defined this condition as one that places the person at a greater risk in experiencing the state of stress, as fewer cognitive resources are available to cope with everyday's demands (Lepore & Evans, 1996). Staying in an environment that does not require concentration and mental effort, allows the mentally fatigued person to rest the mechanism on which directed attention depends. In this way the person is able to recover the efficiency of his or her functioning. In line with the theory of attention regeneration, natural environments provide relatively good opportunities for psychological regeneration because they possess many properties that, combined, emerge less commonly in other types of environments. For instance, being in contact with nature gives humans a sense of extraneousness, literally 'staying away' from the daily routine that imposes a need for directed attention. Second, natural environments have many attractive stimuli such as colors, shapes and these encourage the processes of exploration and understanding; they also spontaneously and somewhat involuntarily attract and hold a person's attention. This quality, which is assumed to be rooted in parallel with human evolutionary history, is called fascination. Finally, experiences in natural environments typically allow for a high degree of compatibility, in other words, a

sort of similarity between what the person wants to achieve and what the environment demands and accepts (Klein, *et al* 2019).

## **CHAPTER 2: OUTDOOR**

The term outdoor literally means "outside" and refers to all those activities that take place outside of closed environments, typically defined as indoor. It often refers to the idea of nature and the practice of sports in naturalistic environments. Recently, the term outdoor has been increasingly associated to a lifestyle that finds in nature the ultimate expression of freedom, recreation, and satisfaction. The concept of outdoor has also become a topic of interest in the fields of psychology and pedagogy: in fact, several studies have been conducted regarding outdoor education and its potential as opposed to standard educational models.. Therefore, its potential towards human beings has been investigated and the relationship between the outdoor and creativity.

### **2.1 Outdoor Education**

One of the most studied aspects related to outdoor is its educational value. Although the educational aspect is mainly focused on children, it should not be considered unrelated to the educational processes concerning adults in contexts where the learning process continues beyond school (e.g., the working environment). Outdoor education, literally "out-of-door education," is a very promising approach in today's educational landscape. More and more studies have been observing its implications for development of both mental and physical well-being. There are many definitions but, currently, experts do not agree on a common one. In general, outdoor education is seen as an approach that favors direct experiences in contact with the surrounding environment, particularly the natural environment. It can be defined as a

sensory-experiential approach, since during outdoor activities people can experience and explore everything around them; the experiences during these activities are direct, mediated only by the senses of the participants. In this context, the natural environment in turn becomes a mentor, teaching practical and theoretical notions and helping to improve emotional, social, and creative skills.

One of the earliest definitions given to Outdoor Education is that of George and Louise Donaldson (1958) who describe it as "education in, about and for the outdoors" emphasizing that outdoor space is the place, the content, and the purpose of this kind of education. Later Priest (1986) defines outdoor education as follows: "an experiential process of learning by doing, which occurs primarily through exposure to the out-of-doors. In outdoor education the emphasis for the subject of learning is on relationships, relationships involving people and natural resources".

### *2.1.1 The regenerative power of nature: psychological well-being*

Many studies have investigated the connection between mental and physical well-being and contact with nature. The evidence collected suggests that benefits brought by contact with nature are not only physical but a large part of them relate to psychological well-being. Considering residential and school settings, in which children spend most of their days, it can be argued that green areas have a positive impact on multiple aspects, such as cognitive functioning, coping and impulse inhibition. Collado and Staats (2019) reported that the overall mood is generally better in places with close contact with nature and this is especially true for children who are generally described as "problematic" by teachers. Taylor and Butts-

Wilmsmeyer (2020), suggested that even just the sight of the green color, may help psychological well-being, so windows facing trees and gardens, or green-colored furniture elements may be significant (Taylor and Butts-Wilmsmeyer, 2020). Evidence found in the literature are considerable, but there are still many aspects of the topic that have not been fully explored.

Although outdoor education is still uncommon in Italy, recent research has been conducted by Pirchio *et al.* (2021), with the aim of demonstrating how contact with nature is effective in promoting the psychosocial well-being of children, parents, and teachers. In the first experiment, a group composed by primary and secondary school's children completed a questionnaire before and after an outdoor program. The following constructs have been measured: sense of belonging to nature, mental and physical well-being, pro-social behaviors, empathy, anxiety, life satisfaction, behaviors and attitudes pro-environment. The program, which took place in spring 2018 and 2019, consisted of several outdoor activities in nature reserves in Lazio region. These activities included: physical activities on trails in the parks, following the tracks of wild animals and being able to analyze one's emotions during the experience. The researchers' hypotheses were that there would be differences between the scores of the pre-program test and those of the post-program test, and that a sense of belonging to nature would be positively correlated the variables being measured. As a result of this program, Pirchio *et al.* (2021) concluded that there is a positive correlation between participation in outdoor programs (and thus exposure to nature) and most of the variables measured in the pre- and post-intervention questionnaires. Specifically, they recorded improvements in mental and physical well-being, pro-social behavior, ecological behaviors, and connection with nature.

### *2.1.2 Experiential learning: a new approach to developing managerial skills*

Moreover, outdoor training is an engaging and potentially highly effective training methodology. Direct experience, dynamic management of relationships within the group and strong emotional impact create the conditions for activating a process of change that is the basis of new learning. Designing outdoor training activities has been demonstrated to be very useful for a variety of purposes. For instance, it proved to be particularly effective for developing teamwork skills, supporting working groups during situations of change, facilitating integration and the necessary motivational boost in the phase of building new teams. (Núñez, María Teresa Del Val, et al. 2018). Designing an outdoor training activity, however, requires serious reflection on goals and objectives. The ease with which engaging activities can be created could lead to underestimate the difficulties often encountered in moving from an activity with a high emotional impact to the "colder" debriefing phase. A challenging moment is when the working group must engage in analysis and research of the elements of "transferability": analogies that allow to create a bridge between the outdoor metaphor and the real organization. In other words, abandoning traditional training settings, stepping out of the classroom to "inhabit a place" intentionally decontextualized and engaging in the acquisition of new skills.

In summary, it is easy enough to construct engaging and evocative activities, more difficult is to be able to relate this emotionally impactful experience to issues of corporate interest. An additional element that should not be underestimated is the choice of the type of outdoor that best fits the objectives of the company. The goal is to find the right balance between the activity, which must be able to free up resources that are very often totally unexpressed in normal work routines, and the possibility of identifying analogies with organizational life. At the end of the

experience debriefing takes place. The main objective of this moment is the elaboration within the group of the events that emerged during the activity. It is an important and delicate phase during which attention is focused on the most critical steps that marked the evolution of the team, from its formation to the achievement of the goal. The trainer together with the group selects the events that happened, analyzes them, with the aim of helping the group to really understand what happened. This is a phase that must obviously be coordinated and harmonized with the goals set at the beginning. The trainer's task is to facilitate the interpretations and analyze the relation with the intended objectives. This phase requires great sensitivity, care, and flexibility on the part of the trainer to avoid the risk of readings that could be perceived as manipulative and instrumental.

