Colapietro, Vincent; Nöth, Winfried; Cestari, Guilherme H. de O. A dialogue on cognitive semiotics: minds, and machines. *TECCOGS* – Revista Digital de Tecnologias Cognitivas, n. 21, jan./jun. 2020, p. 167-184.

Recebido em: 30 jul. 2020
Aprovado em: 15 ago. 2020

dx.doi.org/
10.23925/1984-3585.2020i21p167-184

A dialogue on cognitive semiotics: minds, and machines[1]

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W.N.: *Technologies of Intelligence and Digital Design*, abbreviated TIDD, the interdisciplinary postgraduate program of the Catholic University of São Paulo, founded by Lucia Santaella, was inaugurated in 2006. In its 15th year of existence, it is offering a number of series under the name "TIDD digital", each dealing with topics from the program's various study fields. We have had series on artificial intelligence and art, artificial intelligence and law, artificial intelligence and ethics, and on intelligent business technologies. Today, I am pleased to introduce a new series on *cognitive semiotics*. It is divided into two episodes. Today, in English, the question is "Cognitive semiotics: What is it?"

The interdisciplinary MA and PhD program TIDD deals with the contemporary challenges posed by the digital technologies. It counts on the cooperation of the following interdisciplines: computation, information technologies, social network, cognition and education, design and esthetic technologies, and artificial intelligence. Today's focus is on cognition, a research field of an interdiscipline of its own, called cognitive science. Collaborators of this research field are scholars from the disciplines of cognitive psychology and philosophy, linguistics and anthropology, computer science, and artificial intelligence.

1 The dialogue took place online on the channel @TIDDigital (linktr.ee/TIDDigital), on July 24, 2020, as Episode 1 of the Series Semiótica Cognitiva under the title "Cognitive Semiotics – What is it?" <facebook.com/events/3287017414683647/>.

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Why should cognition be a topic of research for students whose professional background and perspectives are in areas such as computation, digital design, social networks, robots, or artificial intelligence? Cognition has to do with perception (seeing, hearing, feeling, etc.), thinking, reasoning, memory, learning, emotion, and consciousness. TIDD cannot have the ambition to address all of these issues. Instead, its focus is on questions concerning cognition in more specific respects. How does our daily interaction with intelligent technologies influence or enhance our capacities of cognition? Do computers, robots and other so-called technologies of intelligence perceive? Do they think? May they have beliefs? Are these technologies intelligent at all? Can they feel? Are they autonomous agents? Or do they only imitate human minds, whose instruments they are, while they only *seem* to act like them?

Some answers to such questions from the field of cognitive science can be found in theses elaborated by graduate students of TIDD, among whose topics you can find "Artificial intelligence and bioevolution" (Alexandre Quaresma[5]), "Videogames as complex semiotic machines" (Henrique Bittencourt[6]), "Semiotics of artificial life" (Eduardo Camargo[7]), or "Electronic computers as autonomous semiotic agents" (Ricardo Gazoni[8]). Others can be found in several of the thematic issues of the electronic journal of TIDD, whose title is *Revista Digital de Tecnologias Cognitivas* (TECCOGS[9]). Among its issues that have dealt with the topic of cognition in some way or other are those on "collective intelligence", "cognition and information", "cognitive artifacts for building knowledge", "artificial intelligence", or "digital humanities".

Quite a number of studies on issues of cognition conducted at TIDD have taken inspiration in the philosophy of cognition of Charles S. Peirce. This is why we are happy to have with us, today, the internationally renowned philosopher Vincent Colapietro, who is as much expert in Charles S. Peirce as he is on the philosophy of mind, having been translated into Portuguese with his book *Peirce e a abordagem do self*.[10]

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5 QUARESMA DE MOURA, Alexandre Miranda. *Inteligências artificiais e bioevolução*. Tese (Doutorado), 2020.

6 BITTENCOURT NETO, Levy Henrique. *Videogames como máquinas semióticas complexas*: a emergência dos interpretantes nos jogos digitais. Tese (Doutorado), 2019.

7 CAMARGO, Carlos Eduardo Pires de. *Semiótica da vida artificial*. Tese (Doutorado), 2018.

8 GAZONI, Ricardo Maciel. *Semiótica da programação*: levantamento crítico e perspectivas peircianas. Tese (Doutorado), 2015.

9 <pucsp.br/pos/tidd/teccogs/>.

10 COLAPIETRO, Vincent. *Peirce e a abordagem do self:* uma perspectiva semiótica sobre a subjetividade humana, trad. Newton Milanez. São Paulo: Intermeios, 2014.

Professor Vincent Colapietro was Liberal Arts Research Professor of Philosophy at Penn State University until 2015 and is currently Professor in New England at the Center for the Humanities of the University of Rhode Island. He is well known in São Paulo. For decades, he has been a guest of the Catholic University at conferences organized by Lucia Santaella and Ivo Ibri, among others.

Why should Peirce, who lived from 1839 until 1914, have answers to questions of the philosophy of mind in the 21st century? This could be the leading question in our discussion with professor Colapietro today.

