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Conscious Self-Control as Criterion for Reasoning

Stjernfelt, Frederik

Published in:
Cognitive Semiotics

DOI (link to publication from Publisher):
10.1515/cogsem-2021-2039

Publication date:
2021

Document Version
Version created as part of publication process; publisher's layout; not normally made publicly available

Link to publication from Aalborg University

Citation for published version (APA):
Stjernfelt, F. (2021). Conscious Self-Control as Criterion for Reasoning. *Cognitive Semiotics*, *14*(1), 71-99. https://doi.org/10.1515/cogsem-2021-2039

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	Surname	Stjernfelt	
	First Name	Frederik	
	Corresponding	yes	
	E-Mail	stjern@hum.aau.dk	
	Affiliation 1	Aalborg University, Aalborg, Denmark	
	Institution 1	Aalborg University	
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Frederik Stjernfelt*

Conscious self-control as criterion for reasoning

https://doi.org/10.1515/cogsem-2021-2039
Published online ■■■

Keywords: logic; Peirce; philosophy; reasoning; self-control

> […] the faculty which has served to elevate man above all the rest of the fauna of our globe is the power of self-control. (Peirce R: 650; LoF 1: 169)

In his mature, creative period from around 1902, Peirce put a large emphasis on the principle that reasoning proper must be subjected to conscious control. Automatized inferences, be they undertaken by machines, animals, or unconscious human mental processes, do not, in this perspective, count as reasoning because there is no control to grant the validity of the results of the process. This does not imply that such processes cannot be trusted; most often they can, but it implies that when reason leaves its foundations in such automatic and quasi-automatic processes in order to chart new territory, its inferences must be self-controlled, in the sense of subjected to scrutiny by a conscious self. In modern parlance, you might say such automata may be able to produce true belief—but not *justified* true belief. A concise example of Peirce's argument goes like this:

> Reasoning cannot possibly be divorced from logic; because, whenever a man reasons, he thinks that he is drawing a conclusion such as would be justified in every analogous case. He therefore cannot really infer without having a notion of a class of possible inferences, all of which are logically good. That distinction of good and bad he always has in mind when he infers. Logic proper is the critic of arguments, the pronouncing them to be good or bad. There are, as I am prepared to maintain, operations of the mind which are logically exactly analogous to inferences excepting only that they are unconscious and therefore uncontrollable and therefore not subject to criticism. But that makes all the difference in the world; for inference is essentially deliberate, and self-controlled. (Peirce CP: 5.108)

This doctrine of philosophy of logic involves a diverse handful of prerequisites: the mature Peirce's theories of consciousness, of ethical conduct, of self-control. Even if Peirce's mature development of self-control beginning in 1902 does involve logical and semiotic innovations like different types of interpretants, hypostatic abstraction, theorematic reasoning, continuous predicates, etc., Peirce's ideas in

***Corresponding author: Frederik Stjernfelt**, Aalborg University, Aalborg, Denmark, E-mail: stjern@hum.aau.dk

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this field do not form a well-rounded finished result like several other mature achievements, cf. his 1903 sign theory or his system of Existential Graphs. So, in order to get a grasp of Peirce's conception of self-controlled reasoning, we have to situate it on a brief resume of its bases in these diverse presuppositions. Peirce's deep originality probably lies primarily in his logic, semiotics, and pragmatism—yet, his more extravagant endeavors in the philosophy of mind and cosmology intervene in the former on important points requiring examination.[1] The discussion of conscious self-control, therefore, also involves some of Peirce's rather ambitious cosmological ideas—which is not, however, to say that his idea of self-control *necessarily* implies such ideas.

1 Peirce's doctrine of consciousness

The basis of self-controlled reasoning in consciousness is precarious for a number of reasons. Peirce was—along with Frege and Husserl—leading the wave of strong anti-psychologism in logic and epistemology in late 19th Century philosophy and beyond, which became crucial in both analytic and continental philosophy to this day. From his earliest sketches of the 1860s to his last papers around 1910, Peirce never vacillates on the principle that logic is normative and should not be confused with how people *actually* think, nor with the psychological or neurological conditions supporting thinking processes in particular species. So, the appearance of the psychological or psychophysical notion of consciousness in the definition of reasoning forms an important challenge to Peirce's strict anti-psychologism. But, also for the reason that consciousness, in Peirce's pragmatist opinion, is not at all definitory for mind, self, or personality and plays but a relatively weak and marginal role in human behavior and activity in general, as compared to contemporary ideas.

Peirce's description of consciousness is founded on his three categories famously developed on the basis of logic already in his 1868 *On a New List of Categories*. Using these categories, he redefined the standard tripartition of consciousness in many 19th Century philosophers, *feeling*, *will*, and *reason*. An early version of Peircean categorization of consciousness goes as follows:

> It seems, then, that the true categories of consciousness are: first, feeling, the consciousness which can be included with an instant of time, passive consciousness of quality, without recognition or analysis; second, consciousness of an interruption into the field of

1 Both consciousness, mind, and self are complicated issues which undergo developments through Peirce's career, and we cannot here cover all details but aim to highlight the aspects most relevant to conscious self-control of reasoning.

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> consciousness, sense of resistance, of an external fact, of another something; third, synthetic consciousness, binding time together, sense of learning, thought. (Peirce CP: 1.377)

Feeling comprises all possible quality appearances in consciousness; this does not cover elementary sense or emotion qualities only but also e.g. the feeling of appreciating a complex artwork or the feeling of understanding of a mathematical proof.[2] Consciousness of interruption or clash necessarily involves more than one feeling, and a particularly important type is the involuntary change of feeling, which introduces the unconditionality of the external world and reveals the self to have been in error. Synthetic consciousness, finally, involves the fusion of several contents, typically into propositions, arguments, habits, and all larger complexes of thought etc. All consciousness is intrinsically time consciousness and is extended in time and space. The three consciousness types of feeling, brute existence, and cognition merge in continuous experience, and every single act of consciousness will contain all three aspects—however, they have different relations to time. The former is momentaneous only, the middle involves at least a timespan sufficient to record the clash between two feelings and introduce the ego/non-ego distinction, while the latter involving syntheses of the former two, range from simple propositions and inferences and all the way up to larger constructions of habit and thought, developing over longer timespans. Just like European gestalt theorists of the period (Stumpf, Ehrenfels, etc.), Peirce may cite the example of the melody—or the inference chains of a mathematical proof—as example of synthetic consciousness transcending the briefer timespans of feeling or brute clash experience.[3] The simplest consciousness type of Feeling occupies a special position: all mental activity is in need of Feeling in order to appear as conscious; simultaneously, the mind has no direct access to Feeling as it belongs to the fleeting moment, and every reflection upon it is already at a distance, potentially falsifying it, cf. Peirce's lifelong skepticism against introspection as a reliable source of information about mental or psychical issues.

