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Affective Ecology for Sustainability

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Abstract. Affective Ecology is the branch of ecology that deals with our connecting with Nature. Its epistemological statute is interdisciplinary and founded upon two scientific hypotheses: the biophilia hypothesis and the theory of multiple intelligences. Biophilia can be defined as a set of innate learning rules that have evolved in the human species to enable individuals to benefit from a wholesome relationship with Nature; while naturalist intelligence is the ability to recognise living organisms and natural objects, to take care of them and to interact with them in subtle ways. Biophilia and naturalist intelligence can be considered as the two poles of an educational journey about the environment. Biophilia represents the mental energy that nourishes our relationship with Nature; whilst naturalist intelligence is the full realisation of our inborn biophilic potential to connect to the natural world, to pay it attention, to care and to empathise with it. Starting from this theoretical framework, we have evolved a programme of experimental research that has enabled us to make a number of observations regarding the fascination that Nature exercises upon our psyche. Fascination may indeed account for the affective bond that establishes between human beings and Nature in some circumstances and that may also provide a powerful emotive lever favouring of an ethic of sustainability.
Keywords: Affective ecology, active silence, biophilia, fascination, naturalist intelligence.

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***Perspective**: Educational vision*

***Fields**: Earth life support systems*

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The protection of the environment and the search for new eco-sustainable social arrangements cannot ignore from the "type of creatures we are and what we must become in order to survive" (Caldwell, 1995, p. 10). Simply possessing knowledge of Nature is not sufficient to know how to appreciate it, in the same way that it is not sufficient to know that smoking is bad for your health in order to make yourself stop smoking.

We need to go to the root cause of human sentiments, emotions and the instincts that govern the way that we act in relation to the environment. Gaining a deep understanding of Nature is certainly a necessary step, but appreciating Nature – and appreciating ourselves as part of it – involves the human emotional sphere. It is for this reason that alongside Cognitive Ecology, the term we used to describe the science of ecology, its epistemological statute and theory, Affective Ecology also needs be present, the branch of ecology that educates people about Nature by bringing them into direct contact with it; indeed, only by immersing oneself within Nature can the energies be rediscovered that can only be restored by establishing the right kind of connection with Nature (Barbiero, 2011). Cognitive Ecology and Affective Ecology can act in synergy within one another: knowledge may stimulate a more intimate rapport with Nature and a more intimate affective experience of Nature may stimulate a greater desire for knowledge.

1. A theoretical framework for affective ecology

The construction of Affective Ecology requires a solid theoretical framework that regards the phylogenetic and ontogenetic development of the human psyche, a framework into which is it possible to insert specific research hypotheses relative to the Man-Nature relationship. A reliable theoretical framework has started to take form, the origins of which can be traced back to two fundamental discoveries, which curiously were both published in 1984:

a) the human intelligence is not a monolithic construct, but it can instead be divided into different manifestations (Gardner, 1984), one of which can be defined as naturalist intelligence (Gardner, 1999);

b) a set of innate learning rules exist that bind us to Nature and govern our relationship with it: this set of rules manifests as a form of biophilia (Wilson, 1984).

Biophilia, on the one hand, and naturalist intelligence, on the other, constitute the two cornerstones founding research in the field of Affective Ecology (Barbiero, 2011).

1.1 Naturalist Intelligence

Until the mid 1980's a single and almost unanimously shared definition of intelligence existed that was based on three concepts: 1) an individual is born with a certain intelligence, defined as the "intelligence potential"; 2) the intelligence potential is, for the most part, genetically inherited and it is therefore difficult to modify; 3) certain specialised psychologists (psychometrists) are able to recognise this potential by means of a test composed of short-answer questions, and in this way establish the intelligence quotient (IQ) of a person.

This definition of intelligence has various limitations and has been heavily criticised by a new generation of psychologists. Robert Sternberg, for example, whilst at Yale University, discovered that the human intelligence is highly structured and that it manifests itself by means of three principal ways of interpreting reality: analytical intelligence, creative intelligence and practical intelligence (Sternberg, 1985). At roughly the same time, Howard Gardner, a psychologist at Harvard University, reported being able to distinguish at least seven different manifestations of intelligence

(Gardner, 1984). Thus the dogma of intelligence as a uni-polar manifestation in relation to reality no longer held. Despite this, an orthodox school of thought continues to exist today that considers intelligence in the traditional way, but this outlook must now face and consider the experimental data gathered by researchers with others aspirations; scientists who retain that intelligence possesses multiple phenomenology.