Peirce has actually written on machines in relation to minds, but his relevance to the contemporary philosophy of mind seems to go much beyond the paper of 1887 whose title was "Logical Machines".[11] Peirce was the author of a philosophy that postulated the continuity between mind and matter, and hence human thinking and mechanical computing or reasoning. More specifically, he defended theses such as,

1. Every thought, or cognitive representation, is of the nature of sign.[12]

2. We cannot think without signs since all cognition, all thought, is in signs.[13]

3. The thoughts of a living writer are as much in any printed copy of his writings – and we may add today, in his technology of intelligence – than they are in his brain.[14]

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11 Logical machines, *American Journal of Psychology* 1 (Nov 1887), p. 165-170. W6: 65-72. – Port. 2014. Cestari, Guilherme Henrique de Oliveira; Gazoni, Ricardo Maciel; Nöth, Winfried. Tradução comentada de "Máquinas lógicas" de Charles S. Peirce. *TECCOGS:* Revista digital de tecnologias cognitivas, São Paulo, n. 10, p. 20-47. Disponível em: <pucsp.br/pos/tidd/teccogs/dossies/2014/edicao_10/1-dossie_1traducao_comentada_maquinas_logicas_peirce_guilherme_ricardo_winfried.pdf >. Acesso em: 23 set. 2020.

12 On pragmatism: From a review of a book on cosmology. *CP* 8.191, 1904. [*CP* = Peirce, C. S. *Collected Papers*, vols. 1-6, Hartshorne, C. & Weiss, P. (eds.); vols. 7-8, Burks, A. (ed.) Cambridge, MA: Harvard University Press, 1931-58. – References: *CP* followed by volume, full stop, paragraph number.]

13 Prolegomena to an apology or pragmaticism: "There cannot be thought without signs" (*CP* 4.551, 1906).

14 Psychognosy: "It is much more true that the thoughts of a living writer are in any printed copy of his book than that they are in his brain" (*CP* 7.364, 1902).

4. Thought is not necessarily connected with a brain. It appears in the work of bees, of crystals, and throughout the purely physical world.[15]

5. It is a mistake to conceive of mind and matter as absolutely distinct.[16]

Are such ideas still relevant to the current debate on minds and machines? Dear Vincent, please feel free to choose from these questions and topics the ones that you find of greatest interest to the study of cognition at TIDD, and do not hesitate to address issues that you might find even more relevant. But if you don't mind, please tell us first about some of the links between your own career and studies in cognitive semiotics at the Catholic University of São Paulo.

V.C.: I must begin with a confession. As much as I have read in this transdisciplinary field, and I have read a bit, I am uncertain just what cognitive semiotics is. I know what it might be, and I know what such contemporary representatives of "Cogsem" as Jordan Zlatev take it to be.[17] I also know what a Peircean would take it to be, but when I scan the field, I find that things sometimes need clarification. Imagine looking through a microscope and the thing at which you are looking comes in focus and then gets out of focus.[18] On the prevalent assumptions of many of the leading contributors, the object of inquiry does not stay in clear and stable focus. I think of cognitive semiotics in that fashion: there seems to be an object of study that is finely focused at one moment and then there is a loss of focus a short time later. I find this principally because the relationship with Semiotics is inadequately thought through. Much of what calls itself cognitive semiotics, or for short, Cogsem, seems to have grown out of cognitive science. As a result, it seems not to have sufficiently deep roots in any semiotic theorist, including Peirce, so I must say I am a little bit confused when I read some of this. Is *Cogsem* fully or deeply enough semiotic?

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15 Prolegomena to an apology or pragmaticism (CP 4.551, 1906).

16 Man's glassy essence (CP 6.268, 1891).

17 ZLATEV, Jordan. Cognitive semiotics: An emerging field for the transdisciplinary study of meaning. *The Public Journal of Semiotics* vol. 4, no. 1 (2012), p. 2-24.

18 Jordan ZLATEV's paper (see previous fn.) illustrates this point quite well.

If we approach it from Peirce's point of view, let us imagine what he might have said. Those papers from the late 1860s are part of what is called the "Cognition Series"[19], as you well know. As such, they in effect inaugurate a program of cognitive semiotics. Cognition is, and your quotations sent to me in preparation for this exchange make this point very clearly, very solidly, essentially a semiotic process. All thinking and knowing depend on signs. A facet of this that needs to be highlighted because, with Peirce, the question of knowledge needs to be reframed. There is a sense in which Peirce does not have an epistemology – I know this sounds heretical and I suspect my listeners might be shocked to hear such a claim since Peirce wrote so much about knowledge. But terms have to be used very carefully, including the word *epistemology*. Peirce has no epistemology if we think of epistemology in its traditional form, the theory of knowledge crystallized around the question of skepticism. Epistemology in this sense was the attempt to either prove or disprove the very possibility of us knowing anything at all. To a great extent, Peirce was not interested in that question. He was not out to refute skepticism; rather he was committed to facilitating the growth of knowledge. He was not troubled, as contemporary epistemologists are, by whether knowledge is possible. Peirce was, as just noted, much more concerned with the *growth of know*ledge. There is thus with Peirce a shift – and I am following Joseph Ransdell[20] here – a shift *from* what, traditionally, epistemology has been *to* what methodology or methodeutic ideally ought to be. For Peirce it is primarily a question of "how". – *How* can we take what we know or what we suppose we know and use that to discover what we do not know? The focus is upon learning and upon discovery. It is upon an open-ended process in which the very foundations of what we take to be secure might turn out, in the course of inquiry, to be insecure or unstable.

