

## Chapter 19

# Attention and Education: Key Ideas from Charles S. Peirce

Jaime Nubiola<sup>1</sup>

**Abstract.** People working in education easily discover that the key to intellectual growth is attention, because there is where will and intelligence come together. Or, to put it negatively, attention difficulties—what students call ‘concentration problems’—very often reflect breaches in the intimate convergence of affectivity and rationality that frequently result in inefficiency and unproductivity. The objective of this chapter is to recover some of the brilliant insights, not fully appreciated until now, of the American philosopher and scientist Charles S. Peirce (1839–1914)—the founder of pragmatism and one of the ‘fathers’ of contemporary psychology—on the crucial role that attention plays in shaping our inferences and interpretations, that is, in human learning. Aristotle affirmed that human beings began to philosophize when they were moved by wonder, but complementary to this view is the thesis of Charles S. Peirce that the trigger for any genuine research is surprise. It is not only mere admiration that moves us to investigate, but also that which surprises us and demands our attention. Clarifying the role of attention opens the way to a better understanding of desire in moral education. The teachings of Charles S. Peirce—provided here with some textual support—may be extremely useful.

**Keywords:** Attention • Effort • Surprise • C. S. Peirce • Pragmatism

*«L'attention est la forme la plus rare et la plus pure de la générosité».*  
Letter from Simone Weil to Joë Bousquet, 13 April 1942.

### 1 Introduction<sup>2</sup>

People working in education easily discover that the key to intellectual growth is attention. Experts from all disciplines are voicing that mobile phones and electronic devices of all types are stealing the attention and minds of young people who are no longer interested in what educators want to teach them. It is a common place among teachers and the general public the assertion—which is usually also done with claims of scientific rigor—that the internet, cell phones and the proliferation of digital devices in our society are deteriorating the attention capacity of children, young people and, of

---

<sup>1</sup> J. Nubiola  
University of Navarra (Pamplona, Spain)  
jnubiola@unav.es

<sup>2</sup> I am grateful to Magda Bosch for her invitation to take part in this volume. I am also grateful to Sara Barrena and Michael Raposa for their comments and suggestions, and to Alexia Tefel for polishing my English.

course, a good number of adults. This might be somehow a myth (Furedi 2015), but the role of attention in learning is without any doubt a key issue for education.

The objective of this chapter is to recover some of the brilliant insights, not fully appreciated until now, of the American philosopher and scientist Charles S. Peirce (1839–1914)—the founder of pragmatism and one of the ‘fathers’ of contemporary psychology—on the crucial role that attention plays in shaping our inferences and interpretations; that is, in human learning. The chapter is composed of five sections: 2) A brief presentation of the contemporary approach to attention; 3) An introduction to Charles S. Peirce as a scientist, philosopher, educator, and psychologist; 4) Surprise as the trigger of attention: the role of abduction; 5) Some key ideas from Charles S. Peirce for educating attention; and 6) Conclusion.

## 2 The contemporary approach to attention

Although the use of the notion and the term "attention" seems clear in ordinary language, scientists do not agree about its precise definition, nor about its mechanisms. One well-known definition of attention is the one found in William James' *The Principles of Psychology* (1890):

Every one knows what attention is. It is the taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought. Focalization, concentration, of consciousness are of its essence. It implies withdrawal from some things in order to deal effectively with others, and is a condition which has a real opposite in the confused, dazed, scatterbrained state which in French is called *distracted*, and *Zerstreutheit* in German.

In spite of its central role in mental life, attention has been mostly overlooked or neglected in philosophical and psychological studies (Siéroff 2007). Nowadays, attention is a central notion for economy since all the advertising and entertainment business are competing amongst themselves for the attention of their users: the economy of attention is a real issue for the market (Davenport & Beck 2001; Lanham, 2006). Nevertheless, the real psychological processes of attention are poorly understood.

By the 1960s, neuroscience began to transform the study of human behavior in general and attention in particular with new technological devices such as functional magnetic resonance imaging which allows to identify activity in different parts of the brain when the subjects think, feel or act. Where attention is concerned, most experiments involve vision and hearing, since those systems are more suitable for measurement. But, "there's no single, widely accepted way to measure attention, which involves lots of mental processes [...] Research now suggests that like *consciousness* or *mind*, *attention* is a term for a complex neurological and behavioral business that seems like more than the sum of its parts. There's no tidy 'attention center' in the brain" (Gallagher 2009). As this author summarizes:

Neuroscience's truly groundbreaking insight into attention is the discovery that its basic mechanism is a process of selection. This two-part neurological sorting operation allows you to focus by enhancing the most compelling, or "salient," physical object or "high-value" mental subject in your ken and suppressing the rest. Outside an elite scientific

circle, however, this finding's implications for everyday life have been stunningly unremarked.