Gardner's classification, compared to that of Sternberg and to other similar formulations, has the advantage that it provides a very powerful tool for pedagogy, because it makes use of well-defined distinctions between the different manifestations of intelligence, but it does not separate them. In this model, each manifestation is connected to all others, and since situations commonly occur that require the active interaction of multiple forms of intelligence, the hypothesis that the different manifestations of intelligence operate as an inter-dependent network is born. Gardner groups the different manifestations of intelligence into three key categories: the symbol analyst intelligences, which include linguistic-verbal intelligence (I) and logical-mathematical intelligence (II), which also represent the forms of intelligence best indexed by traditional IQ tests; the intelligences linked to relationships, which include inter-personal intelligence (III) and intra-personal intelligence (IV); and non-canonical intelligences, which include musical intelligence (V), spatial intelligence (VI) and bodily-kinesthetic intelligence (VII). In 1999, Gardner added a further form of intelligence to this last group, the most elusive of all: naturalist intelligence (VIII).

In order to identify each particular form of intelligence, Gardner recognised six general criteria. The first criterion is clinical case studies, where cerebral lesions allowed the loss of specific faculties to be identified. If a preferential cerebral area exists where a certain predisposition tends to be developed and if damage to that specific area results in compromised abilities, then this can be considered as evidence for a neurological basis of that particular manifestation of intelligence. The second criterion is the existence of child prodigies, children that demonstrate particular ability in one of the manifestations of intelligence. It may be that a child is very talented with regard to one manifestation, yet absolutely normal or even below average in the other manifestations. The third criterion regards the capacity to activate distinctive operations (for example, to play an instrument) and the possibility that this operation can be encoded in a symbolic system, for example the notes on a music stave. The fourth criterion is ontogenetic and is connected to the possibility of identifying a psychological and pedagogical course of development that permits the production of individual expertise. The fifth criterion, on the other hand, is phylogenetic: the possibility that evolution might be able to create the background that determines expertise; in this case, expertise would result from a specific and efficacious adaptation that enhances chances of survival. Finally, the sixth criterion is the existence of experimental and psychometric data that permit a determined ability to be detected.

For a long time, naturalist intelligence eluded the criteria adopted by Gardner because it shares a neurological-functional basis with other constructs (for example, later on we will address the importance of attention and empathy) and above all because the distinctive functions of naturalist intelligence cannot be encoded into a rigid symbolic system. Nevertheless, in the end Gardner came to a definition of naturalist intelligence: "Naturalist intelligence processes information related to distinguishing among natural and manmade objects, which is evolutionarily derived from the hominid capacity to recognize, group, and label distinctions among natural phenomena" (Gardner, 2006). This form of intelligence requires developed sensory skills for the perception of objects,

the capacity of logical reasoning that permits such objects to be distinguished and classified on the basis of certain logical parameters, a particular emotional sensitivity towards all that is "natural", and finally a certain existential understanding that allows us to link all these qualities together.

If naturalist intelligence is not only the ability to discern living organisms and natural objects, but it is also the desire/ability to take care and interact with them on a more subtle level, we must ask ourselves what pedagogic strategy is the most adequate to develop this potential to the maximum. As a university lecturer, I have often asked myself what type of naturalists, teachers and professionals am I helping to train? Our students are almost always endowed with good logical-mathematical intelligence, and sometimes they are also able in linguistic-verbal intelligence. But what about their naturalist intelligence? Paradoxically, even in the curricula of courses directed at the natural sciences, it does not seem that naturalist intelligence is deemed to be important.

1.2 Biophilia

Our connection with Nature could run much deeper and be more vital than we suspect. E. O. Wilson, Ecologist and Entomologist at Harvard University, tells about an experience he had in Bernardshop, a small village on the outskirts of a tropical forest in Surinam. Out of the blue, Wilson had a vision in which he "saw" the living creatures that inhabit the village as luminous dots against a black background (Wilson, 1984). An intimate and arcane communion (common union) connects us to living creatures and compels us to love and take care of them. This connection seems to be present in all human beings and has been named biophilia (Wilson, 1984). However, biophilia is not comprised of just a single instinct. Like all complex behaviours that characterise the human species, biophilia is characterised by a set of learning rules. The sentiments and the behaviours that emerge from these learning rules traverse a wide spectrum of different and at times even contradictory emotions: from attraction to aversion, from a sense of peace to one of fear and anxiety (Wilson, 1993). Thus is it not easy to define this human instinct with precision. Nevertheless, many lines of empirical evidence are accumulating that support its existence, such that the biophilia hypothesis "can provide a unifying framework across numerous disciplines to investigate the human relationship with Nature" (Kahn, 1999); it can therefore be justifiably put forward as a plausible evolutionary explanation for a series of innate human behaviours which mould our relationship with the natural world.