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19 Peirce's "Cognition Series" consists of following three articles, published in 1868 and 1869 in the *Journal of Speculative Philosophy*: "Questions concerning certain faculties claimed for man" (1868), "Some consequences of four incapacities" (1868), and "Grounds of validity of the laws of logic: Further consequences of four incapacities" (1869). (They have been republished in *CP* 5.213-357, *EP* 1: 11-82 and *W* 2). In his article "The Journal of Speculative Philosophy Papers", C. F. Delany provides a succinct but very helpful account of this series (in *W*2, p. xxxvi-xlii).
EP 1 = *Essential Peirce*, vol. 1. Houser, N, & Kloesel, C. (eds.). Bloomington, IN: Indiana University Press.
W 1, W 2, W6 = *Writings of C. S. Peirce. A chronological edition*, vol. 1, 2, 6. Moore, E. C. *et al.*, eds. Bloomington, IN: Indiana University Press, 1982, 1984, 2000.

20 For example, Ransdell, Joseph. Some leading ideas of Peirce's semiotic. *Semiotica*, vol. 19 (1977), p. 157–178. Ransdell, Joseph. Charles S. Peirce. *In* Sebeok, Thomas A. ed. *Encyclopedic Dictionary of Semiotics*, vol. 2, p. 673-695. Berlin: Mouton de Gruyter, 1986. Ransdell most emphatically made this point regarding methodology as distinct from epistemology in his Presidential Address to the Charles S. Peirce Society, "Peirce and the Socratic tradition". *The Transactions of the Charles S. Peirce Society*, vol. 36, no. 3 (2002), p. 341-56.

I read Peirce as an anti-foundationalist, but equally as an anti-skeptic. We do not need foundations in order to have knowledge. That is the Cartesian trap. to suppose that we need absolutely secure foundations. In supposing, we need such foundations, indeed, in identifying knowledge with absolutely certain truth, we are caught in one of the various Cartesian traps. What we need are self-corrective processes and procedures, what we have to institute, as best we can in the course of inquiry, are self-corrective processes and methods whereby we can detect and correct our errors. For me, then, the pursuit of knowledge is an ever more refined set of self-corrective practices. The emphasis then falls upon process, upon practice, upon embodiment, and upon what is called "enactment". I think Peirce anticipated very clearly an extended theory of mind, so the question of the locus of mind is not in the individual consciousness. It is certainly not in an individual disembodied or purely spiritual consciousness.

Tools are extensions of the body, even such simple technologies as a hammer, a nail, a pencil, and a sheet of paper. It is illuminating to recall here a comment made in 1887 about a logical machine. "It has been contrived to do a certain thing, and it can do nothing else. For instance, the logical machines that have thus far been devised can deal with but a limited number of different letters. The unaided human mind is also limited in this as in other respects; but the mind working with pencil and plenty of paper has no such limitation. It presses on and on, and whatever limits can be assigned to its capacity today, may be over-stepped tomorrow. This is what makes algebra the best of all instruments of thought; nothing is too complicated for it."[21] But may not logical machines also overstep their present limitations? That is, after all, one of the most important if vexing questions we can pose regarding this matter. Imagine what a computer is, as a somatic extension. We pour our intelligence into these collective extended repertoires of artifacts. For me, following Peirce, mind is multiply located it does not have a single or absolute locus. There is a sense in which the community is the locus of intelligence, and my individual intelligence is realized first and foremost by means of my participation in the community of inquiry. The community of inquiry is not to be construed in any mystical or some overly ontological manner, but the community of inquiry is part of the very community of being. "All communication from mind to mind is," Peirce insists, "through continuity of being".[22] My being is continuous with the very being of other beings. This alone makes knowledge possible. While Descartes begins with the assumption that consciousness is cut off from the world, also that it is cut off from

21 Logical machines (see fn. 10) and *w* 6, p. 70-71.

22 Immortality in the light of synechism (*CP* 7.572, c.1892).

its own body, Peirce begins with altogether different assumptions. Moreover, Cartesianism assumes the existence of language without explaining it. It also assumes the existence of an intelligence that is either pre- or extra-linguistic.

Whereas Descartes assumes all of that, Aristotle, Giambattista Vico, Hegel, and Peirce stand in a very different lineage. The body is essential. Other beings, and especially other selves, are essential. I can come to my self-understanding only in and through my relationship to others. This is what Peirce calls *tuism*, from the Latin familiar form of "you", "tu".[23] I am always addressing another whether consciously or with the intention to do so or not. Thought is always addressed to a "thou", to a "tu", to a "you". Rather than a monological conception of thought, we have an irreducibly dialogical conception of thought where the I and the you are equally primordial. No I without a you. No you without an I. That means *we*, you and I together. So, "we" has a reality in Peirce it has in very few philosophers. It certainly had it in Aristotle. It certainly had it in Hegel. But these thinkers are the exception, not the rule.