This point should be highlighted from the beginning: attention is a process of selection. The world is full of stimuli, and when someone pays attention (involuntarily or voluntarily) to some event (for instance, to a car crash when driving, or a movie on a screen at night when one is at home) most of the rest of the world remains in oblivion: "your attentional system selects a certain chunk of what's there, which gets valuable cerebral real estate and, therefore, the chance to affect your behavior. Moreover, this thin slice of life becomes part of your reality and the rest is consigned to the shadows" (Gallagher 2009). On the contrary, when something occupies our mind so intensely that we are not able to draw our attention to the movie we want to watch, we realize that we have a problem, that something disruptive interferes our train of thoughts, claiming for our attention. This example of common everyday experience already suggests the relevant emotional component involved in attention.

"The intelligence can only be led by desire, For there be desire, there must be joy and pleasure. The intelligence only grows and bears fruit in joy. The joy of learning is as indispensable to studies as breathing is to running" (Weil 2012). Happiness is, for most of us, the by-product of focused attention on only one person or activity that interests us; on the contrary, fragmented attention is the most common source of anxiety and distress.

This process of selective attention is essential for learning and intellectual growth. Understanding cognitive processes underlying attention has the potential to help in the design of educational strategies that optimize the development of this capacity and promote children's socio-emotional adjustment and their ability to learn at school (Rueda et al 2016). When students report that they have 'attention difficulties' (what in Spain is known as 'concentration problems'), this very often reflects some breaches in the intimate convergence of affectivity (emotion) and rationality (reason and will). This intimate gap frequently results in inefficiency and unproductiveness. The solution lies not in mere effort, the breath-holding, eyebrows-frowning or the muscle-contractions, that children do when teachers ask them to pay attention, as Simone Weil describes. On the contrary, she explains: "Attention is an effort, perhaps the greatest of all efforts, but it is a negative effort" (Weil 2012). Weil adds:

Attention consists in suspend our thought; letting it become available, empty and able to be penetrated by the object. It means holding the idea close to oneself, but at a lower level and not in contact with it, forced to utilize the diverse knowledge we have acquired [...]. And above all, our thought must be empty, expectant, without searching, but ready to receive the object meant to penetrate it in its naked truth.

Everything said until now clearly suggests that there are different types and levels of attention. For this reason, in order to get a clearer view of the complex behavior of attention, it is useful to classify the different forms in which it appears in our observation. Since the beginning of the twentieth century—as it may be read in the entry on attention in Baldwin's *Dictionary of Philosophy and Psychology* (1901-05)—two main sorts of attention are commonly distinguished: one type, identified as 'reflex,' 'passive,' or sometimes inappropriately called 'spontaneous,' on the one hand; and 'voluntary' or 'active' on the other hand. Attention would be *reflex* when drawn without the subject's foreknowledge by an unexpected stimulation (like the car crash we see

when driving), and *voluntary* when (1) it follows a purpose to attend, or (2) pursues an object intrinsically *interesting*. If the first of these cases is called 'volitional,' the second may be named 'unvolitional' or 'spontaneous,' both being 'voluntary.'

As it was mentioned above, attention is always a *process of selection*, of selective directedness of our mental lives, but the nature of this selectivity is one of the main points of disagreement between the experts of this field and it is also what makes the phenomenon so interesting to study. In some cases attention seems a *perceptual* phenomenon; in other cases it is a phenomenon related to *action*. In some instances the selectivity of attention is *voluntary*, but in other instances it is nonvoluntary, driven, quite independent of the subject's volition, because of the high salience of attention-grabbing items in the perceptual field. Sometimes attention requires effort, but most of the time —as Weil's quotation suggests— it is a *negative effort*, which demands the obviation of distractions. "The difficulty of giving a unified theory of attention that applies to attention's voluntary and involuntary instances, and to its perceptual and enactive instances, makes attention a topic of philosophical interest in its own right," concludes Christopher Mole (2017).

In this somehow perplexing intellectual situation, it might be very useful to get back to the figure and thought of the American scientist and philosopher Charles S. Peirce (1839-1914), who "made a good many quantitative experiments to ascertain what he could of the nature of consciousness and of attention" (CP 7.396, c.1893)<sup>3</sup>.

### 3 Charles S. Peirce as a scientist, philosopher, educator and psychologist

The figure and thought of Charles S. Peirce have remained neglected for decades, but since the last years of the twentieth century there has been a general renewal of interest in his work. The late American novelist Walker Percy wrote on Peirce that "most people have never heard of him, but they will" (Percy 1989), and it seems that this prophetic statement is becoming a reality. In recent times, the figure of Peirce has been gaining an ever-increasing relevance in very different areas of knowledge: astronomy, metrology, geodesy, mathematics, logic, philosophy, theory and history of science, semiotics, linguistics, econometrics, and psychology (Fisch 1980). In all these fields, Peirce has been considered a pioneer, a forerunner and even a 'father' or 'founder' (in the cases of semiotics and pragmatism, for example). As Plowright (2016) has recently asserted, "it is arguable that Peirce's contribution to thinking was, indeed, revolutionary".