## **2.2 Outdoor and Business**

### *2.1.3 Outdoor Training in organizations*

Outdoor programs targeting individual managers, as well as teams of managers and work groups, are becoming increasingly common within organizations. There are now numerous organizations that organize some type of outdoor training, also called adventure or experiential learning. These programs are designed to develop leadership and teamwork skills through specific outdoor activities. Despite the high popularity of these types of programs, it is still a matter of debate whether outdoor training is a revolution or just temporary trends. On one side, there seems to be evidence that these types of programs are very effective: there are numerous cases of actual participants who have spoken very positively about their experiences in outdoor training programs. For example, Nelson Farris, a vice-president at Nike Corporation, speaking

about these programs said: "I think everyone of our employees should go through it, not just some people. We are looking for ways to get people to open their minds and deal with the process of change this program will help our company." In contrast, there have also been many negative views regarding the effectiveness of these programs. Indeed, many skeptics have said that they are at best a waste of time and at worst harmful to managerial effectiveness. For example, in an article published on the Training magazine Ron Zemke said "outdoor programming is nothing more than an opportunity for organizations to pack whole management teams off to risk life and limb together" and Jack Falvey in a Wall Street Journal article "building outdoor party games and simulations, when the real work to be done is all around, should be grounds for managerial malpractice indictments." Despite all the controversy and conflicting opinions, the truth is that these programs have spread very quickly, and many professionals are not very well informed about how they work and how useful they are. The main doubts concern the nature of the program itself: according to some, outdoor trainings are extreme sports activities such as mountain climbing, whitewater rafting and sailing. Other people, on the other hand, think of activities in which participants live and eat indoors but the activities are organized outdoors and are less intense and easier. Despite the skepticism of many managers, outdoor-based experiential training (OBET) continues to be a widespread and popular practice. The outdoor, understood as a training environment, has unique characteristics that make it much better than typical training settings. Outdoor environments tend to eliminate much of the conflict that exists in the office and tend to make managers and their subordinates feel like equals. Of course, outdoor activities require making choices, solving problems, and making compromises, all within a context that generates ambiguity and in which people cannot use their prior experience. Moreover, the outdoor environment is much more flexible than the indoor one and, in many cases, there are difficult situations that we can cope with identifying a

solution and other situations where the solution leads us to another problem. Outdoor programs have been observed to have a beneficial effect when used to promote the creation of effective work teams but also to promote the development of leadership and management skills (Bronson, Gibson and Priest, 1992). It would appear that outdoor programs enable participants to develop a good sense of mutual trust, leading them to improve in their problem-solving skills and their communication skill. As mentioned earlier there are differing opinions about the effectiveness of these programs, a fact partly due to the risk of participants focusing too much on the experience itself and too little on the learning aspect. A very important element is that of "transfer of training" in fact: "training that results in negative or zero transfer is either detrimental or of no value to an organization from a cost/benefit viewpoint" (Wexley and Latham, 1991). Fortunately, several strategies have been devised to foster knowledge transfer during these types of activities: one strategy is to make the outdoor experiences as similar as possible to actual work situations. Another strategy consists in organizing activities that are able to make all participants understand what the real applicability of those concepts is. Considering what has just been said, it is vital that companies organizing these kinds of activities are careful to make sure that there is a good level of training transfer to work setting.

#### *2.1.4 Outdoor Team Building*

In a business setting, building a dynamic team with strong interpersonal communication is essential to be able to best pursue one's goals. Working in a team where frustration and stress dominate is counterproductive both personally and professionally. For this reason, outdoor team building was born. So that being a team never becomes a weakness at work, but rather a strength. The main component of outdoor team building is nature and wildlife. These are the perfect settings where this experience of inclusion and socialization can be established. In such

an environment it is necessary to cooperate, to collaborate, to make the strengths and weaknesses of individuals become those of all. The goal is to have only one strong entity: the team. Building a successful team is every company's dream, but it is not so obvious to achieve it. In fact, work performance depends not only on the technical skills of individuals, but also on their ability to work together towards a common goal. Conducting outdoor training allows you to foster a team spirit and strengthen relationships among team members. The trainer and the company must plan and implement the three phases that such training typically consists of:

- Briefing

During this initial phase, goals to be achieved through the experience are set. Some goals that are typically set concern developing a more cohesive and effective team, or a greater sense of leadership. At this stage it is important that there is effective communication between the employer and the trainer so that all the objectives of the experience are clear beforehand.

- Execution of the test

The team participates in outdoor activities to achieve the goals set in the first phase.

- Debriefing

The trainer stimulates participants to express their emotions and opinions about the activity performed. It also facilitates the emerging of analogies between the training experience and the business reality. Reflection reinforces what has been learned and allows it to be declined in the work context.

## **2.2 Outdoor and creativity**

For our life on earth to continue sustainably, there is a need for people able to solve problems, communicate effectively with others, and adapt to multiple situations. We will always need people seeking new opportunities and new ways of doing things: in essence, we will need people who can develop and express their creativity, possibly in a wide range of different circumstances. This is why creativity is so important, in school settings but also outside, in everyday life. Creativity can maximize our potential as human beings, can instill confidence in dealing with unexpected situations, and can be a source of motivation to learn new things.

The traditional educational model has always been based on the idea of giving children material to learn. In contrast, according to a researcher in education, John Dewey, there is an urgent need for educators to give kids something to do rather than something to learn. In this way, learning is a direct consequence of play. The Learning with Nature Idea Book gives guidelines for creating outdoor learning environments, true outdoor classrooms (Arbor Day Foundation & Dimensions Educational Research Foundation, 2007). Outdoors classrooms following these principles are places where the creativity of participating students is stimulated. According to teachers, creativity as well as all learning opportunities are the result of increased visual impact due to the beauty and vastness of nature. The characteristics that an outdoor classroom must have to stimulate creativity are as follows: "the most successful outdoor classrooms provided: maximum choice, many child-sized spaces, pathways and borders as play affordances, flexible spaces, and support for stakeholder engagement" (Dennis, Wells, & Bishop, 2014). Prior Dimension Foundation has conducted research in this area and observed how children's experiences in outdoor environments depend heavily on the design of the space but also on the adults present with whom they share the activity. Educators should allow children plenty of

time to explore the environment around them (Veselack, Cain Chang, & Miller, 2010). "Play is the way children discover the world around them. They explore, invent, and transform it to suit their needs" (Almon, 2013). During these outdoor games, children are free to try many different things until they find the one that most satisfies them and do not feel forced to compete or be judged by adults. The process of play in nature is often uninterrupted, and children are guided only by their interest and the natural rhythm of their curiosity (Nelson, 2012). When play opportunities occur in nature settings, children develop many skills, and the role of educators becomes critically important. Teachers must carefully observe the learning process of children in the nature setting and document it as much as possible to ensure that these dynamics are studied and explored. Caroline Pratt in her book *I Learn From Children* defined the relationship between teachers and children this way, "How hard they work, only we who have watched them really know. They do not waste one precious moment. They are going about their jobs all the time" (Pratt, 1948).