My first run-through is that there is something exciting happening in what traditionally calls itself cognitive philosophy or cognitive science, or what in contemporary language calls itself cognitive semiotics. But there has not been a careful enough effort to think through the relationship between semiotics and the study of cognition, and cognitive semiotics has been unduly constrained by certain assumptions that we can leave signs aside and focus on meaning. We can think about thinking as computation,[24] and all of these presuppositions seem to me to be erroneous views. If we thought through cognitive semiotics in more strictly, carefully Peircean terms, we would not have to reinvent the wheel to the extent that folks in cognitive semiotics are reinventing the wheel. It seems to me that this would have to begin with a highly flexible but nuanced conception of semiosis – sign activity. From there, we should try to give it specificity and determination by context. Peirce's notion of semiosis is in one sense very abstract and very general, but that enables it to be very concrete, because it can be applied to so many different contexts.

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23 See Fisch, Max H. Introduction. *W* 1, p. xxix, where Fisch quotes Peirce's definition of *tuism* for the *Century Dictionary*.

24 Quite in contrast to Peirce, who would have criticized the view of thinking as computation as reductionist, Kalevi Kull adopts this view in "Virus semiosis". *Transobjeto:* Grupo de estudo dos confrontos entre o realismo especulativo e o realismo peirciano, June 29, 2020. Disponível em: <transobjeto.wordpress.com/2020/06/29/virus-semiosis>. Acesso em: 23 set. 2020.

I think your students are very lucky because you are coming to the study of cognition with a very powerful model of semiosis, mind, and cognition in all of its forms: from perception to the most abstract form of reasoning. You and Lucia Santaella are coming at these phenomena with a very powerful model of at least three things: of meaning, of mind, and of knowledge in all of its forms, but you are not doing it in an antiquarian or a purely scholarly way. You are attuned to the cutting edge of what is going on in the new technologies, of what are the implications of these new technologies and you are trying to marry the older with the newest – not merely the newer – the newest. What is the cutting edge and so coming at it from traditional disciplines like such as linguistics, literary studies, philosophy, psychology, including psychoanalysis. You are coming at these questions from traditional disciplines but with an attunement to what is just now emerging at the cutting edge of cultural processes and practices. I find that immensely exciting. And just one other thing and then I want to hear from you. You mentioned the various groups that make up the constituents of your audience, from design, education, social networks. One of the things that is necessary is to give individuals coming from these diverse backgrounds with these diverse interests a language where they could begin to talk about their common concerns, and what it seems to me Peirce does is precisely that. He gives folks with different interests from different backgrounds with different aspirations a common language in which they can communicate. We cannot learn from one another if we are speaking a completely foreign tongue. We need to have a common tongue, and then we can see the analogies between, for example, design and education.

There is something definitive about Peirce's emphasis on self-criticism. His theory is ultimately a critically reflexive theory. It is a critique of itself in its various applications, and it seems to me that part of the power of Peirce is that he gives us the resources to become ever more self-critical, self-conscious, and self-controlling. I find it immensely important to share a common language with people from disparate and different backgrounds that enable them to be critical of others but much more importantly to be critical of themselves.

W.N.: Thank you for these many ideas. May I pick up some of them that address questions such as artificial intelligence and machines more generally? I would like to hear more about some of your topics. The first was self-correction. You gave much emphasis to self-correction in humans but, as we know, self-correction is a feature precisely of artificial intelligence. Is this one of the points where we can see a convergence of human minds and artificially intelligent machines? I leave it with this question to address the other ones later.

V.C.: Thank you. This is a wonderful question. Let me back up a step and say that there is a very famous passage contained in volume five of Peirce's *Collected Papers*. It is where he distinguishes various grades of self-control. He begins by noting, "of course there are inhibitions and coördinations that entirely escape consciousness".[25] The passage drives toward the conclusion: "The brutes are certainly capable of more than one grade of control; but it seems to me that our superiority to them is more due to our greater number of grades of self-control than it is to our versatility".[26] At this point in the text, the speaker ("the Pragmaticist") is challenged: Is it not due to our facility of language?"[27] The Pragmaticist (presumably Peirce) responds by asserting: "To my thinking that faculty is itself a phenomenon of self-control."[28] Of course, Peirce is post-Darwinian. Whereas classical Western thought often draws an absolutely sharp line between the human being and other animals, for Peirce, as a post-Darwinian, the human animal is just that. The human being is the human animal, and there is no absolutely sharp line between the human animal and other animals, especially as to the question of self-control and self-consciousness. Descartes did not even think other animals were conscious, let alone self-conscious. There is some evidence that some animals other than humans are self-conscious. They have some awareness. They recognize themselves in the mirror. So we need to discuss these matters in fine detail and in close connection with the most recent empirical studies. There is no absolutely sharp line between the human animal and other animals, in particular, concerning self-control and self-consciousness. When Peirce defines scientific or experimental intelligence, he defines it as the capacity to learn from experience,[29] which is, in part, the capacity of experience to remake our habits such that they are more finely and fully attuned to the habits of the beings we encounter in experience.