Although Charles S. Peirce was a philosopher and a logician, he was first and foremost a real practitioner of science. Not only was he trained as a chemist at Harvard, but for thirty years (1861-91) he worked regularly and strenuously for the U. S. Coast Survey as a metrologist and an observer in astronomy and geodesy. Having done research in astronomy, mathematics, logic and philosophy and in the history of all these sciences, Peirce tried all his life to disclose the logic of scientific inquiry. In addition to his personal experience of scientific practice, his sound knowledge of the history of science and of the history of philosophy helped him establish a general cartography of scientific methodology. In this sense, following Hookway to a certain extent (1985), I

---

<sup>3</sup> The habitual convention for quoting Peirce is used along the chapter: CP refers to his *Collected Papers*, followed by the number of volume and paragraph and the year of composition.

think that the most accurate understanding of Peirce's philosophy is to see him as a traditional, systematic philosopher, one who deals with the modern problems of science, truth and knowledge from a highly valuable personal experience as a logician and as an experimental researcher in the bosom of an international community of scientists and thinkers.

Peirce made relevant contributions to deductive logic, but he was primarily interested in the logic of science, and, especially, in what he called '*abduction*' (as opposed to *deduction* and *induction*), which is the process whereby hypotheses are generated in order to explain the surprising facts. Indeed, Peirce considered abduction to be at the heart, not only of scientific research, but of all ordinary human activities. Science is, for Peirce, "a living historic entity" (CP 1.44, c.1896), and "a living and growing body of truth" (CP 6.428, 1893). Already in his early years, Peirce identified the community of inquirers as essential to scientific rationality (CP 5.311, 1868). The flourishing of scientific reason can only take place in the context of research communities: the pursuit of truth is a corporate task and not an individual search for foundations. Throughout his life, but especially in his later years, Peirce insisted that the popular image of science as something finished and complete is totally opposed to what science really is, at least in its original practical intent. That which constitutes science "is not so much correct conclusions, as it is a correct method. But the method of science is itself a scientific result. It did not spring out of the brain of a beginner, but it was rather a historic attainment and a scientific achievement" (CP 6.428, 1893).

During five years, from the fall of 1879 until December 1884 Charles S. Peirce worked as a part-time lecturer in logic at the recently created Johns Hopkins University, in Baltimore, Maryland, where graduate studies involving research were developed for the first time in the United States. As his students remember, Peirce was an inspiring teacher for committed and advanced graduate students, but perhaps unintelligible to others. For instance, Christine Ladd-Franklin remarks that Peirce as a teacher did not attract because of "anything that could be called an inspiring personality" but rather "by creating the impression that we had before us a profound, original, dispassionate and impassioned seeker of truth" (Ladd-Franklin 1916). Joseph Jastrow, another student of Peirce, highlights that "a deep conviction of the significance of the problems presented and a mastery of the intellectual processes were his sole and adequate pedagogical equipment" (Jastrow 1916).

Since 1862, Peirce became acquainted with experimental psychology, a discipline that had just crossed the Atlantic from Germany. He was considerably impressed by the works of German psychologists such as Weber, Fechner, Wundt, and Helmholtz. In his years at Johns Hopkins, Peirce developed experiments in psychophysics with his student Joseph Jastrow, which were published as "On small differences of sensations" (1884). This made him not only one of the first experimental psychologists in the Americas, but the very first to use sophisticated statistical methods for evaluating psychological experiments (Bellucci 2015; Fisch 1986).

Several authors have stressed the great importance of psychology in Peirce's work, although his role for the development of contemporary psychology has been almost totally neglected in favor of the dominant figures of his colleagues William James and G. Stanley Hall (Cadwallader 1975; Hendrick 1993). It seems important to note that Peirce developed a full semiotic theory that makes it possible to better

understand the attention behavior. To put a simple example, when our mobile phone rings, it calls our attention, but the object of the sound is not to listen attentively to the ringtone, but rather to pick up the phone. The call of attention is addressed towards our action, and our action is embedded in a *habit*: we are used to picking up the mobile phone when it rings (or at least we are costumed to check the name or number of whoever is calling or texting us in order to decide if we want or not to attend to the call or text).

The center of Peirce's psychology is the notion of habit. As he writes in his *Minute Logic*, "the taking of habits [...] is the very market-place of psychology" (CP 7.367, c.1902). A recent author adds: "habits represent a thread that runs throughout all of Peirce's writings" (Massecar 2016). In one of Peirce's seminal anti-Cartesian papers, with the title "Some Consequences of Four Incapacities", there is a description about how attention affects our nervous system taking habits, that deserves to be quoted here in order for us to get a glimpse of Peirce's approach as a psychologist (CP 5.297, 1868):

Attention is roused when the same phenomenon presents itself repeatedly on different occasions, or the same predicate in different subjects. We see that *A* has a certain character, that *B* has the same, *C* has the same; and this excites our attention, so that we say, "*These* have this character." Thus attention is an act of induction; but it is an induction which does not increase our knowledge, because our "*these*" covers nothing but the instances experienced. It is, in short, an argument from enumeration.

Attention produces effects upon the nervous system. These effects are habits, or nervous associations. A habit arises, when, having had the sensation of performing a certain act, *m*, on several occasions *a*, *b*, *c*, we come to do it upon every occurrence of the general event, *l*, of which *a*, *b* and *c* are special cases. That is to say, by the cognition that

Every case of *a*, *b*, or *c*, is a case of *m*,

is determined the cognition that

Every case of *l* is a case of *m*.