## **CHAPTER 3: “THE IMPACT OF OUTDOOR ACTIVITIES ON THE CREATIVITY PROCESS”**

When looking at modern society, the impact that technology and innovation have on our lives is noticeable. It is indeed clear how limited our minds are when compared to the capabilities of modern-day technology. For instance, a computer can perform a task that was previously done by a human being, providing a far greater level of accuracy and efficiency. This results in greater dependency on technology and the solutions it provides. We are losing the ability to draw on our personal resources to solve problems. It goes by saying that reliance on technology has its downsides. For instance, it is slowly making people lose interest in nature. The reason lies in the fact that nature is a place where we give up many technological and non-technological aids that we are so used to. Nature is a place where we must rely on ourselves, our abilities, and our resources. Since the advancement of the technological process is almost unstoppable, what can be our competitive advantage as human beings? Our greatest asset is creativity. Although definitions of creativity vary, a widespread definition states that “creativity refers to the process of generating new and useful ideas” (Hennessey and Amabile, 2010). Therefore, “novelty” it’s not enough, it must also be able to add value to a product or service.

According to Dul and Ceylan (2011), creative performance depends on the person, the processes, the social-organisational work environment, and the physical characteristics of the working environment. Moreover, it is generally recognized for having several dimensions: flexibility (the number of different meanings), fluency (the number of innovative ideas we have), originality (the ability to have unusual answers to problems) and finally the ability to

connect apparently disconnected (or remotely associated) ideas together (Baas, Dreu and Nijstad, 2008).

The emphasis of this study research will be the relationship between nature and creativity: since several studies have shown that nature is capable of increasing individual creativity the aim of this study is to explore this relationship.

The current study aims to reproduce the direct effect that a nature experience has on convergent creativity by using a summer retreat in the countryside organized for boys and girls belonging to a Boy Scout group in Rome. Unlike previous studies, in which creativity was measured on a sample of different individuals, this experiment will measure the score obtained from the RAT test on the same group of individuals at the beginning and end of the naturalistic experience.

### **3.1 Literature Review**

#### *3.1.1 Creativity*

The literature defines it as the ability to create, invent, and process information from one's surroundings in an original and imaginative way. To study creativity, psychology has often used the ideas of great artists and authors, but some questions remain: can creativity be measured? And if so, is it possible to logically define what is 'creative' and what is not? These questions are unanswered, and the concept of creativity remains very debated.

One of the main approaches employed by psychology to study creativity is the associationism approach. This theory describes creativity as the result of a number of combinations among different elements. Through such associations, links are established between environmental events and the subject's reactions or behavior. Ideas may turn out to be related because they share common features, functions or relationships (of temporal, spatial, causal or personal kind). Association becomes creative when an entirely new connection leads to brilliant insights and discoveries. The main proponents of this theory are Sarnoff Mednick and Edward De Bono. Instead, Dul and Ceylan (2011) proposed that creativity is the result of four main elements: the person, the process, the physical work environment and finally the social-organisational work environment. In accordance with this conceptual model, this research focuses on the physical environment and its influence on individual creativity.

Another major contribution to the doctrine was given by the American psychologist J.P. Guilford, known for his psychometric studies on human intelligence, including those concerning the distinction between convergent and divergent thinking. He was the first to propose a definition of the mental processes that are involved in the creative process:

1. We become sensible to a problem (being curious to find out the reason why some things do not get along with each other).
2. We produce ideas that do not derive from old ideas put together.
3. We classify ideas into broader concepts and find seemingly non-obvious connections.
4. We are now able to look at the problem with a different perspective.

### *3.1.2 Interactions with nature*

In recent years a large part of research has been concerned with studying the effects of interacting with nature. One example is the study conducted by Ulrich's (1984), in which it emerges that hospitals' rooms overlooking the surrounding nature have a positive impact on recovery. Another interesting example is the study conducted by Tennessen and Cimprich (1995), in which it was shown that students living in dorms with greater visibility of naturalistic landscapes had better scores on attention-demanding tests. Again, a short walk in nature has been shown to improve an individual's cognitive faculties for at least 30 minutes (Gidlow, 2016). Looking at images or videos of nature has also been shown to produce beneficial effects on individuals from reducing stress (e.g., Beukeboom, Langeveld, & Tanja-Dijkstra, 2012) to increasing cognitive abilities (e.g., Berman et al., 2008, Pilotti et al., 2015). Plambech and Konijnendijk (2015), proposed a qualitative outlook on the study of and it was found that nature stimulates curiosity and a more flexible approach of thinking. Finally, a study conducted by Williams and Lee (2018), found that certain mental processes taking place during nature experience result in greater flexibility and novel association of ideas.

These findings support the Attention Restoration Theory proposed by Kaplan (1995). This theory is considered a landmark study when dealing with human well-being and nature: it states that people benefit greatly from spending time or even looking at nature and can concentrate better when in contact with a quiet environment. According to the theory, the naturalistic environment carries certain characteristics that allow it to restore resources that humans might have lost. The theory refers to psychological (such as attention and emotions), physiological (such as stress) or even social resources. Therefore, the naturalistic environment is called

“restorative”. Kaplan mention some characteristics that the environment must have to be defined in this way.

- *Fascination*: the external environment can create awe in individuals.
- *Being away*: nature can make the mind feel free and far away from the problems of daily life.
- *Extension*: the feeling of being able to move in the environment by referring to the elements and clues it provides us.
- *Compatibility*: all the elements we find in an environment that match our goals and preferences.

### 3.1.3 Nature's impact on creativity

The relationship between creativity and nature has long been the subject of investigation and study by environmental psychology. Numerous studies have demonstrated the positive impact that nature has on individuals and on their wellness (Herzog, Chen, 2004). An example is the study conducted by Yu and Heish (2020): their research showed that the creative abilities of a group of individuals improved by 27.74% when faced with a three-day workshop in nature. Another study interested in showing the impact of nature on creativity was conducted by Atchley and Strayer in 2012. It documented how an experience set in nature has a positive impact on the development of its participants' creativity when measured by the Remote Associates Test of Creativity. Several groups of individuals completed the test during nature trips to Alaska, Colorado, Maine, or Washington. The result of the study showed that the score obtained from the creativity test increased after 4 days of full immersion in a naturalistic environment. To define what convergent thinking is we have to recall the theory proposed by

Guilford (1967). According to Guilford, convergent and divergent thinking are two essential components of the creative process. Divergent thinking refers to a way of thinking in which the person comes up with more than one idea because the situation is vague. Practically, this style of thinking is associated with situations in which there is more than one correct solution. On the other hand, convergent thinking allows to give a single solution to a specific problem (this way of thinking is often measured through the Remote Associates Test of creativity).