To get to your question, I think Peirce blurs the line not merely between the human animal and other animals, but also between human intelligence and artificial intelligence. As you say in one of your articles that I just reread recently[30], the notion of "quasi" is very instructive and useful. He sometimes will talk about it "as if", for example, "as if there

25 Pragmaticism [*Prag.* 4] (*CP* 5.533-34 c. 1905).

26 Ibid.

27 Ibid.

28 Ibid.

29 See, e.g., *CP* 2.227, c.1897.

30 Nöth, W. Cognição como semiose: semiótica cognitiva e Cogsem [Cognition as semiosis: Cognitive semiotics and Cogsem]. To appear in *Revista DeSignis* 34 (2021) [= Semióticas cognitivas: Nuevos paradigmas].

is an interpreter" or "as if there is an utterer", and it seems to me that "quasi-mind" is an apt expression he uses. Peirce is hedging his bet. He doesn't want to make too strong a claim, but he doesn't certainly want to make too sharp a divide. This is his position with regard to the question whether machines are intelligent. In certain respects, they are more intelligent than human beings, for example, in terms of chess games. In terms of certain other kinds of activities, such as simply computing, they can far outstrip human intelligence. So, are they intelligent? Yes. Are they intelligent in some other way in the same way as human beings are intelligent? Yes, including questions such as, Can they learn? They can correct themselves. Can they correct themselves? –, which goes back to a point you made earlier. In terms of perception, there is no question that we can make machines that are really skillful at pattern recognition. In that, as far as I know, if they make mistakes in the recognition of patterns, they build those mistakes into refining the operations going forward. On the surface, it looks like these are quasi-intelligent, or let us just say, they are intelligent. Are they intelligent to the same degree as human beings? There is where I hesitate. There is where I hold out because I think there is an open-ended level of self-correction and self-control, and I am not sure that we are at that point with any machine we have been able to make.

W.N.: Thank you, I agree with all you said, but let me come to your other remarks concerning human nature. Peirce has certainly answers as to both the affinities between intelligent machines and humans and the differences. Let us only consider his paper on the "Neglected Argument for the Reality of God".[31] Of course, we do not expect intelligent machines to reflect on God, but there is a connection with another of the topics you addresses – the one of "dialogue". You said that thinking is dialogical, but if thinking is dialogical, how could intelligent machines enter into dialogue with themselves? Now, with whom would an intelligent machine conduct a self-dialogue? On the other hand, is there not some element of dialogicity when a machine corrects itself? Does not self-correction presuppose some sort of self-dialogue? If you consider how computers learns to dominate complex games, such as chess or go, you discover that they advance in their competence as they play against themselves. Is that not a kind of dialogue as it is needed for a thinking being?

31 Peirce, C. S. A neglected argument for the reality of God, *CP* 6.452–480 and *EP* 2:434–446 (1908).

V.C.: This is a very good and equally challenging question. As you were speaking, I was thinking that machines can also be self-monitoring. They can detect something in their operating system that is not going well, when this is the case. However, let me shift the ground a little. As you were speaking, I was also thinking about another aspect of our topic, the affective dimension of human minds, consciousness, and the human psyche. It is not merely the emotional, but also the deeply affective relationship that constitutes the human mind. Is it possible for a machine to *care* about a human being – for another as other? Now, the relevance of this question is that such solicitude might care for you as the unique you that you are. Might not such solicitude be a condition for certain forms of dialogue? It is rather significant and underexplored that Peirce identified what traditionally were the three theological virtues, Faith, Hope, and Charity, as logical sentiments[32], and he thought that one could not be fully logical unless one was animated. He redefines these terms that are both continuous with traditional understanding, but also quite innovative in their own right. One could not be fully logical without possessing these virtues, these sentiments, without being animated by faith, hope, and charity, and it seems to me that there might be truth there. Then, the limits of machine intelligence would be the limits of their affective commitments, or their ability to obtain and refine the so-called logical sentiments of faith, hope, and charity. Can they be intelligence in certain ways? Yes, might those limitations trace their route to their inability in the final analysis to love? Because, for Peirce, Agape[33], the capacity to love the other as the other is absolutely crucial. Here is one of those places where Peirce is unwilling to divide the cognitive and the affective. In him, they are together. The limits of artificial intelligence might be the limits of

32 Peirce, C. S. The doctrine of chances (1878): "It may seem strange that I should put forward three sentiments, namely, interest in an indefinite community, recognition of the possibility of this interest being made supreme, and hope in the unlimited continuance of intellectual activity, as indispensable requirements of logic. Yet, when we consider that logic depends on a mere struggle to escape doubt, which, as it terminates in action, must begin in emotion, and that, furthermore, the only cause of our planting ourselves on reason is that other methods of escaping doubt fail on account of the social impulse, why should we wonder to find social sentiment presupposed in reasoning? As for the other two sentiments which I find necessary, they are so only as supports and accessories of that. It interests me to notice that these three sentiments seem to be pretty much the same as that famous trio of Charity, Faith, and Hope, which, in the estimation of St. Paul, are the finest and greatest of spiritual gifts. Neither Old nor New Testament is a textbook of the logic of science, but the latter is certainly the highest existing authority in regard to the dispositions of heart which a man ought to have." *CP* 2.655 and *EP* 1, p. 150.