Thus the formation of a habit is an induction, and is therefore necessarily connected with attention or abstraction. Voluntary actions result from the sensations produced by habits, as instinctive actions result from our original nature.

This description fits well with the habit mentioned above of picking up the phone when it rings. Even for a lot of people who are accustomed to the mobile phone, they almost instinctively pick up the phone when it rings; we could even say they do this without really making a rational decision. They have a solid habit that allows them to avoid the investment of time or energy in making the decision of whether they want to answer the call or not.

For example, —as Colapietro (2016) describes in a Peircean spirit— the skillful driver effectively ignores any number of vibrations and noises in the car, ones often capturing and even arresting the attention of the novice; as a result, this driver can attend to a host of other factors bearing upon the activity of driving. Obliviousness at one level opens the possibility of attention at another level. "As a result of habituation, the consciousness required initially to acquire these distinct skills and, then, to integrate them in variable patterns gives way to what has been called the *cognitive unconscious*."

Far from being a locus—in a sense, a source— of repressed desires and fears, the cognitive unconscious is a resource of nuanced abilities and skills" (Colapietro 2016).

From this brief presentation of Charles S. Peirce and some of his ideas related with attention, it is easy to get the feeling that this neglected thinker of the nineteenth century can teach us something useful in order to get a clearer view of the role of attention in education.

#### **4 Surprise as the trigger of attention: the role of abduction**

At the very beginning of Western philosophy, Aristotle stated that 'wonder' is the starting point of all search of knowledge. In his well-known passage at the beginning of the *Metaphysics*, he asserts that it is "owing to their wonder that men both now begin and at first began to philosophize; they wondered originally at the obvious difficulties, then advanced little by little and stated difficulties about the greater matters" (982b 12-17). In this line of thought, it is usually said that no high-tech will replace our ability to wonder at ourselves. This is true, but this assertion should be complemented with Peirce's thesis that the trigger of all genuine research is surprise. It is not only that wonder motivates us to research, but the real point is that wonder surprises us, calls our attention and demands our understanding (Nubiola 2005).

Surprise arises from the breaking of a habit; it "breaks in upon some habit of expectation" (CP 6.469, 1908). Our activity of research begins when we realize that we had some erroneous expectation, which perhaps we ourselves were not even conscious of having. Our beliefs are habits, and as such, tend to force the human being to continue in belief until something surprising occurs, some new internal or external experience breaks that habit, and, in some sense, awakes us. A 'surprising' phenomenon demands a regularization that makes the surprise disappear through the creation of a new habit.

Research starts with the acknowledgment of some anomaly, of something surprising. What makes a phenomenon surprising? It is not mere irregularity, for "nobody is surprised that the trees in a forest do not form a regular pattern, or asks for any explanation of such a fact. So, irregularity does not prompt us to ask for an explanation" (CP 7.189, 1901). Mere irregularity creates no surprise where no definite regularity is expected, because in our life irregularity is "the overwhelmingly preponderant rule of experience, and regularity only the strange exception" (CP 7.189, 1901). An event that can be answered in a habitual form does not cause any surprise. On the contrary, a 'surprising' fact requires a change in our rational habit of belief; it demands an explanation requiring our attention. An explanation makes the facts rational, that is, it enables the acquisition of a belief that explains the fact, rendering it reasonable. When the phenomenon is reasonable it is no longer surprising. In Peirce's words:

What an explanation of a phenomenon does is to supply a proposition which, if it had been known to be true before the phenomenon presented itself, would have rendered that phenomenon predictable, if not with certainty, at least as something very likely to occur. It thus renders that phenomenon rational, —that is, makes it a logical consequence, necessary or probable. (CP 7.192, 1901)

The phenomenon of surprise has no relation to Cartesian doubt, which for Peirce is a mere 'paper-doubt' (CP 5.445, 1905; 5.416, 1905). Genuine doubt always has an external origin, usually from surprise, and cannot be produced by an act of the will (CP 5.443, 1905). "There is every reason to suppose that belief came first, and the power of doubting long after. Doubt, usually, perhaps always, takes its rise from surprise, which supposes previous belief; and surprises come with novel environment" (CP 5.512, 1905). Surprise produces some irritation and demands a hypothesis; it forces us to seek an *abduction* which transforms the surprising phenomenon into a reasonable one.