### **3.2 Research Model**

The purpose of this study is to explore how outdoor experiences impact human creativity. As already mentioned in the section of this paper dedicated to the review of the existing literature on this topic, there are many studies confirming that this positive relation does exist. In this specific study, the research model takes into consideration also two additional variables: the personality of the participants and their outdoor experience (their previous experience in outdoor settings). Hence, the model is composed by four variables: creativity, outdoor experience, personality traits and outdoor background.

#### *3.2.1 Variables*

- Dependent Variable: Creativity

Research shows that creativity is a complex variable to test. The first issue to take into consideration is that there are several research instruments. In fact, since this topic is very complex and diversified, researchers have different approaches according to their own point of

view. Research instruments are often limited (by confirmation biases or Pygmalion effects) and therefore have several restrictions. This is why researchers that seek to measure creativity face many challenges: from defining creativity, determining which aspects need to be valued and measured and finally what are the most suitable instruments to do so. The RAT test I used in the experiment was composed by ten questions, each one composed by three words. To avoid a collaboration among the participants, I realized 5 different tests, each one composed by ten different triads. Moreover, before administering the test, a brief example (made of two triads that were not included in the actual study) was given to the students to familiarize with the test. Since the outdoor group was not allowed to use electronic devices, a paper-pencil survey was administered. On the contrary, the indoor group answered a web-based survey.

- Independent Variable: Outdoor experience

The purpose of this study is to explore the impact of a 7 days experience in the wild on the participants' creativity. The sample was made up of 74 boys and girls, aged 12-16, who spent a week in Tuscany, in a place completely immersed in nature. Participants were members of a scout group from Rome, and they were attending a summer training camp that is organized every year in July. Moreover, they were not allowed to have phones or other electronic devices. All daily activities were organized using natural materials and involved the development of different abilities. For instance, each sub-group participants had been divided into, had to cook for themselves, had to build their dining table and had to clean and keep tidy the area assigned to each sub-group

This summer training camp was organized by a Scout group from the south of Rome, and the aim of this experience was for children to spend time completely immersed in nature, away from all the distractions they are used to. The main purpose of this experience is to keep them entertained by enjoying only what nature and imagination offer.

- Control variables

#### Gender

Respondents' gender was assessed in order to control results.

#### Outdoor background

Outdoor background refers to prior experience with respect to outdoor activities. Six questions were developed to investigate time spent in nature beyond the summer camp and the importance of the outdoor activities in each participant's life. The questions that were asked of the participants are the following:

1. Have your parents involved you in nature activities since childhood?
2. Has your school involved you in nature activities?
3. Would you like to have the opportunity to have more outdoor experiences?
4. Do you enjoy watching nature documentaries in your free time?
5. Do you belong to organizations that promote outdoor activities?
6. If you answered yes at the previous question, how often do you participate in outdoor activities?

There were only two possible answers for each question: "yes" or "no." Each affirmative answer earned one point while the negative answer was associated with a score of zero. The individual who answered affirmatively to all questions would score 6/6.

#### Energy - Extroversion

Extroversion refers to aspects such as being active, interest for social relationships, enthusiasm, energetic and self-confidence. High levels of extroversion relate to people who favor direct and immediate contact with reality, especially with regard to social interactions, which attracts them greatly. On the contrary, people with low levels of extroversion have a different view of the world to the extent that reality induces them to the formulation of concepts, ideas, without any practical outcome.

#### Agreeableness

Agreeableness is a personality trait that refers to people that are perceived as cooperative, warm, kind, and altruistic. On the contrary, people with a low level of agreeableness are more associated to a selfish way of being and less empathic.

#### Conscientiousness

Conscientiousness is the personality trait of being cautious and diligent. Conscientious people take very seriously what other people ask them to do and tend to be very efficient and methodical. The contrary of being conscientious is a much more easygoing way of being, associated with spontaneous decisions and a less rational mind.

## Emotional instability

Emotional instability pertains to a proneness to experience feelings of nervousness, sadness, anxiety, and anger. It is considered a personality disorder and those affected have unstable social relationships and they can engage in dangerous behaviors toward themselves.

## Intellect - Openness

Open-mindedness is responsiveness to new ideas and experiences. On the one hand, it implies an attitude of being open to the new, different, and unknown, and on the other hand, it requires the ability to incorporate these new things into ourselves.

### **3.3 Research Methodology**

#### *3.3.1 Data Collection process and measurement development*

The following methodology was adopted: one questionnaire was administered to participants on the first day of the summer training camp while the second was administered at the end of the experience. The data collection process was closed with 37 valid responses from the main test group and 37 from the control group. In order to test and validate the research model proposed, we followed a quantitative approach by conducting a survey. Each questionnaire remained anonymous and consisted of 3 main blocks. The first block made up of some questions aimed at measuring creativity. To do this, the Remote Associates Test was used, a test within which there are 10 questions, each consisting of three words seemingly unrelated to each other: the goal is to find the fourth word that links all three. All participants had 10 minutes to complete

the creativity test. The second block consisted of a demographic section, aimed at measuring the participant's prior outdoor experience. The questions that were asked in this phase were intended to investigate how often participants engaged in nature activities outside of their scout membership. Finally, the third and last block: the Big Five Questionnaire (a very useful tool for studying the five most common personality traits described earlier). To prevent the respondents from collaborating with each other in the first section related to creativity, 5 different surveys were administered. On the other hand, the second and third sections were the same for all respondents, since no significant risk of collaboration was identified. As indicated earlier, the initial test (administered at the beginning of the summer training camp) was followed by a second one (conducted at the end of the same event). While the initial test consisted of three sections, the second one consisted of one section only: the one related to creativity.

### 3.3.2 Data analysis

Data were analyzed using descriptive statistics and a linear regression. Respondent characteristics were summarized in the following table:

<b>Variables</b>	<b>Observations</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>Outdoor experience</b>	74	0,50	0,50	0	1
<b>Gender</b>	74	0,53	0,50	0	1
<b>Initial score</b>	74	2,05	2,65	0	9
<b>Final score</b>	74	2,73	2,85	0	10
<b>Background outdoor</b>	74	0,43	0,50	0	1
<b>Energy_Extroversion</b>	73	3,45	0,95	1,5	5
<b>Agreeableness</b>	73	3,04	0,83	1	5
<b>Conscientiousness</b>	72	3,31	0,84	1	5
<b>Emotional instability</b>	72	2,80	1,07	1	5
<b>Intellect_Openness</b>	73	3,31	1,04	1	5