33 In Evolutionary love (1893), Peirce introduced the terms "Agapism" and "*Agapastic* evolution" for the view that creative love is operative in the cosmos. *"The good result is here brought to pass, first, by the bestowal of spontaneous energy by the parent upon the offspring, and, second, by the disposition of the latter to catch the general idea of those about it and thus to subserve the general purpose" (CP 6.303).*

genuine affection, of the logical sentiments. Can computers think? Unquestionably. Can they think in sophisticated, self-corrective, self-monitoring ways? Unquestionably. It is not so much falling short, but are they different from human intelligence in this regard? Yes.

One other point: to what extent can computers make wild errors? To what extent can they fall into mistakes that seem to call much too much into question? For Peirce, humans are deeply fallible animals, and this is, actually, why we have once managed to survive. – Well, we will see what the upcoming decades bring, but let us leave that to the side. Once we were able to survive, we turned that vulnerability into an immense advantage. We turned the vulnerability of fallibility into a tremendous advantage because all science is making mistakes intelligently. Fallibilism is not only our tendency to fail; it also means our ability to see that we have made a mistake then find, ascertain, the source, the root of the error and, then, correct it.[34] There is a continual process of self-correction, predicated on our ineradicable fallibility. This is actually a good thing, that we were so prone to making mistakes. "It is a truth well worthy of rumination that all the intellectual development of man rests upon the circumstance that all our action is subject to error. *Errare est humanum* is of all commonplaces the most familiar. Inanimate things do not err at all; and the lower animals very little".[35] Now, can you make a machine to make as many mistakes as human beings do?

W.N.: You are perfectly right. People always speak of the mistakes computers and robots make. They never talk about the mistakes human make in the same situations. This is why we need the philosophy of cognition to answer such questions. Philosophers of mind have given diverse answers without having reached consensus. Some have focused on intentionality, others on consciousness: computers have none, humans have. Can you say something about these two topics?

34 In 1897, William James, in a book dedicated to Charles Peirce (*The Will to Believe and Other Essays*. Cambridge, MA: Harvard University Press, 1979, 25), wrote: "Our errors are surely not such awfully solemn things. In a world where we are certain to incur in spite of all our caution, a certain lightness of heart seems healthier rather than this excessive nervousness in their behalf. At any rate, the fittest thing for the empiricist philosopher." – That is, the empiricist philosopher cannot help but be a thoroughgoing *fallibilist*. A "contrite" fallibilist (a thinker willing to confess, "I was wrong") can possess "a high faith in the reality of human knowledge" (CP 1.14, c.1896), arguably, only such a fallibilist can possess such a faith.

35 Detached ideas on vitally important topics, (CP 6.86, 1898).

V.C.: Right, so here is one of the places where it seems to me Peirce's notion of synechism is especially relevant. Of course, this is his doctrine of continuity and so there is no absolutely sharp line to be drawn here. Let us begin with intentionality. If we go back to Franz Brentano, who was, of course, the one who, drawing upon the Scholastics, introduced the notion of intentionality. He seemed to be committed to an anti-synechistic project. By means of the concept of intentionality, he wanted to determine the feature that differentiates mental from all other phenomena, distinguishing the mental from the physical, as though there were an absolutely sharp line of demarcation between the two. He also began in a somewhat introspective way, a mind reflecting upon its own activity. I think Thomas Short[36] and others have suggested something that is really crucial: that purposive behavior is the key out of which ever more refined and abstract forms of intentionality have evolved. No doubt, an animal is conscious in the sense that it has thoughts about something. Hence, it is just part of the very comportment or conduct of the animal to be oriented toward the world and to be animated by quasi purposes. I think what we understand by the intentional and intentionality in that narrow mentalistic sense can be explained naturalistically if we think about animal behavior. If we think about the animal looking for food, it takes this smell to be indicative of the presence of food nearby, but in fact, it may be mistaken about this. Nonetheless, it is it is searching for something. An object of desire is implicated in the activity of searching. There is an aboutness there. Hence, we do not have to posit any anything mysterious under the rubric of intentionality. This may not be altogether fully adequate, but I think it points us in the right direction. A naturalistic account can begin to render intentionality intelligible. It does so by taking conduct itself to be purposive or at least quasi-purposive.