Abduction is a kind of inference that can be characterized by probability (Barrena and Nubiola 2019). The conclusion reached by abduction is conjectural, thus only probable, but, to the researcher, the conclusion seems totally plausible. In Peirce's mature thought, this plausibility, this intuitive force of abduction, is where its validity resides. In his later years Peirce coined the terms «retroduction» or reasoning backwards, and «abduction» to refer to the process of adopting a hypothesis. He dedicated a lot of writings—a good amount of them still unpublished—to the study of this operation. The study of abduction was so important for Peirce that he did not hesitate to write that the question of pragmatism "is nothing else than the question of the logic of abduction" (CP 5.196, 1903). Because Peirce's texts which illustrate his notion of abduction could be multiplied almost indefinitely, I have preferred to quote only the following lengthy one:

*Abduction* is that kind of operation which suggests a statement in no wise contained in the data from which it sets out. There is a more familiar name for it than *abduction*; for it is neither more nor less than guessing. A given object presents an extraordinary combination of characters of which we should like to have an explanation. That there is any explanation of them is a pure assumption; and if there be, it is some one hidden fact which explains them; while there are, perhaps, a million other possible ways of explaining them, if they were not all, unfortunately, false. A man is found in the streets of New York stabbed in the back. The chief of police might open a directory and put his finger on any name and guess that that is the name of the murderer. How much would such a guess be worth? But the number of names in the directory does not approach the multitude of possible laws of attraction which would have accounted for Kepler's laws of planetary motion and in advance of verification by predictions of perturbations etc., would have accounted for them to perfection. (MS 692, 1901: 24-25).

We are now in a position in which it is possible to understand the logical structure of abduction. According to Peirce's explanation in the seventh of his 'Lectures on Pragmatism,' it is the following (CP 5.189, 1903):

The surprising fact, *C*, is observed;

But if *A* were true, *C* would be a matter of course,

Hence, there is reason to suspect that *A* is true.

This is the logical structure of all abductions. The key for understanding it properly is to realize that the trigger of abduction is the surprising character of the fact referred to in the first premise, and the 'motor' is the work of imagination in the second premise. In the second premise, one discovers that if some hypothesis were true it would render the surprising fact to be a matter of course, something normal, reasonable,



and thus, something that is not surprising. If this is the case, it is reasonable to think that *A* is true. Not only are detective stories full of abductive reasoning, but our everyday lives contain also many examples of its effective use. Medical diagnoses, for instance, follow this structure: from certain surprising symptoms and a classification of diseases, some particular disease is chosen to make those symptoms reasonable (Eco and Sebeok 1983; Niño 2001).

Creativity lies essentially in the way in which the subject relates the elements available in the different realms of his or her experience. This is not only an inferential process, for "the abductive suggestion comes to us like a flash. It is an act of insight, although of extremely fallible insight. It is true that the different elements of the hypothesis were in our minds before; but it is the idea of putting together what we had never before dreamed of putting together which flashes the new suggestion before our contemplation" (*CP* 5.181, 1903). It is essential to pay attention to that flash, to that act of insight; otherwise, it will be engulfed in the stream of thoughts and soon forgotten.

## 5 Some key ideas from Charles S. Peirce for educating attention

Scholars on Peirce have started to realize very recently the essential role that attention has in all his conception of the human being, the processes of learning, of intellectual growth, of creativity and education. In this vein Michael Raposa declares with some solemnity: "Peirce's writings, I am convinced, embody a series of brilliant insights, not yet fully appreciated, about the crucial role that attention plays in shaping all of our inferences and interpretations" (Raposa 2017; see also Raposa 2019). In this final section of the chapter, I will deal briefly with five key ideas from Peirce that are relevant not only for educating people's attention, but for most educational processes: 1) Self-control; 2) Fostering the desire to learn; 3) Cultivating *museness*; 4) Love as attention; and 5) Mindfulness.

### 5.1 Self-control

Education must foster a creative way of living, a way of living based on self-control and on taking the reins of one's life. It is not about controlling, but about teaching and promoting self-control (Barrena 2015). "Self-control seems to be the capacity for rising to an extended view of a practical subject instead of seeing only temporary urgency. This is the only freedom of which man has any reason to be proud" (*CP* 5.339 n., 1868). According to Peirce the ultimate aim of education is self-control:

The righteous man is the man who controls his passions, and makes them conform to such ends as he is prepared deliberately to adopt as ultimate. If it were in the nature of a man to be perfectly satisfied to make his personal comfort his ultimate aim, no more blame would attach to him for doing so than attaches to a hog for behaving in the same way. A logical reasoner is a reasoner who exercises great self-control in his intellectual operations; and therefore the logically good is simply a particular species of the morally good (*CP* 5.131, 1903).

In order to understand why self-control is so central in education it might be useful to realize that, according to Peirce, and particularly to William James, "the essence of volition *is* attention" (Raposa 2016). It may be said that education is

ultimately educating attention. Not only does an "educated person" pay attention to details overlooked by an uneducated one, but education also aspires to train the person to the point in which the very person will be the real master of his or her attention. Education in essence may be considered as a matter of *how* one pays attention and to *which* people, actions or things our attention is addressed. We are truly free only when we become *masters* of our attention. "One chooses to pay attention, or, more accurately, one chooses the amount of effort with which to pay attention to whatever attracts one's interest [...] Moreover, the process of choosing is ongoing, a continuous struggle to decide what matters most and to resist distraction. That is how individuals shape the world they inhabit and the sorts of persons they will become in the future", explains Raposa (2003).