Table 1. Descriptive Statistics

There were 37 participants for the treatment group and 37 for the control group for a total of 74 people. The variable "outdoor experience" was represented through a dichotomous variable of values 0 and 1 (in 50% of the cases it took value 1 and in the remaining 50% it took value 0). Of these 74 people, 39 were male, represented in the table with a "1", and the remaining 35 were female, represented in the table with the "0". Regarding the creativity test, the following results were obtained: the average result of the score obtained in the initial test was 2.05 (SD=2.65) with a minimum score obtained equal to 0 and a maximum score obtained equal to 9/10; the average result of the score obtained in the final test was 2.73 (SD=2.85) with a minimum score obtained equal to 0 and a maximum score obtained equal to 10/10. The Background Outdoor Activity variable was coded as "1" or "0". "1" if respondents had scored above 3 and "0" for values below 3. In this way, we controlled whether respondents had prior experience with respect to outdoor activities. For the study of participants' factors of personality, the Big Five Questionnaire for Children (BFQ-C) was used. Each of the five personality traits consisted of 13 items: each item had to be scored on a five-point Likert scale ranging from 1 = almost never to 5 = almost always. All item scores are combined to yield a total score for each personality trait. The number of observations is smaller than the total number of respondents to the survey as some left the answers incomplete and their responses were excluded. Specifically in the case of the variable "Energy\_Extroversion," only one response from the treatment group was considered invalid and therefore excluded. The same applies for the variable "Agreeableness." For the variables "Conscientiousness" and "Emotional instability" two responses were deemed invalid and excluded: one within the treatment group and one in the control group. Finally, for the variable "Intellect\_Openness" only one response was deemed invalid and excluded, within the treatment group.

The mean values obtained from the individual personality traits were calculated as the arithmetic mean of the scores obtained in the individual items (13 for each of the five traits). "Energy\_Extroversion" obtained a mean value of 3.45 (SD=0.95), the highest among all five personality traits. "Agreeableness" obtained a mean value of 3.04 (SD=0.83), "Conscientiousness" obtained a mean value of 3.31 (SD=0.84), "Emotional instability" obtained a mean value of 2.80 (SD=1.07) and finally "Intellect\_openness" obtained a mean value of 3.31 (SD=1.04).

	<b>Coeff</b>	<b>Rob Std.Err</b>	<b>t</b>	<b>P&gt; t </b>	<b>95% Conf. Interval</b>	
<b>Outdootactivity</b>	1,221	0,679	1,800	0,077	-0,136	2,577
<b>Background Outdoor</b>	-0,587	0,843	-0,700	0,489	-2,271	1,097
<b>Gender</b>	-0,471	0,716	-0,660	0,513	-1,902	0,960
<b>ENEXT</b>	0,121	0,375	0,320	0,748	-0,628	0,869
<b>AGREE</b>	-0,775	0,470	-1,650	0,104	-1,714	0,164
<b>COSC</b>	-0,261	0,338	-0,770	0,444	-0,937	0,416
<b>EMOTINST</b>	0,268	0,278	0,960	0,339	-0,288	0,824
<b>INTOPENN</b>	0,341	0,410	0,830	0,409	-0,479	1,162
<b>_cons</b>	1,504	1,862	0,810	0,422	-2,217	5,224
<b>R-Squared= 0,368</b>						

Table 2. Linear Regression

SPSS, a statistical software, has been used in order to test the actual relationship of the variables studied and a linear regression has been performed. The dependent variable used was the delta score in the creativity test, while the independent variable was the outdoor activity (defined as participation in summer training camp). The control variables included in the regression were: gender, outdoor background and the Big Five personality traits. We studied the hypothesis looking at R square, t-value, Beta. In particular, the following results have been obtained: outdoor activity impacts positively the delta score of creativity and it is statistically significant, since the marginal effect is  $\beta = 1,221$  with  $p < 0.1$ ; thus, confirming the hypothesis that outdoor

activities have a positive impact on creativity. As for the control variables, the results obtained from the regression found that none of them are statistically significant and therefore they do not influence the dependent variable. R-squared is moderate (R-squared= 0,368) this means that approximately 60% of the variability in the outcome data cannot be explained by the model.

The Kaiser-Meyer-Olkin index and Bartlett's test of sphericity were used to measure sample adequacy. The Kaiser-Meyer-Olkin test determines whether the variables considered are consistent for the use of a principal components analysis. Its value is 0.614 and, therefore, the adequacy of the sample is adequate. Regarding Bartlett's test of sphericity, the p-value is 0, and thus we can conclude that the studied variables are correlated with each other.

<b>Misura di Kaiser-Meyer-Olkin di adeguatezza del campionamento</b>	0,614
<b>Test della sfericit� di Bartlett</b>	
<i>Appross. Chi-quadrato</i>	423,489
<i>gl</i>	136
<i>Sign.</i>	0,000

Table 3. KMO and Bartlett's test of sphericity

### 3.4 Discussion

Studying cognitive skills such as creativity within a naturalistic environment is no easy task. In this respect, this study is unique because not only it investigated the impact of spending an extended period of time in nature, but the tests themselves were administered in the course of a summer camp there there was no external interference. Despite many difficulties were

encountered in conducting a test in this type of environment, the current research shows that there is a clear and quantifiable cognitive advantage to be realized when we spend time fully immersed in nature. In fact, a significant increase in creativity was found (through the use of the RAT Test of Creativity) in a group of young boys and girls who took part in a week-long nature summer camp compared to an indoor control group. In addition to the impact of nature on individual creativity, this research also investigated the role played by other variables: specifically, the five personality traits developed from psychological trait theory and the previous outdoor experiences participants had.

Most likely, the increase in the cognitive abilities of the participants, is due to many dynamics and mechanisms that are triggered in the naturalistic environment. For this reason, more comprehensive studies would be needed to understand this phenomenon in depth. One explanation could be that naturalistic environments have the ability to elicit a kind of gentle, soft fascination, and are both emotionally positive and low-arousing (Kaplan S. 2008). It is also worth noting that with the rapid decline of outdoor practices we are experiencing a rapid spread of adoption and dependence on technology (Zaradic PA, 2006). In this sense, the results obtained from this experiment are even more interesting: in fact, the participants were not allowed to use any kind of technological tools during the entire time spent in nature.

According to some recent studies from the literature, it has been observed that exposure to naturalistic environments could trigger the "default mode" (Singh V, 2012). The default mode refers to areas of the human brain that are activated by certain specific situations, such as moments of restful introspection. During these moments the mind has been shown to be more efficient in performing tasks that employ frontal lobe function, such as divergent thinking

(Immordino-Yang et al., 2012; Raichle et al., 2001). With this in mind, a situation such as a mountain hike, or canoe ride could stimulate a state of introspection and mind wandering which can trigger the default mode.

### **3.5 Conclusion, limitations, and implications for future research**

This study has some limitations. First of all, it is not possible to determine whether the results obtained are the consequence of exposure to nature, reduced use of technology, or other factors related to the 7-day retreat in nature. Moreover, during the experience, participants took part in many types of activities: group games, cooking and building competitions. As a result, it's difficult to identify whether it was the nature itself or some of these outdoor activities that stimulated the participants' cognitive activities. A similar problem relates to the children who did not participate in the experience: future studies could analyse what the control group did during that time frame. Another limitation is due to the fact that participants in the outdoor experience shared a particular interest in nature programs and, as a result, they were all very comfortable in the wilderness setting. The result is that we cannot assume that the same findings apply to different populations, and we must be very careful about applying these findings to different groups. This limitation could be overcome by proposing a similar experiment in the future where the participants in the treatment group are boys and girls who are unfamiliar with the outdoor environment, just like the participants in the control group. An additional weakness of this study is that the participants in this experiment are very young. Consequently, it is plausible to think that the effect that nature had on their cognitive abilities is different from the effect that nature might have on people of a more advanced age (and more structured mind set) such as managers. Future studies could investigate the extent to which nature influences

creativity among youngster and managers and show how aspects such as business processes and prior experience influence this relationship.