But what happens when biophilia is not adequately stimulated? The human functions that regulate our relationship with the natural world can persist, generation after generation, atrophied or manipulated according to the needs of the new environments into which technology has catapulted humanity (Wilson, 1993). "Even apparently remote capacities – such as recognizing automobiles from the sounds of the engines, or detecting novel patterns in a scientific laboratory, or discerning artistic styles – may exploit mechanisms that originally evolved because of their efficacy in distinguishing between, say, toxic and nontoxic ivies, snakes, or berries (Gardner, 1999, p. 50). In modern human culture, biophilia seems to assume the characteristics of an ex-adaptation, a characteristic that was evolved to fulfil a certain purpose and that, with time, has become useful for a different purpose. However, since biophilia is the source of the mental energies that connect us with Nature, we should revert to its primary evolutionary adaptation: the development of a healthy relationship with Nature. The more that we are able to propose and develop educational programmes that stimulate the biophilic instinct, the more effective Affective Ecology will become in helping children, adolescents and adults understand how a

close relationship with Nature is essential for the harmonic development of one's personality.

2. The connection between biophilia and naturalist intelligence

Biophilia and naturalist intelligence can be considered as the two poles of an educational journey. Biophilia is the more ancient of the two; it is the mental energy that nourishes our relationship with the natural world. Naturalist intelligence is the full realisation of our inherent potential to attend, to care for and to empathise with the natural world. Biophilia represents the capacity to relate to the natural world while naturalist intelligence is the capacity to use this psycho-biological potential to create relationships able to resolve the problems that our presence poses upon our natural environment.

In this context, the learning rules that constitute the biophilic construct (that are apparently innate and universal) could constitute the prerequisites necessary for developing naturalist intelligence. Each specific competence is developed starting from precise requirements that are in some way inherent to human nature. For example, analytical intelligences (linguistic-verbal and logical-mathematical) require some prerequisites, like the capacity to become spatially orientated (for example, to distinguish left from right, up from down, and so on), the capacity to categorise in a logical manner (for example, to group objects of the same form, colour, and so on) and the capacity to recognise and distinguish symbols (for example, letters and numbers). The prerequisites arise naturally in all children of a given age. Indeed, no great effort needs to be made to teach these capacities to children. At the most, these elements of development may need to be stimulated in some children who for some reason are delayed in acquiring such skills. However, it is absolutely counterproductive to force them.

We can also observe how a child's relationship with Nature changes with time. From a very young age, between six months and two years of age, children are spontaneously attracted to living forms that move, according to a sort of equation that states " what moves = alive". At around two-three years, an attraction towards the young of many vertebrates develops, while a fear and aversion to spiders, snakes, scorpions and insects, like wasps, develops. Between three and six years of age, children start to demonstrate an interest towards certain types of plant life, especially flowers, fruit and seeds. From the point of view of developmental psychology, these stages are easy to recognise in all children: they correspond to the preoperatory phases (Piaget, 1967) and may be the universal biological basis of biophilia. It therefore stands to reason that these competences are only correctly acquired when the child can come into contact with the right stimuli. Unfortunate events or forcing contact can bring about aversions that sometimes result in biophobias. Alternatively, the absence of stimuli may conceal these potentials and the mental energies that accompany them, as we have seen, are dispersed or used for purposes very different to those for which they were evolved. As this possibility is widespread within our society, it should not be excluded that when the role of biophilia is assigned a lower level of importance than was evolutionarily intended that this can indirectly provoke mental disorders (Louv, 2005; Charles, 2009). Thus it becomes fundamental for the mental integrity of the child that contact with Nature ensues and accompanies a child along his/her entire developmental journey.

Around six years of age, children start to acquire operatory skills that allow them to execute logical thought processes and to engage them with concrete actions and to the concept of time and space. If, until six years of age, the primary learning channel in children is fundamentally of an affective nature, from

this age onwards (and coinciding with the start of formal school education) children also start to develop a cognitive interest for the natural world; they start to become aware of the emotional states of domestic animals, to show an interest for smaller animals, like ants and beetles, and to perceive the plant world as being alive. Between nine and twelve years of age, cognitive development allows them to develop their own interest in nature that continues to expand until it also to includes the non-living world of rocks, water and the natural landscape; while from the start of adolescence, youngsters start to mature ecological awareness, which they express in the form of wanting to care for and conserve the well-being of living species and natural environments. In developmental psychology, this phase appears to be tightly correlated to the development of empathy (LoCoco, 1998).