In this sense it might be also illustrative to quote another passage from Peirce about the conflicts between desires and personal freedom:

So when certain psychologists write, chiefly in French [...] about "*involuntary attention*," they can only mean one of two things, either *unpremeditated* attention or attention influenced by conflicting *desires*. Though "desire" implies a tendency to volition, and though it is a natural hypothesis that a man cannot *will* to do that which he has no sort of desire to do, yet we all know conflicting desires but too well, and how treacherous they are apt to be; and a desire may perfectly well be discontented with volition, *i.e.*, with what the man *will* do. The consciousness of that truth seems to me to be the root of our consciousness of free will. "Involuntary attention" involves in correct English a contradiction *in adjecto* (CP 1.331, n.d.)

## 5.2 The desire to learn

Thirty years ago, I taped a sign on the door of my office (and it is still there) with Peirce's quote "The life of science is in the desire to learn" (CP 1.235, c.1902), which I learned from the late professor of logic at MIT, George Boolos. Like him, I put it on my door to invite students to come in to inquire, because their questions are really not only the life of science, but also the sparks that set alight my passion of teaching. The professors and students who desire to learn are the real agents, the main characters, of the whole process of education in secondary school and university. Education cannot be understood as the transmission of old solutions to outdated problems, but rather as *a way of life*, to be devoted to learn the truth wherever it may be found.

Although they are well known, Peirce's words about the first rule of reason deserve to be quoted once again (CP 1.136, c.1899):

Upon this first, and in one sense this sole, rule of reason, that in order to learn you must desire to learn, and in so desiring not be satisfied with what you already incline to think, there follows one corollary which itself deserves to be inscribed upon every wall of the city of philosophy:

DO NOT BLOCK THE WAY OF INQUIRY

The natural desire to learn of our students should be fostered and fed on a daily basis by educators. On the contrary, this natural desire could unfortunately be blocked by poorly motivated educators. Everything that is learned is ultimately done so *with*

*pleasure*. On the contrary, as is testified by universal experience across generations, what students have to learn without pleasure is easily forgotten. Along this line, the Deweyan motto of New Education "learning by doing" should be kept as a real guiding principle in all levels of education inspiring students in the scientific spirit of research and discovery. As Barrena has written (2015):

It is necessary to foster in the students a scientific spirit, that is, that spirit that pursues growth and research, with all the intellectual training and the acquisition of habits that entails, that spirit that pursues knowledge and not the mere practical benefit. Students must be researchers. The institutions of teaching must also be institutions of investigation. Learning is discovering. Teachers, who should not be focused on teaching but on learning, must also be researchers. Students and teachers should share moments of doubt, concerns that will lead them to undertake joint research. You cannot give everything done to the students, but you have to find out things, check them experimentally. Teachers must understand and foster the skills students need to ask good questions, to investigate and even make discoveries.

### 5.3 *Musement*

There is a very useful tool to defocus attention, introduce new perspectives and develop our imagination, which both Peirce and Dewey recommended. Peirce calls *musement* this peculiar type of attention that helps us develop creative imagination; it may also be called *daydreaming*, or perhaps mental play. In "The Neglected Argument for the Reality of God" of 1908 (CP 6.458, 1908), Peirce wrote:

There is a certain agreeable occupation of mind which, from its having no distinctive name, I infer is not as commonly practiced as it deserves to be; for indulged in moderately —say through some five to six per cent of one's waking time, perhaps during a stroll— it is refreshing enough more than to repay the expenditure. [...] It involves no purpose save that of casting aside all serious purpose. [...] In fact, it is Pure Play. Now, Play, we all know, is a lively exercise of one's powers. Pure Play has no rules, except this very law of liberty. It bloweth where it listeth. It has no purpose, unless recreation. The particular occupation I mean [...] may take either the form of aesthetic contemplation, or that of distant castle-building (whether in Spain or within one's own moral training), or that of considering some wonder in one of the Universes, or some connection between two of the three, with speculation concerning its cause.

The first of the "three Universes" mentioned above encompasses all "mere Ideas" or pure possibilities, the second embraces the "Brute Actuality of things and facts", and the third comprises "everything which is essentially a Sign" (CP 6.455, 1908; Raposa 2012). The interesting point is that *musement* is a fruitful way of playing with ideas, particular experiences, and signs without a determined purpose. In *musement* the mind goes free, loose, from one thing to another, without following predetermined rules. This way of thinking is governed by the law of liberty, but demands particular training. *Musement* is a mental state of free speculation, without limitation of any kind, in which the mind plays with ideas and can dialogue with what is perceived, in a dialogue made up, not only of words, but also of images; a dialogue in which imagination plays an essential role (CP 6.461, 1908):

Enter your skiff of Musement, push off into the lake of thought, and leave the breath of heaven to swell your sail. With your eyes open, awake to what is about or within you, and open conversation with yourself; for such is all meditation. It is, however, not a conversation in words alone, but is illustrated, like a lecture, with diagrams and with experiments.