The inferences subject to self-control belong to the latter of the three, the synthetic type of consciousness. This theory of consciousnesses makes Peirce an opponent to empiricist theories seeking to build psychology on the idea of elementary, immediate sense data as a basis of later, higher-level cognitive

2 Peirce's notion of feeling thus transgresses the reduction of feeling to pleasure and pain found, e.g., in Kant; instead he refers back to the Danish-German philosopher J.N. Tetens and his definition of Feeling as "whatever is directly and immediately in consciousness at any instant" (Peirce CP: 7.540). Cf. Tetens' *Philosophische Versuche* of 1777.

3 Melodies in early gestalt theory—see, e.g., Ehrenfels (1890) and Stumpf (1883–1890). Thus, Peirce distinguishes the cognitive, synthetic processing of a melody or a proof, taking place in synthetic consciousness, from the resulting, momentaneous and simple feeling accompanying such syntheses.

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processing. Such ideas keep popping up, both in lay people and the discipline of psychology, because humans entertain a spontaneous and partly erroneous naïve psychology, an "instinctive theory" of their own psychological processes.[4] It is correct, Peirce claims, that consciousness considered in the moment consists of feeling or quale exclusively, but that does not imply that feeling or immediate sense data are elementary input to consciousness. Rather, isolated feeling or immediate sense data are post-hoc abstract constructions only. Consciousness, always involving all of the three aspects mentioned, rather has "percepts" as input, involving feelings, existence as well as cognition, which are invariably signs about external objects or events, not of internal psychical ideas. Consciousness, then, is primarily conscious about aspects of the external world which is why introspection is barred and information about the internal world is possible only by hypothetical reconstruction beginning with external percepts. Particularly, immediate consciousness—be it presented in "sense data," feelings, or quale consciousness—is fleeting, disappearing with the moment and is not at all accessible to introspection, but to retroactive, hypothetical reconstruction only, both as to the ordinary person's own experience and the scientific investigator of consciousness.[5] Such reconstruction invariably involves the third, synthesizing kind of consciousness.

A couple of further peculiarities, as against naïve, "instinctive" psychology, in Peirce's theory must be mentioned. A corollary, particularly developed through the 1890s, is that as generality is part and parcel of perceptual judgments, it is possible directly to observe some generalities, that is, they are not derived higher-level psychical phenomena only but may form aspects of the external world directly perceived:

> We can understand one habit by likening it to another habit. But to understand what any habit is, there must be some habit of which we are directly conscious in its generality. That is to say, we must have a certain generality in our direct consciousness. Bishop Berkeley and a great many clear thinkers laugh at the idea of our being able to imagine a triangle that is neither equilateral, isosceles, nor scalene. They seem to think the object of imagination must be precisely determinate in every respect. […] I can see no way of escaping the proposition that to attach any general significance to a sign and to know that we do attach a general significance to it, we must have a direct imagination of something not in all respects determinate. (Peirce R: 407, CP: 5.371FN; added to the 1877 *Fixation of Belief* in a draft to *How to Reason*)

4 Cf. "A part of this instinctive science, as we may call it, is that events succeed one another in time, that the past, when not too remote, is remembered, that the future, when not too remote, can be with some probability conjectured or anticipated, and that a single moment between the past and the future (that is, some facts belonging to that moment), is directly before the mind" (Peirce CP: 7.422).

5 For more elaborate discussions of Peirce's doctrines of consciousness, see Houser (1983) and Champagne (2018).

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As inferences involve generality at several levels, in their predicates, in their structure, in their logical principles, this is important for their control undertaken by the third kind of consciousness.

Another, more extravagant aspect of Peirce's theory is that consciousness is not confined to the individual. His broader concept of mind comprises large swathes of the individual's unconscious activities, but also general aspects of the external world, cf. below. The narrower concept of consciousness, however, may also go beyond the individual to comprise pairs or groups of persons, even larger social groups and organizations. Here an expression of the idea from Peirce's most romantic and spiritualistic period in the early 1890s around the first *Monist* articles:

> […] there should be something like personal consciousness in bodies of men who are in intimate and intensely sympathetic communion. It is true that when the generalization of feeling has been carried so far as to include all within a person, a stopping-place, in a certain sense, has been attained; and further generalization will have a less lively character. But we must not think it will cease. Esprit de corps, national sentiment, sympathy, are no mere metaphors. None of us can fully realize what the minds of corporations are, any more than one of my brain cells can know what the whole brain is thinking. (Peirce CP: 6.271)

Later, Peirce even extended this hypothesis to cover large parts of the cosmos, cf. around the same time as his intensive investigation of self-control: "Analogy suggests that the laws of nature are ideas or resolutions in the mind of some vast consciousness, who, whether supreme or subordinate, is a Deity relatively to us" (Peirce CP: 5.107). The extension of consciousness beyond the individual continued to engage Peirce, but he never really settled on the exact scope or character of such extensions. The upshot, however, is that conscious self-controlled reasoning is not necessarily a privilege of the individual but may also be undertaken by at least some human collectives; cf. also Peirce's insistence on science as a collective endeavor across generations.

Finally, ascribing to consciousness the ability of self-control is possible only when assuming its causal efficiency, rejecting epiphenomenalism:

> But while I say this, it must not be inferred that I regard consciousness as a mere "epiphenomenon"; though I heartily grant that the hypothesis that it is so has done good service to science. […] it exercises a real function in self-control, since without it, or at least without that of which it is symptomatic, the resolves and exercises of the inner world could not affect the real determinations and habits of the outer world. (Peirce CP: 5.493)

Despite the rather marginal place Peirce is willing to admit for consciousness in the larger perspective, it—or the process of which it is a part—is assumed to possess causal powers.

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2 Self-control and reasoning

Peirce emphasized the role of self-control in ethics already in the 1860s but only beginning in late 1880s, he focused upon of the issue of control of logical inferences.[6] In an 1893 manus recuperating the associationist tradition, he continues the "Law of Mind" idea that the basis of thought is the synthesis or clustering of ideas, so that logical processes are here seen as a sort of bottom-up thermodynamics of ideas connecting by means of largely unconscious associations:

> Such inferences are beyond the jurisdiction of criticism. It is the part of psychology to explain their processes as it can; but, as long as they are out of the focal plane of consciousness, they are out of our control; and to call them good or bad were idle. The ordinary business of life is, however, best conducted without too much self-criticism. Respiration, circulation, and digestion are, depend upon it, better carried on as they are, without any meddling by Reason; and the countless little inferences we are continually making,—be they ever so defective,—are, at any rate, less ill performed unconsciously than they would be under the regimen of a captious and hypochondriac logic. Quite otherwise is it with the actions which carry out our grander purposes. Here all must be voluntary, thoroughly conscious, based on critical reflection. Logic is wanted here, to pull inferences to pieces, to show whether they be sound or not, to advise how they may be strengthened, to consider by what methods they ought to proceed. (Peirce CP: 7.448–49)

The vast majority of human everyday life is governed by unconscious associations and habits—and so governed well—while the "grander purposes" breaking with everyday routines must be, by contrast, governed by controlled logic.