In conclusion, we can say that nature immersion can be a way to increase creativity in young adults but, most importantly, these results may be extended to college students or managers. This results in several proposals: for instance, within universities, teachers could consider supplementing undergraduate courses (especially those courses where creativity is a key success factor, e.g. design, software engineering, etcetera) with outdoor activities aimed at developing creative skills. Or, within a corporate environment, hiking events (as an example) could be organized to promote the development of creativity among the employees. Finally, the practice of outdoor activities could be used as an evaluation criterion in a selection process in which a creative person is desired.

## References

1. Atchley, R. A., Strayer, D. L., & Atchley, P. (2012). Creativity in the wild: Improving creative reasoning through immersion in natural settings. *PloS one*, 7(12), e51474.
2. Amabile, T. (2011). *Componential theory of creativity* (pp. 538-559). Boston, MA: Harvard Business School.
3. Barbaranelli, C., Caprara, G. V., Rabasca, A., & Pastorelli, C. (2003). A questionnaire for measuring the Big Five in late childhood. *Personality and individual differences*, 34(4), 645-664.
4. Berman, M. C., Jonides, J., & Kaplan, S. (2008). The cognitive benefits of interacting with nature. *Psychological Science*, 19, 1207–1212.
5. Berto, R. (2005). Exposure to restorative environments helps restore attentional capacity. *Journal of Environmental Psychology*, 25, 249–259.
6. Chulvi, V., Agost, M. J., Felip, F., & Gual, J. (2020). Natural elements in the designer's work environment influence the creativity of their results. *Journal of Building Engineering*, 28, 101033.
7. Collins, M. A., & Amabile, T. M. (1999). Motivation and creativity.
8. Dul, J., & Ceylan, C. (2011). Work environments for employee creativity. *Ergonomics*, 54(1), 12-20.
9. Felsten, G. (2009). Where to take a study break on the college campus: An attention restoration theory perspective. *Journal of Environmental Psychology*, 29, 160–167
10. Ferraro III, F. M. (2015). Enhancement of convergent creativity following a multiday wilderness experience. *Ecopsychology*, 7(1), 7-11.
11. Gidlow, C. J., Jones, M. V., Hurst, G., Masterson, D., Clark-Carter, D., Tarvainen, M. P., ... & Nieuwenhuijsen, M. (2016). Where to put your best foot forward: Psychophysiological responses to walking in natural and urban environments. *Journal of environmental psychology*, 45, 22-29.
12. Guilford, J. P. (1967). Creativity: Yesterday, today and tomorrow. *The Journal of Creative Behavior*, 1(1), 3-14.
13. Hennessey, B. A., & Amabile, T. M. (2010). Creativity. *Annual review of psychology*, 61, 569-598.
14. Herzog, T. R., Chen, H. C., & Primeau, J. S. (2002). Perception of the restorative potential of natural and other settings. *Journal of environmental psychology*, 22(3), 295-306.
15. Immordino-Yang, M. H., Christodoulou, J. A., & Singh, V. (2012). Rest is not idleness. Implications of the brain's default mode for human development and education. *Perspectives on Psychological Science*, 7, 352–364.
16. Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, 15, 169–182.
17. Mednick, S. A. (1962). The associative basis of the creative process. *Psychological Review*, 69, 220–232.

18. Mednick, S. A., & Mednick, M. T. (1967). Examiner's manual: Remote Associates Test. Boston, MA: Houghton Mifflin.
19. Muris, P., Meesters, C., & Diederens, R. (2005). Psychometric properties of the Big Five Questionnaire for Children (BFQ-C) in a Dutch sample of young adolescents. *Personality and individual differences*, 38(8), 1757-1769.
20. Neilson, B. N., Craig, C. M., Travis, A. T., & Klein, M. I. (2019). A review of the limitations of Attention Restoration Theory and the importance of its future research for the improvement of well-being in urban living. *Visions for Sustainability*, 11, 59-67.
21. Plambech, T., & Van Den Bosch, C. C. K. (2015). The impact of nature on creativity—A study among Danish creative professionals. *Urban Forestry & Urban Greening*, 14(2), 255-263.
22. Ratcliffe, E., Gatersleben, B., Sowden, P. T., & Korpela, K. M. (2022). Understanding the perceived benefits of nature for creativity. *The Journal of Creative Behavior*, 56(2), 215-231.
23. Salvi, C., Costantini, G., Pace, A., & Palmiero, M. (2020). Validation of the Italian remote associate test. *The Journal of creative behavior*, 54(1), 62-74.
24. Tennessen, C. M., & Cimprich, B. (1995). Views to nature: Effects on attention. *Journal of Environmental Psychology*, 15, 77-85.
25. Uhls, Y. T., Michiyani, M., Morris, J., Garcia, D., Small, G. W., Zgourou, E., & Greenfield, P. M. (2014). Five days at outdoor education camp without screens improves preteen skills with nonverbal emotion cues. *Computers in Human Behavior*, 39, 387-392.
26. Ulrich, R. S. (1983). Aesthetic and affective responses to natural environment. In I. Altman & J. F. Wohlwill (Eds.), *Human behavior and environment* (Vol. 6, pp. 85-125). New York: Plenum.
27. Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *science*, 224(4647), 420-421.
28. Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology*, 11, 201-230.
29. van Rompay, T. J., & Jol, T. (2016). Wild and free: Unpredictability and spaciousness as predictors of creative performance. *Journal of environmental psychology*, 48, 140-148.
30. Williams, K. J., Lee, K. E., Hartig, T., Sargent, L. D., Williams, N. S., & Johnson, K. A. (2018). Conceptualising creativity benefits of nature experience: Attention restoration and mind wandering as complementary processes. *Journal of Environmental Psychology*, 59, 36-45.
31. Williams, K. J., Lee, K. E., Hartig, T., Sargent, L. D., Williams, N. S., & Johnson, K. A. (2018). Conceptualising creativity benefits of nature experience: Attention restoration and mind wandering as complementary processes. *Journal of Environmental Psychology*, 59, 36-45.
32. Yu, C. P. S., & Hsieh, H. (2020). Beyond restorative benefits: Evaluating the effect of forest therapy on creativity. *Urban Forestry & Urban Greening*, 51, 126670.

33. Ekvall, G. (1996). Organizational climate for creativity and innovation. *European journal of work and organizational psychology*, 5(1), 105-123.
34. Cropley, D. H., Kaufman, J. C., & Cropley, A. J. (2011). Measuring creativity for innovation management. *Journal of technology management & innovation*, 6(3), 13-30.