Contrary to what it may initially seem, it is through that imaginative wandering (whose paths sometimes might take us very far) where the logical mind reaches its maximum efficiency. For that reason, imagination and mental play are some of the most important areas to be developed in schools. Not surprisingly this activity requires a very peculiar type of attention and education (Dewey *LW* 8, 1933, 347; Barrena 2015). It is a sort of defocusing our attention, of suspending thought, to make it available, empty and penetrable to the object (Weil 2012).

#### **5.4. Love as attention**

Usually, attention is understood as a stressful concentration in our own thoughts or in a more or less painful task. However, it is extremely relevant to understand that most of our attention is usually addressed to what really interests us: people, activities, and so on. In these cases attention does not demand a particular effort from the agent. On the contrary, full attention is very often the mark of pleasure. In this realm, attention and love may ultimately be identified.

Understanding love as attention makes sense, of course, for our social life, but also according to Peirce it is also possible to realize that knowledge grows through love, that our ideas grow in harmony with other ideas thanks to love: "The Law of Love and the Law of Reason are quite at one" (Peirce 1900). Peirce's words, now from "Evolutionary Love" (1893) provide a good statement regarding this concept (*CP* 6.288-9):

The movement of love is circular, at one and the same impulse projecting creations into independency and drawing them into harmony. This seems complicated when stated so; but it is fully summed up in the simple formula we call the Golden Rule. [...] Love is not directed to abstractions but to persons; not to persons we do not know, nor to numbers of people, but to our own dear ones, our family and neighbors. "Our neighbor," we remember, is one whom we live near, not locally perhaps but in life and feeling.

Everybody can see that the statement of St. John is the formula of an evolutionary philosophy, which teaches that growth comes only from love, from I will not say self-sacrifice, but from the ardent impulse to fulfill another's highest impulse. Suppose, for example, that I have an idea that interests me. It is my creation. It is my creature; [...] it is a little person. I love it; and I will sink myself in perfecting it. It is not by dealing out cold justice to the circle of my ideas that I can make them grow, but by cherishing and tending them as I would the flowers in my garden.

Highlighting the role of love as attention in educational processes puts friendship, conversation, and the central role of dialogue at the center the notion of community.

### 5.5. *Mindfulness: Overcoming distractions*

As Raposa (2016) has written, the "intellectual communities to which we might claim allegiance appear to confront the special challenge in our twenty-first century high-information society of a certain heightened threat of potential distractions. I can give neither love nor loyalty to that which I pay no attention". All the people involved in education are seriously concerned about the impact that new technologies are having in the minds of its users, particularly in the minds of the students of the digital generation. The competition for their attention is fierce: these technological resources have been created to "capture and then channel the attention of those who employ them" (Raposa 2016). For this reason, the educators of our century need to learn not only how to use fruitfully the new technologies in the classroom, but, in particular, they should try to learn and personally develop some type of *digital minimalism* in order to be able to capture the attention and love of their students (Newport 2019).

Charles S. Peirce did not use in his writings the term "mindfulness", but the activity of musement just described above might clearly be identified as a form of mindfulness. As Kathleen Hull (2008) has written, "education brings mindfulness, a quality of attention, along with a deliberate, rather than randomly reactive, manner of dealing with the world around us. Learning, on this model, is essentially active and creative, and it is based on wakeful inquiry". The tradition of American pragmatism is a conception of educational activity that insists upon a real engagement between theory and practice. In particular, Peirce insists upon the personal search for truth and he adds also a communitarian dimension in the learning process: it is the community of inquirers that gives shape to our learning in the long run.

The most important thing that we can teach our students with words and particularly with our personal example, is a *form of life* in which thought and love take the reins of our minds and our activity. This is the only real way for overcoming distractions. "We now live in a world that seems almost *designed* to eradicate the inner life", wrote the American poet Christian Wiman (2007). Teaching our students to overcome the powerful attraction of the screens that surround them makes sense only if we are able to offer them a more attractive style of living. The education of attention is probably the most pressing challenge for educators of the twenty-first century, since attention is the password of moral education.

## 6 Conclusion

In this chapter some brilliant insights of the American philosopher and scientist Charles S. Peirce on the crucial role that attention plays in human learning, have been presented. In particular it has been highlighted, on one hand, the role of surprise as the trigger of attention and the key for any genuine research. On the other hand, a healthful clarification of the notion of attention and its types opens the way to a better understanding of the role of desire in education. In this sense, the teachings of Charles S. Peirce (provided here with some textual apparatus) may be extremely useful to educators. "Although today we seem ignorant to it, the formation of the faculty of attention is the true goal and unique interest of all studies" (Weil 2012).