The decisive questions now: how can such self-control "pulling inferences to pieces" be described, which forms may it take, how does it proceed? Here we shall address a number of issues: 1) the relation of logical self-control to ethical self-control; 2) self-control, inhibitory or creative; 3) the details of self-control internal dialog processes; 4) levels of self-control—the role of hypostatic abstraction; 5) machine and animal counterexamples; and 6) the role of consciousness in self-control.

6 Petry (1992) covers four phases of Peirce's development of the concept of self-control. The first is his early writings of the 1860s where the concept is inspired by Schiller and Swedenborg; the second the 1880s where he oftentimes attacked self-control as allied with moral absolutism; the third later in the decade where he began to see self-control as a condition for deliberate reasoning. The fourth phase from around 1902 "consists in the integration of the concept of self-control with the rest of his philosophy" (Petry 1992: 668). This is certainly correct; unfortunately, Petry stops short of detailing this final and decisive phase.

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2.1 Ethics and logical self-control

In his strong semiotic-philosophical push in the first years of the 20th Century, Peirce realizes that logical self-control is but a species of the more encompassing genus of ethical self-control—leading him to elevate ethics (and even higher, aesthetics) to sciences superior to logic in his flowering classifications of sciences (e.g., in the Carnegie application 1902). Thus, "Ethics, or the science of right and wrong, must appeal to Esthetics for aid in determining the summum bonum. It is the theory of self-controlled, or deliberate, conduct. Logic is the theory of self-controlled, or deliberate, thought; and as such, must appeal to ethics for its principles" (Peirce CP: 1.191). In ethics, self-control is taken to be not only what permits humans to pursuing their aims in thought-out action sequences, it is also what leads humans out of narrow selfishness to pursue higher ideals, over a never-ending lifetime process, simultaneously developing and strengthening personality: "Man comes from the womb in actuality and animal little higher than a fish; by no means as high as a serpent. His humanity consists in his *destination*. He becomes not actual man until he acquires self-control and then he is so in the measure of his self-control" (Peirce R: 330). Self-control is thus required for controlled action, but also an overall, ethical, character-building endeavor: "At any rate, our power of self-control certainly does not reside in the smallest bits of our conduct, but is an effect of building up a character. All supremacy of mind is of the nature of Form" (Peirce CP: 4.611).

In the particular case of logic, self-control builds on an ideal of rule-following:

> […] reasoning is a species of controlled conduct and as such necessarily partakes of the essential features of controlled conduct. […] every inference forces itself upon us irresistibly. That is to say, it is irresistible at the instant it first suggests itself. Nevertheless, we all have in our minds certain norms, or general patterns of right reasoning, and we can compare the inference with one of those and ask ourselves whether it satisfies that rule. (Peirce CP: 1.606)

Such rules do not, however, *generate* inferences which rather appear spontaneously, uncontrolled, bottom-up, to be controlled post-hoc. The thermodynamics of associative idea-generation of the 1890s is supplied with an ensuing control phase weeding out bad results—a quasi-Darwinian schema of variation-followed-by-selection often employed by Peirce. The 1900s is also the period where Peirce develops his general idea of diagram experiments as source of knowledge, and they add a more controlled aspect also to the generation of inferences:

> […] the secret of rational consciousness is not so much to be sought in the study of this one peculiar nucleolus, as in the review of the process of self-control in its entirety. The machinery of logical self-control works on the same plan as does moral self-control, in multiform detail.

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> The greatest difference, perhaps, is that the latter serves to inhibit mad puttings forth of energy, while the former most characteristically insures us against the quandary of Buridan's ass. The formation of habits under imaginary action (see the paper of January, 1878) is one of the most essential ingredients of both; but in the logical process the imagination takes far wider flights, proportioned to the generality of the field of inquiry, being bounded in pure mathematics solely by the limits of its own powers, while in the moral process we consider only situations that may be apprehended or anticipated. (Peirce CP: 5.440, EP2: 347)

The original birth certificate of pragmatism, the 1878 "How to Make our Ideas Clear" is now reinterpreted and recruited as a doctrine of self-control. The notion of "Formation of habits under imaginary action" refers to the idea of imagining fictitious situations and actions before they occur so as to be ready for thought or action if and when such situations should appear for real. But is self-control thus creative or is it rather a mere sieve to strain away acritical inferences?

2.2 Self-control: inhibitory or creative?

There seems to be a certain tension in Peirce's descriptions of self-control. One the one hand, we may find claims that the action of self-control is purely *inhibitory*: it only serves the role of weeding out emerging examples of bad reasoning, but not at all otherwise contributing to the furthering of reasoning. On the other hand, we may find repeated insistence that diagram experiments of future action possibilities in the imagination is part and parcel of the process of self-control. The former argument appears in the interesting context of a phenomenology of logic attempting to answer the issue of the origin of logical forms of inference, a bit like Husserl's *Erfahrung und Urteil*. As to the matter or content of inferences, it is dealt with by referring to the idea that at some point, the chain of inferences must have begun with premises not themselves the result of conscious inference, but rather stemming from "the uncontrolled parts of the mind". But such an argument would not solve the even deeper issue of the origin of the *form* of inference schemas themselves:

> But as to the logical *form*, it would be, at any rate, extremely difficult to dispose of it in the same way. An induction, for example, concludes a ratio of frequency; but there is nothing about any such ratio in the single instances on which it is based. Where do the conceptions of deductive necessity, of inductive probability, of abductive expectability come from? Where does the conception of inference itself come from? That is the only difficulty. But self-control is the character which distinguishes reasonings from the processes by which perceptual judgments are formed, and self-control of any kind is purely *inhibitory*. It originates nothing. […] What can our first acquaintance with an inference, when it is not yet adopted, be but a perception of the world of ideas? In the first suggestion of it, the inference must be thought of as an inference, because when it is adopted there is always the thought that so one might

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> reason in a whole class of cases. But the mere act of inhibition cannot introduce this conception. The inference must, then, be thought of as an inference in the first suggestion of it. Now when an inference is thought of *as* an inference, the conception of inference becomes a part of the *matter* of thought. Therefore, the same argument which we used in regard to matter in general applies to the conception of inference. (Peirce CP: 5.194)

In order to be able to judge inference candidates appearing before the mind, self-control has to be acquainted with the elementary forms and rules of inferences to be able to see whether those candidates fit the pattern, so to speak. It cannot itself be responsible for generating or discovering those rules. Inferences and their forms must be there before any self-control of them. Peirce attempts to solve the problem by *self-reference* in the appearance of the very first inference: when self-control thinks of an inference *as* an inference, it passes from form to becoming the matter of a higher-order inference. This makes it amenable to the same argument as the matter of inferences, he claims—the upshot must be that it too derives from some uncontrolled region of the mind. [7] This would fit with Peirce's insistence that man has an innate, if not perfect, pre-self-control capacity for reasoning and understanding the world, assumedly supported by Darwinian arguments. Such an imperfect capacity could then be fine-tuned by self-control of self-control, cf. below on levels. This is developed further in Peirce's late 1908 doctrine of "continuous predicates."[8] They are predicates so to speak emptied of all non-logical content, so that what remains are signs like "_possesses the character_", "_stands in the relation of_to_", "_ occurs concurrently with_"; other candidates could be "_is identical to_", "_is teridentical to_and_", "_implies_", "_is co-localized with_", etc. Of such signs, Peirce says that "These signs *cannot be explicated*, they must convey Familiar universal elementary relations of logic. We do not derive these notions from observation, nor by any sense of being opposed, but from our own reason" (Peirce EP2: 184). So, they form existing rational structures for inhibitive self-control to work with.