## *Executive Summary*

This dissertation deals with the impact nature has on individual creativity. Creativity is a quality of human behavior that is evident in individuals who can recognize new connections between objects, thoughts, and ideas. It is a critically important quality since, in an ever-changing marketplace, the ability to innovate is what can make all the difference. On the other hand, nature is understood as a set of experiences lived out of the indoor environments such as offices or meeting rooms. Numerous studies, conducted by the literature in recent decades, have shown that nature is capable of increasing individual creativity and several studies explained how and why this happen. Therefore, this study aims to investigate the relationship between creativity and nature, as this could expand our knowledge regarding the role of nature in creative processes which may be of great value in today's and tomorrow's society.

This view implies that creativity itself is the engine of evolution and contributor to development and innovation (Hennessey, 2010). The term “engine of evolution’ refers to the fact that it is expressed in reaction to everyday’s problems and challenges. While it is defined as “contributor to development” because it is also defined as the ability to generate new and original ideas which may prove of use. These reasons allow to recognize the importance of stimulating creativity in young people, especially students, so that they are ready for the future. Indeed, research shows that creativity facilitates late-life adaptations and growth (Cohen 1989; Cohen-Shalev 1986, 1989; Dudek & Hall 1991). Regardless of the importance of creativity for some specific groups of individuals, it should be noted that creativity benefits everyone: as mentioned

earlier, creativity stimulates progress in technology, but also in social sciences and humanities (such as art and music).

Despite all these positive implications, there is still much difficulty in defining creativity and its components. In fact, there are numerous definitions of creativity and each one sheds light on specific aspects. The definition proposed by Sawyer (2012) defines creativity as "a new mental combination that is expressed in the world." From this definition, two key elements emerge. The first is that an idea, no matter how innovative, is nothing more than the combination of several existing ideas. The more distant from each other are the original ideas which have been put together, the more original the resulting idea is. The second is the fact that creativity needs to be shared to the world through communication. Without communication, representation, or formalization, one cannot disseminate the results that arise from creativity. The definition proposed by Woodman (1993) states that creativity is "the creation of valuable, useful new product, service, idea, procedure or process by individuals working together in a complex social system." Another example is by Amabile (1996) who states that creativity is "the production of novel and useful ideas or solutions in any domain." According to Dul and Ceylan (2011), creative performance depends on the person, the processes, the social-organizational work environment and the physical characteristics of the working environment. Moreover, it is generally recognized for having several dimensions: flexibility (the number of different meanings), fluency (the number of innovative ideas we have), originality (the ability to have unusual answers to problems) and finally the ability to connect apparently disconnected (or remotely associated) ideas together (Baas, Dreu and Nijstad, 2008).

The concept of creativity has been subject of interest particularly in the field of environmental psychology, which studies the interaction between human beings and nature. Despite this,

creativity has become a "must have" also in the workplace. Today we operate in a highly competitive and global environment, thus making creativity crucial. But what does creativity do for a business or organization? It is precisely creativity that fosters business growth, by means of new ideas. Companies that understand the importance of growing and nurturing creative talent realize that it is a vital part of the corporate culture. Creative thinking is a skill that can be developed but cannot be imposed, and providing the right environment helps stimulate creativity in the workplace and encourage a nontraditional approach to problem solving. It prospers in environments that are inclusive, adaptive, safe, trust-based, that welcome experiments and encourage people to be curious and explore.

Nowadays, the words creativity and innovation are often used as synonyms: being creative is the same as being innovative. In fact, we can talk about a creative (or innovative) person or an innovative (or creative) idea without much difference. However, creativity does not necessarily refer to innovation. Indeed, we can have creativity without innovation, but we cannot talk about innovation without talking about creativity. As indicated earlier, according to the contemporary approach to creativity, "creativity is the production of novel and useful ideas in any domain" while "innovation is the successful implementation of creative ideas within an organization" (Amabile, 1996). These two different ways of viewing creativity and innovation have been further supported by the link between technological innovation and productivity in economic terms. Ultimately, innovation has historically been funded by private and public interventions as opposed to the creative arts, which have remained tied to public funding alone.

We finally come to the most important theme of this paper: the relationship between creativity and nature. It has been demonstrated that nature not only create pleasure and calm but also can

stimulate creativity, something very important in environments where people work or study, such as schools or offices (Berto, 2005). Indeed, nature scenes such as mountain landscapes, waterfalls, forests, or hills have the capacity to create admiration (Chulvi et al., 2020). The admiration is due to their beauty and perfection, which is in no way possible to recreate artificially, as well as to their strength, which creates a feeling of weakness in the face of something so great compared to us (Hsieh et al., 2020). It seems strange that nature can help develop a quality that seems to have nothing in common with it, but there are many studies that have been conducted over the years that show that the relationship between nature and creativity do exist (Korpela *et al.*, 2022). One study which tried to show that nature helps creativity was conducted by researchers at the University of Utah and Kansas. The experiment was quite unique. As many as fifty-six people were divided into eight groups and sent into the mountains, to camps in Alaska, Colorado and Maine. Deprived of every technological accessory, they had to live in the wild for four months. The ability to reason creatively and solve problems and carry out complex cognitive tasks had improved for 28 out of 56 people. One very interesting example occurred in Sweden, where an "outdoor office" was implemented. The results were surprising; in fact, employees reported feeling more creative and inspired (Pettersson Troije et al., 2021). Another study, conducted by Jones (2013), reported similar results in a group of professors who took part in a week-long training session immersed in nature. Based on a self-report, the participants said they felt more creative at the end of the week.

Unfortunately, the amount of time we spend in contact with nature is getting smaller and smaller (Felsten, 2009). Our interaction with electronic devices now takes up much of our day, and digital content satisfies us far more than the outdoor activities. Our lives are increasingly sedentary and are consumed in front of the TV, computer, tablet or smartphone. All these habits

do not contribute to stimulating creativity as we have become accustomed to having our minds always busy and tired. We are depriving our minds of the fertile ground that creativity needs.

This paper then concentrates on the analysis of outdoor activities. The term outdoor literally means "outside" and refers to all those activities that take place outside of closed environments, typically defined as indoor. It often refers to the idea of nature and the practice of sports in naturalistic environments. Recently, the term outdoor has been increasingly associated to a lifestyle that finds in nature the ultimate expression of freedom, recreation, and satisfaction. The concept of outdoor has also become a topic of interest in the fields of psychology and pedagogy: in fact, several studies have been conducted regarding outdoor education and its potential as opposed to standard educational models.