As to the other question, the one regarding consciousness, it seems to me that Peirce is immensely useful on this. He spilled a lot of ink in his correspondence with William James, who obviously was very important in the history of Psychology, delineating "consciousness" in a very detailed way. Some of those letters are virtual essays, where Peirce is writing to James and talking about what consciousness might mean.[37] It seems to me that here is where the Peircean categories, specifically, the power of the categories as heuristic prompts and guides, just shines forth, because

36 Short, Thomas. Semeiosis and intentionality. *Transactions of the Charles Sanders Peirce Society*, vol. 17, no. 3 (1981), 197-223 and Short, T., *Peirce's Theory of Signs* (Cambridge: Cambridge University Press, 2007), p. 175-77.

37 See especially *CP* 8.249-315 (1897-1909).

Peirce distinguishes between monadic, sort of dream consciousness, polar or dyadic consciousness, and then synthetic or mediational consciousness. Much of contemporary cognitive science including cognitive semiotics wants to operate with a purely univocal notion of consciousness, but obviously, consciousness is a word possessing many meanings. It is anything but univocal, possessing at least three fundamentally different meanings: qualitative consciousness, polar consciousness, synthetic or mediational consciousness. The interesting thing is that the higher the form of consciousness, the more easily replicable it is by machines. The so-called lower forms of consciousness, purely qualitative consciousness, are the ones that are most difficult to replicate in machines. Peirce's philosophy and Mark Champaign's book[38] are rather good here. It would be very instructive to trace in detail Consciousness in reference to Peirce, or, more accurately, to the classification of the sciences (e.g., what consciousness means in the context of Phenomenology, or in those of the three Normative Sciences, etc.). – I think, Peirce has much to say about the question of consciousness. However, to take it up in a truly Peircean manner, we would have to be attentive to his emphases and classifications. What philosophers ought to do well, Peirce does exceedingly well and that is to draw the relevant distinctions and not to suppose that we can get along with one word or with a univocal sense of such a complex nuanced word as *consciousness*. There are tremendous resources in Peirce's phenomenology and his theory of signs. Even his cosmology addresses questions of consciousness. I also think that there are resources for understanding intentionality here.

W.N.: We are coming to more and more difficult topics. Before we open the floor for questions, let me propose a no less difficult question. Life, for example, does intelligence presuppose life? How about artificial life, is life a dividing line between machines and biological beings or not?

V.C.: I tend to think that life is a condition for intelligence since the problem is: nothing is alive except in an environment, and nothing could sustain itself apart from an ambience. So, machines have a history that suggests a kind of life, that is to say, they have obviously evolved in conjunction with natural intelligence. However, natural intelligence has just as obviously evolved because of the ability to use and refine ever-new technologies. Human intelligence is dependent upon artificial extensions, but

38 Champagne, Mark. *Consciousness and the philosophy of signs:* How Peircean semiotics combines phenomenal qualia and practical effects. Cham: Springer, 2018.

consider, in Peirce's early writings, that little dialogue between human beings and the words created by them.[39] The words created by humans seem to be utterly dependent upon their creators, but Peirce argues that this is not entirely the case. There is a mutual dependence between language and humans. The words could also turn around and say, "You can think what you think because of us". It might very well be that this dialogue is an analog of understanding the relationship between naturally intelligent beings and artificially intelligent ones.

W.N.: Indeed, this seems to be the very key to the question of artificial and natural intelligence. Perhaps you can explain the quote to which you only made a very brief reference a bit more to our audience.

V.C.: What Peirce says is that words only mean what we make them mean, but then he imagines that these words may turn around and say, "That is not the whole story, nor the complete picture. You, human beings also mean only what we allow you to mean". Thus, there is this deep mutual dependence between language and humans. Language obviously depends upon us having somehow created it, and somehow, we have refined it over decades and centuries, but not adequately for many of our purposes. However, in turn we also depend utterly upon language as human beings. This is a case of mutual dependency – we depend on language as much as it depends on us.

W.N.: Right and we do not only depend on language, but also, more and more, on intelligent machines. This brings us to the end of our dialogue, but not to the end of our program because we have questions from the audience. Luis Felipe[40] will tell us what these questions are. Pollyana Ferrari[41]: "Isn't it the ability to love that makes us human? Would the machine's limit be affection?"

V.C.: I think so. I would say that this ability is only one among numerous abilities; I think our ability to make fantastic and wild mistakes is also very distinctive of the human animal. Even so, I do not want to

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39 Peirce, C. S. Some consequences of four incapacities (1869): "Does not electricity mean more now than it did in the days of Franklin? Man makes the word, and the word means nothing which the man has not made it mean, and that only to some man. But since man can think only by means of words or other external symbols, these might turn round and say: 'You mean nothing which we have not taught you, and then only so far as you address some word as the interpretant of your thought.' In fact, therefore, men and words reciprocally educate each other; each increase of a man's information involves and is involved by, a corresponding increase of a word's information." (*CP* 5.313)

40 Thanks are due to Luis Felipe Napoli, student of TIDD, who managed the interface of this dialogue.

41 Pollyana Ferrari is a professor of TIDD.

identify us simply or solely with our ability to love. It is *a* defining feature of the human animal, but I resist making it *the* definitive property of human beings. It is a form of transcendence. To transcend the self in a way that allows for transformations of the self. Peirce was somehow drawn to Buddhism in this way and to certain forms of Christianity in this regard as well. However, I do not want to say that our ability to love is what marks us off from all other beings. I suppose other beings have the capacity to love, too, but I do think if machines are limited in their affection, they are limited in their intelligence. I do think that.