But how does this idea of self-control as merely inhibitive or selective fit with the description of its "fancied reiterations" which facilitate the creation of new action habits, determining future behavior? Many times, we hear about how repeated practicing will strengthen habits of self-control, both in morality and logic, and how this practicing, in both cases but particularly in logic, may take

7 It is strange, however, that Peirce does not here consider his own ideas of consciousness beyond the individual or indeed the pragmatist idea of the society of scientists informing its simple members of its achievements. Obviously, Peirce here entertains a thought experiment of the very first appearance of inference forms in order to find their original conditions of possibility. Even within this experiment, one cannot help to feel a sort of bootstrap trick being pulled: making an inference take itself as an object is hardly a sufficient explanation of its appearance to the mind.
8 Cf. Stjernfelt (2017).

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place in the imagination so that a well-practiced habit lies ready to give rise to premeditated action if the relevant situation arises:

> Moreover,—*here is the point*,—every man exercises more or less control over himself by means of modifying his own habits; and the way in which he goes to work to bring this effect about in those cases in which circumstances will not permit him to practice reiterations of the desired kind of conduct in the outer world shows that he is virtually well-acquainted with the important principle *that reiterations in the inner world – fancied reiterations, – if well-intensified by direct effort, produce habits*, just as do reiterations in the outer world; *and these habits will have power to influence actual behaviour in the outer world*; especially, if each reiteration be accompanied by a peculiar strong effort that is usually likened to issuing a command to one's future self. (Peirce R: 318, 57)

This obviously also holds for the establishment of that important subset of habits which are habits of thought. The solution to the enigma of inhibition versus creation, I think, must be sought in two different uses of the notion of self-control, one narrow, stepwise, inhibitory, and one broader, of which inhibition is a basic component, but which describes its nesting within an overarching process of voluntary, purposive habit-forming and habit-changing.

These two meanings of self-control may be combined so that the former constitute steps in the overarching purpose-orientation of the latter. This feeds into Peirce's epistemological discussion of how a series of single, simple, logically necessary steps may combine to form an overall chain of thought that is original. His example is mathematical proofs which are not automatic algorithms but rather driven by the intention of reaching a goal by proving a particular theorem, seeking to reach it by a series of steps not pre-determined. Peirce considers the possibility of automatization of such deductions:

> […] that necessary reasoning takes a course from which it can no more deviate than a good machine can deviate from its proper way of action, and that its future work might conceivably be left to a machine—some Babbage's analytical engine or some logical machine (of which several have actually been constructed). […] the tendency of the logic of relations itself—the highest and most rational theory of necessary reasoning yet developed—is to insinuate the idea that in necessary reasoning one is always limited to a narrow choice between quasi-mechanical processes; so that little room is left for the exercise of invention. (Peirce CP: 4.611)

This, however, is erroneous, according to Peirce, and he claims that even the great 19th Century English-American mathematician J.J. Sylvester falls prey to such self-misunderstanding when he almost apologizes for failing to always reach his conclusions by way of apodictic procedures. Sylvester may refer to the correct fact that accidental experience or a happy guess can lead to the solution of a mathematical problem, Peirce says, but still it remains correct that "all genuine mathematical work, except the formation of the initial postulates (if this be regarded as

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mathematical work) is necessary reasoning" (Peirce CP: 4.611). Peirce here, implicitly, seems to distinguish the context of discovery from the context of justification, cf. Reichenbach's later terminology, the former may be accidental, while the latter is necessary. This takes Peirce to this important observation that:

> The mistake of Sylvester and of all who think that necessary reasoning leaves no room for originality—it is hardly credible however that there is anybody who does not know that mathematics calls for the profoundest invention, the most athletic imagination, and for a power of generalization in comparison to whose everyday performances the most vaunted performances of metaphysical, biological, and cosmological philosophers in this line seem simply puny—their error, the key of the paradox which they overlook, is that originality is not an attribute of the matter of life, present in the whole only so far as it is present in the smallest parts, but is an affair of form, of the way in which parts none of which possess it are joined together. (Peirce CP: 4.611)

Originality lies in the overall construction of the whole of a mathematical proof, not in any of its single steps, but in their combination. Peirce exemplifies and generalizes this by the following brief analysis of Napoleon's particular genius: "Every action of Napoleon was such as a treatise on physiology ought to describe. He walked, ate, slept, worked in his study, rode his horse, talked to his fellows, just as every other man does. But he combined those elements into shapes that have not been matched in modern times. Those who dispute about Free-Will and Necessity commit a similar oversight" (Peirce CP: 4.611). Peirce concludes this argument with the quote about self-control above, that it resides in the overall build-up of character.[9]

The single, inhibitory steps of self-control combine to form an overarching process of self-control, aiming to shape future conduct of action and thought after some purpose. The mathematical proof serves as a generalizable example here: the theorem to be proved is already known, and the aim of the whole self-controlled proof process is to somehow get there. This purpose so to speak recruits the single building-blocks of inhibitory self-control in a combination which may not be mechanically predicted, until the theorem is (maybe) proved. Peirce implicitly relies upon his contemporary development of the important distinction of *corollarial* and *theorematic* deductions, the former a version of Kantian deduction where the conclusion is merely making explicit what was already there in the premises, while the latter is taken to cover mathematical proofs requiring the introduction of material not present in the premises, like auxiliary lines in geometry. Such introduction is an original, abductive step and de-banalize the understanding of

9 Cf. Peirce when introducing his newly-constructed Existential Graph logic representation system in the "Peripathetic Talks" of 1898: "It will be found that by piling truism upon truism we arrive at last at deeply interesting and important results" (Peirce LoF 1: 348).

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deduction, as Jaakko Hintikka argued.[10] This unpredictability of the investigation process is one of the things that sets self-control apart from automatized inference processes, cf. about machines and instincts below.

This doubleness of inhibitory and creative is also involved in the detailed sequencing of the larger self-control process.