One of the most studied aspects related to outdoor is its educational value. Although the educational aspect is mainly focused on children, it should not be considered unrelated to the educational processes concerning adults in contexts where the learning process continues beyond school (e.g., the working environment). Outdoor education, literally "out-of-door education," is a very promising approach in today's educational landscape. More and more studies have been observing its implications for development of both mental and physical well-being. There are many definitions but, currently, experts do not agree on a common one. In general, outdoor education is seen as an approach that favors direct experiences in contact with the surrounding environment, particularly the natural environment. It can be defined as a sensory-experiential approach, since during outdoor activities people can experience and explore everything around them; the experiences during these activities are direct, mediated only by the senses of the participants. In this context, the natural environment in turn becomes

a mentor, teaching practical and theoretical notions and helping to improve emotional, social, and creative skills.

Many studies have investigated the connection between mental and physical well-being and contact with nature. The evidence collected suggests that benefits brought by contact with nature are not only physical but a large part of them relate to psychological well-being. Considering residential and school settings, in which children spend most of their days, it can be argued that green areas have a positive impact on multiple aspects, such as cognitive functioning, coping and impulse inhibition. Collado and Staats (2019) reported that the overall mood is generally better in places with close contact with nature and this is especially true for children who are generally described as "problematic" by teachers. Taylor and Butts-Wilmsmeyer (2020), suggested that even just the sight of the green color, may help psychological well-being, so windows facing trees and gardens, or green-colored furniture elements may be significant.

This is why there are now numerous organizations that organize some type of outdoor training, also called adventure or experiential learning. These programs are designed to develop leadership and teamwork skills through specific outdoor activities. Outdoor environments tend to eliminate much of the conflict that exists in the office and tend to make managers and their subordinates feel like equals. Of course, outdoor activities require making choices, solving problems, and making compromises, all within a context that generates ambiguity and in which people cannot use their prior experience.

In a business setting, building a dynamic team with strong interpersonal communication is essential to be able to best pursue one's goals. Working in a team where frustration and stress dominate is counterproductive both personally and professionally. For this reason, outdoor team building was born. So that being a team never becomes a weakness at work, but rather a strength. The main component of outdoor team building is nature and wildlife. These are the perfect settings where this experience of inclusion and socialization can be established. In such an environment it is necessary to cooperate, to collaborate, to make the strengths and weaknesses of individuals become those of all. The goal is to have only one strong entity: the team. Building a successful team is every company's dream, but it is not so obvious to achieve it. In fact, work performance depends not only on the technical skills of individuals, but also on their ability to work together towards a common goal. Conducting outdoor training allows you to foster a team spirit and strengthen relationships among team members.

The experiment proposed in this dissertation aims to assess the positive effect (if any) that an outdoor experience has on team's creativity. The context is a summer retreat in the countryside, organized for young boys and girls belonging to a Boy Scout group in Rome. Unlike previous studies, in which the pre-test and post-test were administered to different samples, this experiment will measure the score obtained from the RAT test on the same group of individuals at the beginning and at the end of the naturalistic experience.

The variables that have been studied are the following: creativity (dependent variable), outdoor experience (independent variable), gender and the Big Five personality traits (control variables).

Research shows that creativity is a complex variable to test. The first issue to take into consideration is that there are several research instruments. In fact, since this topic is very complex and diversified, researchers have different approaches according to their own point of view. Research instruments are often limited (by confirmation biases or Pygmalion effects) and therefore have several restrictions. This is why researchers that seek to measure creativity face many challenges: from defining creativity, determining which aspects need to be valued and measured and finally what are the most suitable instruments to do so.

In this experiment, the Remote Associates Test developed by Mednick (1962) was used to test the individual ability to associate apparently disconnected topics. The advantage of this test is that it has a single correct solution and therefore there is a standardized criteria to interpret the scores. This aspect is very important because all the other instruments are based on self-reports of creativity or on judgments made by third parties. Both ways are affected by deep biases.

The independent variable, outdoor experience, has been studied in the following way: a sample of 74 boys and girls, aged 12-16, spent a week in Tuscany, in a place completely immersed in nature. Participants were members of a scout group from Rome, and they were attending a summer camp that is organized every year in July. Moreover, they were not allowed to have phones or other electronic devices. All daily activities were organized using natural materials and involved the development of different abilities. The control variables included in the experiment were gender, outdoor background (meant as the previous experience participants had in nature environments) and finally the Big Five traits of personality (Extroversion, Agreeableness, Conscientiousness, Emotional instability, and Openness).

The following methodology was adopted: one questionnaire was administered to participants on the first day of the summer training camp while the second was administered at the end of the experience. Data collection process was closed with 37 valid responses from the main test group and 37 from the control group. In order to test and validate the research model proposed, we followed a quantitative approach by conducting a survey. Each questionnaire remained anonymous and consisted of 3 main blocks. The first block made of some questions aimed at measuring creativity. To do this, the Remote Associates Test was used, a test within which there are 10 questions, each consisting of three words seemingly unrelated to each other: the goal is to find the fourth word that links all three. All participants had 10 minutes to complete the creativity test. The second block consisted of a demographic section, aimed at measuring the participant's prior outdoor experience. The questions that were asked in this phase were intended to investigate how often participants engaged in nature activities outside of their scout membership. Finally, the third and last block: the Big Five Questionnaire (a very useful tool for studying the five most common personality traits described earlier). To prevent the respondents from collaborating with each other in the first section related to creativity, 5 different surveys were administered. On the other hand, the second and third sections were the same for all respondents since no significant risk of collaboration was identified. As indicated earlier, the initial test (administered at the beginning of the summer training camp) was followed by a second one (conducted at the end of the same event). While the initial test consisted of three sections, the second one consisted of one section only: the one related to creativity.

Despite many difficulties were encountered in conducting a test in this type of environment, the current research shows that there is a clear and quantifiable cognitive advantage to be realized when we spend time fully immersed in nature. In fact, a significant increase in creativity was

found (through the use of the RAT Test of Creativity) in the group of boys and girls who took part in a week-long nature retreat compared to an indoor control group. Nevertheless, this study has some limitations. First of all, it is not possible to determine whether the results obtained are the consequence of exposure to wilderness environment, reduced use of technology, or other factors related to the 7-day retreat in nature. Moreover, during the experience, participants took part in many types of activities: group games, cooking and building competitions. As a result, it's difficult to identify whether it was the nature itself or some of these outdoor activities that stimulated the participants' cognitive activities. An additional weakness of this study is that the participants in this experiment are very young. Consequently, it is plausible to think that the effect that nature had on their cognitive abilities is different from the effect that nature might have on people of a more advanced age (and more structured mind set) such as managers. Future studies could investigate the extent to which nature influences creativity between among youngsters and managers and show how external aspects influence this relationship.

In conclusion, we can say that nature immersion can be a way to increase creativity in young adults but, most importantly, these results may be extended to college students or managers. This results in several proposals: for instance, within universities, teachers could consider supplementing undergraduate courses (especially those courses where creativity is a key success factor, e.g. design, software engineering, etcetera) with outdoor activities aimed at developing creative skills. Or, within a corporate environment, hiking events (as an example) could be organized to promote the development of creativity among the employees. Finally, the practice of outdoor activities could be used as an evaluation criterion in a selection process in which a creative person is desired.