## Bibliographic References

- Barrena, S. (2015) *Pragmatismo y educación. Charles S. Peirce y John Dewey en las aulas*. Madrid: Antonio Machado Libros.
- Barrena, S. & Nubiola, J. (2019). Abduction: The Logic of Creativity. In T. Jappy (Ed.), *The Bloomsbury Companion to Contemporary Peircean Semiotics* (pp. [in press]). London: Bloomsbury.
- Bellucci, F. (2015). Logic, Psychology, and Apperception: Charles S. Peirce and Johann F. Herbart. *Journal of the History of Ideas*, 76(1), 69-91.
- Cadwallader, T. C. (1975). Peirce as an Experimental Psychologist. *Transactions of the Charles S. Peirce Society*, 11, 167-186.
- Colapietro, V. (2016). Habits, Awareness, and Autonomy. In D. West & M. Anderson (Eds.), *Consensus on Peirce's Concept of Habit. Before and Beyond Consciousness* (pp. 297-313). Cham: Springer.
- Davenport, T. H. & Beck, J. C. (2001). *The Attention Economy*. Boston, MA: Harvard Business School Press.
- Dewey, J. (1969-1991). *The Collected Works of John Dewey 1882-1953*, J. A. Boydston (Ed.). Carbondale, IL: Southern Illinois University Press.
- Fisch, M. H. (1980). The Range of Peirce's Relevance. *The Monist*, 63, 269-276; 64, 123-141.
- Fisch, M. H. (1986). *Peirce, Semeiotic and Pragmatism*, K. L. Ketner y C. Kloesel (Eds.). Bloomington, IN: Indiana University Press.
- Furedi, F. (2015, October 11). Age of Distraction: Why the Idea Digital Devices Are Destroying our Concentration and Memory is a Myth. *Independent*. <https://www.independent.co.uk/life-style/gadgets-and-tech/features/age-of-distraction-why-the-idea-digital-devices-are-destroying-our-concentration-and-memory-is-a-a6689776.html>. Accessed 30 August 2019.
- Gallagher, W. (2009). *Rapt. Attention and the Focused Life*. New York: Penguin.
- Hendrick, C. (1993). The Relevance of Peirce for Psychology. In E. C. Moore (Ed.), *Charles S. Peirce and the Philosophy of Science* (pp. 333-349). Tuscaloosa, AL: University of Alabama Press.
- Hookway, C. (1985). *Peirce*. London: Routledge & Kegan Paul.
- Hull, K. (2008). Peircean Teaching. *Transactions of the Charles S. Peirce Society*, 44(2), 204-208.

- James, W. (1890). *Principles of Psychology*. New York: Henry Holt.
- Jastrow, J. (1916). Charles S. Peirce as a Teacher. *Journal of Philosophy, Psychology and Scientific Methods*, 13, 723-726.
- Lanham, R. A. (2006). *The Economics of Attention*. Chicago, IL: The University of Chicago Press.
- Massecar, A. (2016). *Ethical Habits. A Peircean Perspective*, Lanham, MD: Rowman & Littlefield.
- Mole, C. (2017). Attention. In Edward N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. <https://plato.stanford.edu/archives/fall2017/entries/attention/>. Accessed 25 July 2019.
- Newport, C. (2019). *Digital Minimalism. Better with Less Technology*. London: Penguin.
- Nubiola, J. (2005). Abduction or the Logic of Surprise. *Semiotica*, 153(1), 117-130.
- Peirce, C. S. (1900). Review of *Clark University 1889-1899. Decennial Celebration*. *Science*, 9(20), 620-622.
- Peirce, C. S. (1931-1958). *Collected Papers of Charles Sanders Peirce*, vols. 1-8. C. Hartshorne, P. Weiss, & A. W. Burks (Eds.). Cambridge, MA: Harvard University Press. [CP]
- Peirce C. S. & Jastrow, J. (1885). On Small Differences of Sensations. *Memoirs of the National Academy of Sciences*, 3, 75-83.
- Percy, W. (1989). The Divided Creature. *The Wilson Quarterly*, 13, 77-87.
- Plowright, D. (2016). *Charles Sanders Peirce. Pragmatism and Education*. Dordrecht: Springer.
- Raposa, M. (2003). *Meditation & the Martial Arts*. Charlottesville, VA: University of Virginia Press.
- Raposa, M. (2016). Loyalty, Community, and the Task of Attention: On Royce's 'Third Attitude of the Will'. *American Journal of Theology and Philosophy*, 37(2), 109-122.
- Raposa, M. (2017). Review of Gary Slater's *C. S. Peirce and the Nested Continuum Model of Religious Interpretation*". *Transactions of the Charles S. Peirce Society*, 53(3), 491-495.
- Raposa, M. (2019). Review of D. West and M. Anderson (Eds.), *Consensus on Peirce's Concept of Habit. Before and Beyond Consciousness*. *The Pluralist*, 14(2), 112-128.

- Rueda, M. R., Conejero, A. & Guerra, S. (2016). Educating Attention from Neuroscience, *Pensamiento educativo. Revista de Investigación Educativa Latinoamericana*, 53(1), 1-16.
- Siéroff, É. (2007). L'attention dans la psychologie et les neurosciences cognitives actuelles: Une introduction à *La psychologie de l'attention* de Ribot. In T. Ribot, *La psychologie de l'attention* (pp. lii-lxxii). Paris: L'Harmattan.
- Weil, S. (2012). *Awaiting God*. Translated by Brad Jersak. Abbotsford, BC, Canada: Freshwind Press.
- Wiman, C. (2007). *Ambition and Survival: Becoming a Poet*. Port Townsend, WA: Copper Canyon Press.