2.3 The self-control process

The mature Peirce gives a number of shots at the more elaborate description of the phases of the self-control process, a task he initiated in detail through 1903–1906. A brief version goes like this: "its essential features are review, critical comparison with previous decisions or with ideals, rehearsal in the imagination of future conduct on various possible occasions, and the formation or modification thereby of habits or dispositions of the occult something behind consciousness" (Peirce R: 939, 3–5). Here, inhibition initiates the first step of "review, critical comparison with previous decision or with ideals," the idea being that if such comparison is unfavorable, the inference controlled will be ditched. After this first inhibitory phase follows the subsequent use of inferences having passed the first phase in habit formation. Here comes the imagination-of-future conduct phase, spreading over different subtypes of occasions where the inference is relevant. Such imagination practices, essentially a version of diagram experiments, must involve the full test of abductions (let us try our new insight on *this* type of occasion), followed by deductions (in this case, such and such implications would follow), and inductions (would such implications, again, fit with other collected knowledge of the situation)—leading to higher-level inhibitions to weed out conclusions not fitting the relevant ideal. Only the results of this test, presumably, will give rise to action resolutions, aiming to instill a new habit, possibly automatized by subsequent mental or real repetition training, thereby possibly affecting non-conscious habit patterns so as to stay ready if the relevant situation should occur. As always, "habit" and "action" comprise not only external, physical behavior but just as well the action type of future thought. This process also involves considerations in case an inference or action candidate did *not* pass the inhibitory control phase, just like it involve training or preparation of self-control in itself, as in this more detailed account of the process:

10 Cf. Hintikka (1983), see also Stjernfelt (2011). A result reached by theorematic reasoning is necessary and the whole of the process one of deduction; yet it involves, in the context of discovery, abductive trial-and-error steps such as the selection of which auxiliary objects to instantiate and put to use, cf. Shin 2010.

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> After every occasion on which one has acted in any marked manner, one will, if not too pressed, review one's conduct, and tell oneself how one likes it. If one is highly satisfied, one will go over it again; and imaginary performances are nearly as effective as real ones in establishing habits. But if one blames oneself, one proceeds to analyze and to determine wherein one erred by comparison either with one's resolutions or with one's ideal. One considers how the errors might be avoided. One resynthetizes, and enacts another proposed line of conduct before the imagination. Perhaps several. When one's selection is made one rehearses in imagination the future performances again and again, as if one were committing it to memory, putting particular stress on the passages where one is liable to be surprised by a sudden impulse. Perhaps one says to oneself (all meditation being in dialogue,) why did I not behave as I intended to behave, and how am I to make sure of doing so next time? Or perhaps one says: I acted as I had resolved to act. How did I ever come to suppose such conduct would meet any approbation? These are mentioned as specimens of possible complications. All self-control is affected by self-preparation. Its essential parts are, four; viz:—1st, the review of past conduct, 2nd, esthetic valuation of that conduct, 3rd, analytic criticism; 4th, synthesis and imaginative rehearsal of proposed future conduct tending even to a habit of so behaving. (Peirce R: 288, v. I, 25–33)

The final formation of such a new habit, importantly, is seen as a form of mechanization or automatization. Thus, conscious self-control, in a sense, is but an intermediary update check of the human machine of largely unconscious mind. In itself, this phase has at least three steps, first a resolve, an inference conclusion of the imaginary future experiments, then the addressing of oneself in a determination, and finally the result of that decision in the shape of a more or less complete automatization of an action—or thought—sequence relevant to the situation types investigated:

> The power of self-control is certainly not a power over what one is doing at the very instant the operation of self-control is commenced. It consists (to mention only the leading constituents) first, in comparing one's past deeds with standards, second, in rational deliberation concerning how one will act in the future, in itself a highly complicated operation, third, in the formation of a resolve, fourth, in the creation, on the basis of the resolve, of a strong determination, or modification of habit. This operation of self-control is a process in which logical sequence is converted into mechanical sequence or something of the sort. How this happens, we are in my opinion as yet entirely ignorant. There is a class of signs in which the logical sequence is at the same time a mechanical sequence and very likely this fact enters into the explanation. (Peirce CP: 8.320)

Self-control of habits is a sort of self-induced programming of the human mind utilizing the computational possibility of transforming a logical sequence into a mechanic sequence.

In "What makes reasoning sound?," the first of the 1903 Lowell Lectures (Peirce EP2: 245ff), Peirce goes into some detail about the self-control process. Here, he isolates eight overall phases:

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1) Adoption of an *ideal*, more or less developed;
2) An *intention* to shape one's conduct according to that ideal;
3) The articulation of *a rule of action* for some future occasion, simultaneously minimizing the "wiles of the devil" in the person;
4) The *anticipation* of a specific future occasion where that rule will be relevant, and the *gathering of forces* considering how one will then act, resulting in …
5) A *resolution* to act in a certain way on the imagined occasion, in the shape of a *diagram* or a plan;
6) The *imprinting of that resolution* on oneself;
7) The resulting *determination* to act, the establishment of a persisting action habit which is now the "really efficient agency" (Peirce EP2: 246) for the future action once it arrives;
8) A *capacity for* comparing the resulting actions with the 1) ideal (cf. Atkins 2016, 184f).

As Atkins emphazises, the resulting determination is the actual efficient agency of conduct. That role is not played by desire which may accompany or motivate some of the phases and components of self-control or not (thus, this constitutes Peirce's argument against hedonism and its claim that desires desiring their own gratification are the motors of action; cf. Atkins 2[illegible]: 191). An issue remains here: as the future is necessarily underdetermined, determination cannot foresee future action sequences in all possible detail. It cannot be completely correct, then, as Atkins says, that determinations are not general (Atkins 2006: 189). They are considerably less general than desires, indeed, but as habits, they must remain on some level of generality.

Maybe this conundrum was the reason Peirce continued to take interest in the *specification* of the action sequence in the self-imprinting of determinations, so to speak the deliberate lessening the degree of generality in order to enhance control over single sub-phases of future events. The investigation of the self-training phases establishing the action habit (points 4–7 in the 1903 scheme) reaches its largest detail in a very late sketch titled "Self-government:" "He establishes this government; and *then* he *is* bound. But only by his own free and reasonable act, which is world-wide apart from being bound by nature. It is a free government" (Peirce R: 675, second draft 18–20).[11] Here, Peirce lists nine steps as follows, almost in the shape of a self-help training manual for habit improvement, now with emphasis on the fleshing out in detail the imagined conduct, associating those

11 Peirce rarely uses the notion of "autonomy;" he rather sticks to notions like "self-government", but it is clear that the centrality of "self-control" in Peirce's ethics sketches are close to that of autonomy in Kant's ethics.