With this theoretical background, we can now start to formulate some initial ideas about the education of naturalist intelligence. During early childhood (2-6 years) it is important that the biophilic learning rules have the opportunity to be established through adequate sensory-motor and preoperatory experiences of Nature. More cognitive stimuli can be introduced around six years of age, the age at which children start to develop their individuality and are able to open up to the world "beyond the self". The educational process should be directed at reinforcing the biophilic instinct in the child. Progressively, the intellectual interest of the child can be stimulated with an environmental educational programme appropriate for the child's age, trying to maintain, as much as possible, the affective and cognitive components of ecology in balance (Barbiero, 2007).

3. Experimental research

Starting from this theoretical setting – that organises in an interdisciplinary way the empirical experiments of environmental education, the discovery of biophilia and naturalist intelligence, and knowledge about developmental psychology – it has been possible to direct experimental research towards more focussed objectives.

In collaboration with Rita Berto, an environmental psychologist at the University of Padua, we have started to develop an experimental plan, starting from a more precise formulation of the biophilia hypothesis: "the innate tendency to focus upon life and lifelike forms, and in some instances to affiliate with them emotionally" (Wilson, 2002, p. 134). Starting from this definition, we have attempted to isolate and individually analyse the two fundamental constructs of biophilia, attention and empathy, concentrating initially on the former.

In psychology, attention is defined "as the process through which some elements of sensory information are encoded and elaborated whilst other aspects of reality are neglected" (Valenza, 2002). Although our senses continuously receive an enormous mass of stimuli and information originating from both the external and internal environment, only a small part is consciously perceived and thus attracts our attention. Specifically, directed attention is the capacity to activate a state of alertness or to consciously direct ones attention towards the object or process that is of interest. It is a phylogenetically adaptive form of attention and it has evolved in man in response to basic survival needs, developing characteristic neural network configurations corresponding to the different modalities with which it manifests.

However, directed attention cannot be sustained for long periods of time because it requires very large amounts of mental energy and thus a very intense metabolic expenditure. From the evolutionary point of view, the development of processes that regenerate directed attention without jeopardising an individual's capacity to react to stimuli would be extremely useful. Rachel and Stephen Kaplan, environmental psychologists and husband-and-wife research team at the University of Michigan, have studied in great depth the processes that regenerate directed attention and have come to the conclusion that there at least two forms of experience that are able to significantly stimulate the regeneration of directed attention following mental exertion: the wilderness, immersion into an environment perceived as being totally natural (Kaplan, 1995) and mindfulness, a meditation practice that develops the capacity to self-observe and become self-aware (Kaplan, 2001).

These observations have had very important implications for our research because they have allowed us to formulate the fascination hypothesis. According to the Attention Restoration Theory (ART) of Rachel and Stephen Kaplan, fascination is one of the four properties that an environment must possess in order to be regenerative for directed attention; the other properties are: the sensation of being away from ones everyday setting; compatibility of the environment with one's own purposes or inclinations; and the perception that a certain environment has its own consistency within which we can harmoniously insert our own purposes. But compared to the other three properties, fascination is the only one that requires that the subject behaves in a truly passive manner, simply present and attending without expectation. If this is true, it means that the environment, i.e. Nature, is not only a collection of objects, as might a library also be for example, but it has its own precise evocative power within our psyche. It is an active subject in relation to the human observer. It is thus Nature itself that fascinates the human being. It is the human being that becomes fascinated by Nature and that becomes regenerated by it. Indeed, an extraordinary point of convergence can be noted in the cultures of the many and vastly different human populations that have inhabited the Earth that is the maternal bond that connects man to Nature.

The Nature that embraces, that protects and that regenerates is interpreted as a Goddess, with countless epiphanies that have left their traces in the myths and the legends: the Egyptian Iside, the Greek Demetra, the Jewish Sekina, the Celtic Eire, the Latin Tellus Mater, the Scandinavian Freya, the Christian Myriam, and many others. If one wanted to give a name to this regenerative Goddess, perhaps the most appropriate name today would be Gaia, the goddess of Greek cosmogony that the scientific community has borrowed in order to name the fine layer of life that covers the planet, that influences in particular the chemistry of the atmosphere and the temperature of its surfaces (Lovelock, 1979; Volk, 1998). The scientific community sees Gaia as: a golden crib boasting a perfect equilibrium between its chemical and physical elements that permits humanity to survive. But Gaia is also an archetype. Thus might it also be possible that this chemical-physical connection that we have with Gaia can also be perceived on a deeper mental level?