W.N.: Second question, Peter: "Can AI produce something like a soliloquy like Hamlet, who asked "To be, or not to be, that is the question?"

V.C.: Well, there are actually two questions there. There is a question about a soliloquy in general, and then there is a question specifically about a soliloquy in which one holds up the possibility of exterminating one's own life. Those are two different questions, related, obviously, but not necessarily the same. To the first I say yes, you made the point, and you were just dead right in making it. Higher forms of artificial intelligence can engage in self-dialogue and a soliloquy is just another name for a self-dialogue, right, the self in dialogue with itself. That is the first question. The other question has to do with whether the machine could raise the issue of self-extermination or self-annihilation, the question of suicide. There, I plead ignorance. I think at present there does not seem to be much evidence to support that, but who knows what might come in the future?

W.N.: Question number three, Henrique Bittencourt, "Could you comment on the role of fallibilism in cognition?"

V.C.: Yes. There are various ways of putting it, I would say. One way to put it is to insist that fallibility is the engine that drives the pursuit of knowledge, that is to say our fallibility is the engine we are caught up short, time and again, by making a mistake. It is precisely that, which animates us to actually engage in the arduous work of inquiry. John Locke says, and I think Peirce was aware of this passage and actually influenced by Locke: The love of truth is, in some ways, easy. The love of *finding* the truth is a difficult love.[42] Everybody wants the truth handed to them, but the arduous, oftentimes humiliating work is finding the truth, be-

42 *Essay on Human Understanding*, Book IV, chapter XIX.i ("On Enthusiasm"): "Everyone in the commonwealth of learning professes himself to be a lover of truth, and every rational creature would be offended if it were thought that he is not. And yet it's true to say that very few people love truth for its own sake, even among those who persuade themselves that they do. How can anyone know whether he is seriously a lover of truth? I think there is one unerring mark of it, namely that one doesn't accept any proposition with greater assurance than is justified by the proofs one has for it."

cause you make so many mistakes. Mistake after mistake, the arduous, sometimes humiliating, work of seeking the truth, that is a difficult love. I think there is no more important role in cognition because cognition is never knowing. It is always the pursuit of knowing, always *coming to know*. There is no more important feature than our fallibility. Our limitless growth is actually rooted in our ineradicable fallibility.

W.N.: Without pretending to reach a conclusion, our discussion leaves us space for this last question: "Is our cognitive development limited through language? In the case of AI, through a langue made up of OS and IS (0/1)?" What kind of language is that? Don't we deserve a better language?

V.C.: Right. We may use the word "language" in a very narrow sense to designate natural languages such as Portuguese, or English, or French, or Spanish. Or we may use this word in a much broader sense to mean any mode of symbolization. I think that the limits of artificial intelligence are in part defined by the limits of our capacities, our symbolic capacities, not necessarily the limits of our natural language. We are limited but, for Peirce, this is always only a provisional limit. There is no ultimate invincible limit to what human ingenuity or imagination might yet craft by means of symbols.

W.N.: Such as Kant's unsurpassable limit of the of the *unrecognizable thing in itself*, which Peirce rejected[43], is that what you mean?

V.C.: Yes, it would be, and it seems also that Peirce is ultimately an anti-formalist. He understands the power of algorithms, but he also understands that not everything is reducible to algorithmic relationships. By an algorithm, I mean a finite set, usually a very small set, of explicit rules that can be rendered fully explicit. Now, for certain purposes in certain contexts, algorithms are immensely powerful tools, but there is not an algorithm for everything. There is a role for some norm-guided but not strictly rule-governed forms of human ingenuity. So, yes, artificial intelligence is limited by the symbols we are able to use and fall back on. Yes, a language of just "yes" and "no", one and zero, is limiting in some ways, empowering in others, but there is also this issue of algorithms, and Peirce is not ultimately a formalist who thinks that everything is formalizable. It is very interesting that Peirce hardly says anything about

43 "The *Ding an sich*, however, can neither be indicated nor found. Consequently, no proposition can refer to it, and nothing true or false can be predicated of it. Therefore, all references to it must be thrown out as meaningless surplusage" (CP 5.525, c. 1905).

codes, in the European tradition. For Ferdinand de Saussure and Roland Barthes, there is much emphasis on codes and little attention to habits. For Peirce, the opposite is the case: habits are primordial, whereas codes are, being codifications of habits, derivative. In Peirce's theory of signs, habits in effect replace codes. He can account for codes by means of the codification of habits? Can Saussure and his progeny however account for habits?

W.N.: This is where we have to conclude, not because we have reached a final conclusion, but because we have wrapped up as many topics of interest to the students of our program in the short time available. Your contribution to our program TIDD digital was most important. We are very grateful, dear Vincent. Your presentation and your answers show that philosophy is needed in our field of studies because it offers answers to so many open questions of topical interest. Let us stay in contact.

V.C.: Thank you, goodbye then.