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details with imagined feelings and imprinting the result so as to form a determination, all of it subjected to training by repetition:

1) "[S]elf-critiques of conduct must be regularly kept up;"
2) Repetition of act in imagination;
3) Rendering vivid all details;
4) Attention to feelings accompanying those details;
5) Focusing especially on difficult parts of the act sequence;
6) Making a resolution—by a strenuous self-command;
7) Repeating this, again, half a dozen times;
8) Make determination strong so as to performing it almost unconsciously;
9) And making a "movement of the soul" accompanying determination.[12]

The overall scheme remains invariant, yet detailing subarticulations of the imagination and determination phases, with special respect to imagining and memorizing details of the action sequence and repeating these as well as the determination to oneself. Particular emphasis is here put on how the general rule—established in step 4 of the 1903 scheme—is now detailed with respect to a more specific, even if still to some degree general, action sequence in an imagined future occasion. Each phase, moreover, here is expressed so as to overcome a certain inertia or counterargument.

Peirce's phase dissections of the self-control procedures immediately pertain to deliberate activity in general, subject to moral assessment. But they carry over to that important subspecies of deliberate action which is reasoning. First, the whole process of imaginary self-training regarding future action is, in itself, a piece of reasoning, inferring a number of implications from an ideal. Second, when the object of self-training is reasoning itself, self-control extends itself to not only checking inferences already made, comparing them to more or less explicit standards of leading principles, but to improving future inference procedures by imagining them in logical step-by-step detail. In that sense, the "creative", not only inhibitory version of self-control implies the self-critical exercising of inference steps to stay ready for future challenges for reason.

An important upshot of this development of the syntax of self-control is the idea that it takes place in a sort of constant dialog with one's future self, in no less than two senses: 1) the immediate proposing/inhibiting interaction within the ongoing dialog of thinking where the future self is that of the next moment, ready

12 See Atkins (2016: 182–185). Due to such a list of identifiers, Atkins says that "We are all sufficient familiar with self-controlled actions so as to differentiate them from actions or behaviors that are not self-controlled" (Atkins 2006: 183). That may be true as a general statement even it does not necessarily imply that we are able to distinguish the two in each particular case.

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to voice a counterargument; and 2) the more remote future self at the unknown later time of being prompted to perform the action trained. The former is a special version of the mature Peirce's more overall analysis of reasoning to take place in a constant feedback between a "utterer" and an "interpreter", that is, a proposer and a critic, or a verifier and a falsifier, taking turns in roles opposed vis-à-vis each other —in the conduction of proofs in the Existential Graphs nicknamed a "Grapheus" and a "Graphist" (cf. Pietarinen 2006). Each step in Peirce's process descriptions of self-control, then, has the shape of countering imagined objections in an ongoing ping-pong. A much slower dialog is the second one with the remote future self, possibly reporting back when occasion rises to test the new-established habit in practice, comparing action results with action rules and their motivating ideal.

2.4 Levels of self-control and hypostatic abstraction

This process description of self-control in its pro-and-con phases forms a so to speak *horizontal* issue of self-control. Quite another, then, is the *vertical* issue of how one control may take another, already established control, as its object. Also, in 1905, Peirce considered this relation: "control may itself be controlled, criticism itself subjected to criticism; and ideally there is no obvious definite limit to the sequence" (Peirce CP: 5.543, EP2: 349). The idea is illustrated with the example often cited in later cybernetics literature, of how 19th Century steam engines were equipped with a "governor" facilitating feed-back control by the letting out of steam at a certain pressure threshold to avoid too fast working pace, which might potentially damage machinery.[13] That governor, in turn, may be controlled by another, higher-level governor so as to avoid the former's kicking in too fast and making too abrupt a velocity brake, also threatening the machine:

> […] man's machinery is provided with an automatic governor upon each and every governor to regulate it by a consideration otherwise not provided for. For while an automatic governor may be attached to any governor to prevent any given kind of excess in its action, yet each such attachment complicates the machine; and not to speak of the impossibility of ever planning an infinite multitude of distinct contrivance, the disadvantages of complication in artificial machinery are so serious, that the automatic government of the governor of a governor is, I suppose, a thing hardly to be seriously considered, while in the human machine,—or, at least, in the cortex of the brain, or in whatever part it be whose action determines of what sort the man's conduct shall be, there seems, as far as we can see no limit to the self-government that can be and will be brought to bear upon each such determining action, except the lack of time before the conduct which was to be determined must come into actual play. (Pierce R: 649, 20–21)

13 On Peirce and cybernetics, see Holmes (1966).

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Here, a distinction between human and machine is proposed based on the idea that the governing of governors must reach an end due to ensuing complications of mechanisms, while humans supposedly are able to make an indefinite number of levels of conscious self-control. That is hardly a strong argument, empirically dependent on the development of machines as it remains, cf. next section.

Stronger is a first sketch Peirce gave of the details of these levels in the central self-control year of 1905:

> To return to self-control, which I can but slightly sketch, at this time, of course there are inhibitions and coördinations that entirely escape consciousness. There are, in the next place, modes of self-control which seem quite instinctive. Next, there is a kind of self-control which results from training. Next, a man can be his own training-master and thus control his self-control. When this point is reached much or all the training may be conducted in imagination. When a man trains himself, thus controlling control, he must have some moral rule in view, however special and irrational it may be. But next he may undertake to improve this rule; that is, to exercise a control over his control of control. To do this he must have in view something higher than an irrational rule. He must have some sort of moral principle. This, in turn, may be controlled by reference to an esthetic ideal of what is fine. There are certainly more grades than I have enumerated. Perhaps their number is indefinite. 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. (Peirce CP: 5.533)

We may summarize these seven levels as follows:

1) Unconscious controls in the mind;[14]
2) Instinctive self-control (not necessarily completely unconscious);
3) Self-control resulting from training (upbringing, education, coaching, etc.);
4) Self-control resulting from self-training (cf. the process descriptions above involving imagination), aiming at some selected goal;
5) Improving the goal already set;
6) Involving some guiding moral principle;
7) And that principle, in turn, reconstructed after some aesthetic ideal.

Peirce muses that the number of such levels may be indefinite. The recursive mode of definition by level n controlled by metalevel $n + 1$, however, seems to entail that level numbers remain describable by an integer. Peirce's seventh level—an aesthetic norm—is taken to stem from the uppermost normative discipline of aesthetics in Peirce's idiosyncratic definition of that term (the study of those ultimate aims or values which are valid in and by themselves). For that reason, level 7

14 Even recently, the existence of unconscious controls may be celebrated as a pathbreaking discovery in neuroscience and neurophilosophy – that is, e.g., the main point of Suhlers and Churchland's 2010 paper.

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seems to be the ultimate level, even if different aesthetic values may compete.[15] This does not preclude, however, that intermediate levels may multiply by subdivision facilitating more detailed, articulated and easier manageable control procedures.