3.1 The Active Silence programme (2006-2009)

One possible interpretation of Wilson's biophilia hypothesis says that Nature is able to trigger a process that activates involuntary attention, which in turn allows directed attention to regenerate itself. A fundamental characteristic of involuntary attention, and of fascination, is the absence of effort. In relation to the natural world, fascination might be the equivalent of involuntary attention: i.e. it is Nature that allures the human being, who

only needs to absorb in a passive manner its regenerative effect upon directed attention. The capacity to become responsive to the allure of Nature may be another of the innate learning rules that characterise biophilia, since shortening the times required to recuperate directed attention might represent an evolutionary advantage. In other words, a genetic predisposition to let oneself be fascinated by Nature and therefore to recuperate quickly from mental fatigue could have conferred to our ancestors the capacity to sustain activities that require directed attention for longer periods of time.

If a phylogenetically determined predisposition to fascination indeed exists, it would constitute an innate mental faculty, and as such it could be consciously cultivated and transformed into a permanent mental state of naturalist intelligence. Nature exerts its fascinations upon us and we can respond by giving it our open attention, without prejudice, in the here and now. In its purest form, open attention shares with fascination the trait of being receptive and effortless, but it can be differentiated by the element of awareness.

With the help of Dinajara Doju Freire, a Zen Buddhist monk, we have perfected an experimental protocol where fascination is exercised through the use of exercises derived from mindfulness meditation techniques. Freire had already experimented and obtained success using these techniques in various primary schools, where the children were exposed to a series of games involving simple self-awareness techniques (Freire, 2007). We have since called this protocol "Active Silence Training" (AST); it uses silent observation, as an instrument to develop self and body awareness, and play, as a way of stimulating fascination and the activation of involuntary attention. The study involved over a hundred children attending a primary school in Aosta (Italy), whom we followed over the course of four years. The objective of the study was to test the effect of Active Silence on certain physiological parameters – including heart rate and arterial blood pressure – and above all its effect on the regeneration of directed attention. The results of this initial phase of the study were very encouraging: the experimental group demonstrated a significant reduction in heart rate, in the absence of variations in arterial blood pressure; moreover the children practicing AST were able to complete a test of sustained directed attention significantly faster than those belonging to the control group (Barbiero, 2014). Not only was it encouraging that the children voluntarily took part in games involving Active Silence Training, but the fact that the exercises were effective in regenerating directed attention was a particularly promising result.

Since spontaneous play is in itself a source of regeneration of a child's attention and since the AST protocol also comprised games involving silent self-awareness (Mindful Silence) and Cooperative Play, in a second study we tried to distinguish between these two components of Active Silence Training. The results of this second study revealed the mindful silence activities to produce significant improvements in the regeneration of directed attention that were longer lasting than those produced by cooperative play, which, on the other hand, induced faster improvements in the regeneration of directed attention but of shorter duration (Berto, 2014).

3.2 The Etroubles conifer wood experiment (2010-2011)

The study of Active Silence Training within the classroom provided us with an important starting point that allowed us to make the next step and propose an experimental protocol that involved bringing the children into direct contact with Nature, nominated the "The Etroubles Conifer Wood Experiment". Etroubles is a small village within the Grand Combin Mountain Community in the Aosta Valley of Italy that

presents a typical alpine landscape (to which the children taking part in the study are very familiar), with expansive meadows that alternate with conifer woods. At the time, we had just started to understand that fascination was a form of attention that did not require the exertion of conscious effort and that following a state of mental fatigue, immersing oneself within a fascinating environment would allow directed attention to rest and to regenerate itself, in accordance with Attention Restoration Theory. But would direct experience of nature prove to be as regenerative as Active Silence Training in the classroom?

To answer this question we needed to adapt the experimental protocol to assess more complex conditions that would take into account the specific state of fascination – or perhaps it is better to say enchantment (in its literal sense) – that the children would find themselves in and that would be all too easy to disrupt, or even bring to an end, when taking our measurements. After much deliberation, we decided to seek assistance from the O Thiasos theatre group from Rome, a group that is experienced in performing in natural environments. We delegated this group the task of accompanying the children whilst they immersed themselves within the wood. With the help of Alice Benessia, a gifted artistic photographer who had been working together with the O Thiasos theatre group for some time, we were able to document the experiment with photographs and by recording the children's comments.