Peirce's bottom-up description of the levels of meta-controls seems to indicate that the rise in levels is also, to some degree, a process of cultivation, domestication, civilization, also in the German sense of a personal *Bildung*, of character construction and growing conscious self-insight, ranging from biological, cultural, and to individual developments, also having the character of a discovery procedure aiming to gradually revealing and realizing higher values not explicit in the beginning of the process. Interestingly, while the 1903 sketch of the horizontal process of self-control *began* with the assumption of an ideal governing the whole process, the vertical process of controls of controls *terminates* with the reorganization of the columns of controls after some aesthetic ideal. If the process takes place on every single level of nested controls, we must assume that there are lower-level ideals, one for each level, while the uppermost, "aesthetic" ideal is reached late or never, and if it is reached, it may exert at downward restructuring of lower-level ideals.

Continuing the quoted sketch of the column of meta-levels of controls of controls, Peirce draws a crucial connection to the semiotic device of *hypostatic abstraction*, developed since 1902, but also culminating in the self-control year of 1905. Hypostatic abstraction is a generalization of Duns Scotus' observation that while some entities are real objects (like actual things or processes), on the basis of such an *ens realis*, an *ens rationis* may be defined. One of Peirce's staple examples is that from the existence of white things, the hypostatic abstraction of "whiteness" may be constructed.[16] Continuing the dialog above where Peirce claimed that human superiority was the result of self, control, his fictive interlocutor asks:

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15 Aesthetic ideals being the ultimate governors of self-control also seems to lie behind this late piece of philosophy of life advice: This consideration shows the great advantage of man's making the best use of his time in deciding that supreme and difficult question, what sort of Attainment would prove most satisfactory to himself;—say, wealth, or the power of reading men's minds, or power to compel this or that body of men to obey him, or magnetic power, or self-approval, or what else, to give a few of the least complex and crudest examples of what I mean by "Attainments" [...] (Peirce R: 649, 21). A further level might be that of selecting between such competing "aesthetic" norms.

16 Strictly speaking, a step of "prescission" is taken from "white thing" to "white" before the next, hypostatic step to "whiteness." A longer discussion of "hypostatic abstraction" and its different types, see Stjernfelt (2007: ch. 11, 2012, 2014a).

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> *Doctor Y*. Is it not due to our faculty of language? *Pragmaticist*: To my thinking that faculty is itself a phenomenon of self-control. For thinking is a kind of conduct, and is itself controllable, as everybody knows. Now the intellectual control of thinking takes place by thinking about thought. […] One extremely important grade of thinking about thought, which my logical analyses have shown to be one of chief, if not the chief, explanation of the power of mathematical reasoning, is a stock topic of ridicule among the wits. This operation is performed when something, that one has thought about any subject, is itself made a subject of thought. (Peirce CP: 5.534)[17]

This is the idea that the ladder climbed by the ensuing steps of meta-control levels is constructed from corresponding steps of the semiotic tool of hypostatic abstractions. Following the quote, Peirce gives the example of hypostatic abstraction in mathematics, giving rise to a series of ever more abstract conceptions, from entities to the abstraction of a set, to the cardinality of that set, to the cardinal number, etc.—each new abstraction introducing variability—and hence controllability—of a lower-level within a higher one.[18]

While much other semiotic machinery is deemed accessible to higher animals like parrots or dogs by Peirce (including inferences, arguments, precission, etc.), hypostatic abstraction not so. This ability of thinking about thought by means of making an *n*-order thought the object of *n* + *1*-order thought and thus exercising self-control seem to be a candidate for a Peircean missing link between higher animals and human beings.[19] It is also a good candidate, then, to what distinguishes humans from other machines.

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17 Omitted here is a long quote of Peirce's favorite example of a hypostatic abstraction, Moliére's "Virtus dormative," the sleep-inducing power of opium, which he ridicules in his last play *Le malade imaginaire* as an idle medieval abstraction. Peirce, by contrast, defends the scholastic *virtus dormativa* for constituting a small but important step in reasoning: it highlights it is no accident that opium puts to sleep; there must be *something* in opium inducing sleep, calling for further research to identify that something, cf. Stjernfelt (2007).

18 Peirce here uses his partially home-made set-theory terminology: In order to get an inkling—though a very slight one—of the importance of this operation in mathematics, it will suffice to remember that a collection is an hypostatic abstraction, or ens rationis, that multitude is the hypostatic abstraction derived from a predicate of a collection, and that a cardinal number is an abstraction attached to a multitude. So an ordinal number is an abstraction attached to a place, which in its turn is a hypostatic abstraction from a relative character of a unit of a series, itself an abstraction again (Peirce CP: 5.534). So, this generation of still higher-level concepts in set theory is taken as a formal parallel to the still higher-levels of self-control also in other domains of thought and action.

19 Cf Stjernfelt (2012, 2014a). This is not the place to go deeper into Peirce's animal and machine counterexamples; see Stjernfelt (in press c).

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2.5 The role of consciousness in self-control

An important issue to which Peirce does not seem to furnish any definitive answer is the more precise role of consciousness in self-control. It is obvious that he finds the relevant kind of self-control in logic to be *deliberate* or *voluntary*, mirroring his mature theory of assertions which refers to the *assumption of responsibility* in making truth claims.[20] The central argument here is that actions of which you are not conscious, that is, automatized behavior sequences in act or thought, cannot count as deliberate and thus not be criticized as being good or bad.

An initial general issue is how consciousness—or the larger mind of which it is a part—is able to influence future concrete action at all. Peirce thinks that all physical events are directly caused by other physical events only just like all mental events are immediately caused by other events of the mind. Still, he refuses to admit any dualist doctrine of parallelism between the two. This is why he thinks the two realms may interact *indirectly*:

> […] we must understand by final causation that mode of bringing facts about according to which a general description of result is made to come about, quite irrespective of any compulsion for it to come about in this or that particular way; although the means may be adapted to the end. The general result may be brought about at one time in one way, and at another time in another way. Final causation does not determine in what particular way it is to be brought about, but only that the result shall have a certain general character. (Peirce CP: 1.211)

We already saw how, in the process of self-control, determination is assumed to possess causal efficacy in bringing concrete actions about. The argument cited leads into Peirce's recurrent metaphor with the court and the sheriff. The court refers to the law, but that law being general cannot act to catch the perpetrator. That requires the strong arm of the sheriff. So, the mind guides concrete events by general, final causation, while those actual events determine the particular way the aim is realized, by efficient causation. Psychologist logicians do not understand this, Peirce claims: "So, those logicians imagine that an idea has to be connected with a brain, or has to inhere in a 'soul.' This is preposterous: the idea does not belong to the soul; it is the soul that belongs to the idea. The soul does for the idea just what the cellulose does for the beauty of the rose; that is to say, it affords it opportunity. It is the court-sheriff, the arm of the law" (Peirce CP: 1.216). Even if consciousness is an effect of the physiology of the brain, it is simultaneously guided by final, ideal causation, just like the sheriff by the law: "though matter cannot act immediately upon mind or t'other way it may act all the same