In addition to measuring the usual physiological parameters of the children – heart rate and arterial blood pressure – and evaluating the regeneration of directed attention, we introduced two questionnaires corresponding to the Italian versions of two evaluation scales adapted for primary school children: The Perceived Restorativeness Scale (PRS/IT; Pasini, 2009) and the Connected to Nature Scale (CNS; Mayer & McPherson, 2004). The intention was that the first questionnaire would evaluate the perception of the four regenerative qualities of the environment that the children were experiencing: distance from the everyday setting (the school); fascination of the new environment (the wood); the compatibility of the environment and the freedom to do things within it (facilitated by O Thiasos); the joy of being in the environment. The second questionnaire, on the other hand, was meant to evaluate the level of connectedness that the children felt with the natural world. The CNS is an empirical tool that is widely used in research to evaluate the level of feeling emotionally connection with the natural world. It was the best tool available for making an approximate assessment of biophilia in children.

The expert performers of O Thiasos immediately fascinated the children. As soon as the children disembarked the coach in the car park, accompanied by their teachers, they started along the footpath that led to the conifer wood. Once they were within one hundred meters from the edge of the wood, the O Thiasos performers greeted the children singing – immediately creating an atmosphere that the children happily accepted to accompany them along their explorative journey through the wood and which helped them use of all their senses to grasp the vital energy of their surroundings. We made use of games, singing and story-telling to help the children become fully immersed and feel fully at ease within the environment. Surprisingly, the children responded even better than we could ever have hoped for with regard to the restorative perception of the environment, although their level of emotional connectedness with the environment did not appear to significantly alter (Berto et al., in preparation).

4. Conclusions

Only a naïve scientist would think that psychometric scales, as ingenious and complex as they may be, can justify the

complexity of any human experience, let alone the relationship of man with Nature. During our studies, we also took the opportunity to collect qualitative data and observations; subjective observations experienced at first hand that no test would be able to reveal. But even these qualitative results can only depict a part of the experience, the tip of the iceberg. Moreover, there is all that cannot be measured or detected, but that we nevertheless need to take into consideration.

A second limitation of the observations that we have made until now regards the bias of the observations themselves. All of our studies have so far concentrated on the faculty of attention. We have not yet been able to investigate empathy – the other important mental faculty (Barbiero, 2007) – in a systematic manner, neither in relation to biophilia nor naturalist intelligence. And it is easy to predict that this line of research will also be the bearer of interesting surprises. Nevertheless, we can still derive some conclusions from our series of experiments that, even in their preliminary form, provide a solid starting point for future studies.

The games involving mindful silence and those of cooperative play successfully regenerate directed attention following mental fatigue, most likely through a process involving the activation of a state of fascination (Barbiero, 2014). The games of mindful silence act more directly on the faculty of directed attention (Berto, 2014). However, cooperative play also exerts effects on the sphere of empathy. In the future, it will be interesting to study this second fundamental aspect of biophilia more specifically (Barbiero, 2009), but for the moment we must remain satisfied with the fact that the games of mindful silence and cooperative play are able to act in synergy and can be used effectively as part of "Active Silence Training".

The children found the guided exploration of a natural environment more fascinating than playtime in an artificial environment (Berto, et al., in preparation). It would be interesting to test whether mindful silence and cooperative play can enhance the ability of the children to familiarise themselves with a natural environment or whether these exercises obstruct the perception of being connected with Nature.

It is important to highlight the fact that in no study have we ever been able to modify the perception of being connected with Nature (Berto et al., in preparation). It is probable that this perception is associated with a layer that goes deeper than our relationship with Nature, than the simple perception of the power to restore attention. It is difficult for a person to feel part of a natural world to which we are continuously less and more sporadically exposed. One potential line of research could use mindful silence as a means to establish a deeper and more continued connection, as previously proposed by Kaplan (2001). A heightened awareness of oneself, of one's own body and its senses, might also help us perceive more consciously and deeply the world that surrounds us.

It stands to reason that a deeper connection with Nature can stimulate a sincere interest in all the more intellectual aspects of our relationship with ecology. As observed by Stephan Harding (2008), to establish an affective connection with the natural world brings with it the desire to know it on a deeper level, where the verb "to know" returns to its original meaning of "to love".

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