20 See Stjernfelt (in press b).

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upon it. That self-control, self consciousness, involve endless series is clear. There are other modes of application, not merely other applications" (Peirce CP: 8.122Fn). It is not, however, the first aspect of consciousness, instantaneous feeling, that guides self-control: "Rationality is being governed by final causes. Consciousness, the feeling of the passing instant, has, as such, no room for rationality. The notion that logic is in any way concerned with it is a fallacy closely allied to hedonism in ethics" (Peirce CP: 2.55). Final causes, like the pursuit for truth animating logic, is to be found in the third, synthetic aspect of consciousness, more particularly in the self-conscious self or ego part of it: "I use the word 'self-controlled' for 'controlled by the thinker's self,' and not for 'uncontrolled' except in its own spontaneous, i.e., automatic, self-development, as Professor J. M. Baldwin uses the word" (Peirce CP: 6.454–455). The map-of-map metaphor of self-consciousness through time makes of it the center of consciousness, referring to itself by all of the time taking itself as its object in the self-controlling chain of self-criticism: "My dear Professor Royce, I wish you would tell me precisely why it is that you object to making anything its own purpose, or the sign of itself. It seems to me clear that is just what consciousness is […]" (Peirce CP: 8.122, 19). To Peirce, it is a definitory aspect of consciousness that it, all of the time, dialogically addresses itself. But what is covered by its self-criticism?

An important reason for its activity seems to be that its object is not merely mechanized deductions of the Kantian type where the conclusion contains nothing but what was already there in the premise. We already heard how "theorematic" deductions were argued to transcend mechanizability. Rather, the object of conscious self-control of reasoning is *the whole of the ongoing investigation process*, comprising abduction, theorematic deduction, induction, including self-correcting error-detection, all of it interconnected by the aim of truth continuously recruiting these inferences. In one of Peirce's many attempts at a proof of pragmatism in the 1900s, he mentions, as the seventh out of fourteen steps: "7. And the very first steps in all reasoning,—which is retroduction,—consists in the manipulation of signs of a certain sort, and an attentive and observational manipulation, self controlled & selfconscious" (Peirce R: 330). Abduction—the qualified guess constructing possible hypotheses to explain a surprising fact—as the first step in investigation is covered by self-control, just like every subsequent step in an indefinite chain of inferences. This also explains the distance Peirce saw from full scientific investigation processes to simple syllogism-proving machinery. This ambitious scope of what is supposedly covered by self-conscious self-control, however, should not be confused with an idea that such self-control should be expected to possess insight in each detail of the actual process of thinking. Here, another principle considerably minimizes what self-control must be able to make explicit in order to perform this duty.

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Reasoning is distinguished from acritical inference because of the fact:

> […] that it is always accompanied by the belief that it, the special inference, is only an instance of a type, or genus of inference. I do not agree with Hume that the line should be drawn between cases where the "check or control" actually *is* resorted to. It suffices that the mind should appeal to the possibility of such confirmation, just as the moral difference between lawful and lawless action consists, not in the case being carried into court, but in the agent's confidence that a court would sustain him. (Peirce R: 939, 3–4)

Again, the court/sheriff metaphor is invoked: control requires the consciousness that the inference controlled *is a token of a general type of valid inference structure*, which may, if necessary, be made explicit, just like a legal activity does not have to be tried at court, but might be so tried, if necessary. Othertimes, Peirce likens it with a contract: you do not need to be conscious about every word of a contract, nor, a forteriori, how its text psychologically came into being as a piece of writing—what you need to know is which obligations the contract implies for the contracting parties.[21] Likewise, the role of consciousness here should not be confused with an idea that all details of the psychological thinking process should be consciously present or even accessible; not even in the idea that every single *logical* step of the process should be so accessible. That lies in Peirce's revival of the medieval distinction of the *logica utens* and *the logica docens*—the former being the spontaneous use of logic based on scientific and other practice, put to use e.g., by practicing mathematicians or other scholars. They need not take logic courses nor be fluent in logical doctrine—but they should be conscious of what they are doing in the minimal sense of realizing that every step they take is "an instance of a type" of inference, and that inference, if challenged by errors, insufficient results, or by counterarguments, could be made explicit.

Finally, the conundrum of human versus general intelligence. Is it not strange, Peirce basing his whole logic on the principle of universality, normative principles holding for every possible intelligence—while simultaneously invoking for its control the peculiar psychophysical property of consciousness in higher animals and humans? In one of the main loci of Peirce's general account of diagrammatical reasoning, R 293 of 1906, a parallel version of the *Prolegomena* paper called "pl," he underlines this "Those whom we hear all-confidently asserting that anything like reasoning is a phenomenon peculiar to human consciousness or to the specific type of consciousness to which the human variety appertains, have not sufficiently considered the subject, and in particular fail to recognize that the question is not

21 Cf. "The mind is like the conveyancer who has drawn up a deed. What books he looked into in choosing his verbiage is no concern of the person who signs, provided he knows what the paper binds him to doing" (Peirce CP: 2.183).

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what happens to be extant but what the essential nature of reasoning allow." (Peirce R: 292a, LoF: 38)

Peirce assumes, in short, that every possible intelligence able to exert self-control will have to make use of *some* type of consciousness serving the construction of a self-conscious self, implying the ability to measure its own activity against the elementary standards of logic.

3 Perspectives

Peirce's struggle with the conceptual cluster of self-control, consciousness, mind, self, machines, animals, humans, reasoning, and logic gives result less clear that one may have wished for and probably also than what Peirce himself would have wanted. Still, it is thought-provoking to follow his struggle. Not only new aspects appear of what animated Peirce in his last fertile philosophical explosion through the 1900s—much of the reflections on conscious self-control appear intertwined with the definitive developments of semiotics, pragmatism, existential graphs in the years 1902–1906, through Peirce's *Annus Mirabilis* of 1903.

One clear result appears to be two levels of self-control. One local, stepwise, inhibitive self-control, built on the simple measuring of inferences by some minimal degree of consciousness of their general leading principle, developed in constant ping-pong with oneself characteristic of dialogic Peircean reasoning. And one global, habit-forming self-control, oriented towards a more remote future, stitching together a series of inhibitory steps, utilizing imaginary thought experiments, attempting by training to command a future version of oneself, guided by some more or less explicit overarching purpose, personal, societal or universal. Both of them, of course, take place in the third mode of consciousness, the cognitive, temporally extended, learning ability of synthesis. The two aspects of self-control mentioned simultaneously display the enormous range of that synthetic ability required for self-control.

The first one pertains to what could be called the immediate *window* of consciousness—related to the ongoing synthesis capability in what psychologists call short-term memory or working memory. We heard Peirce's claim that consciousness is both temporally and spatially extended. Its possibility of critically reviewing the simplest step of thought—the inference step from one proposition to the next—seems to rely upon an elementary ability of surveying, in one glance, as it were, a limited spatiotemporal domain covering the way a proposition combines subject and predicate. The synthesis of those two components or aspects of a proposition into one, truth-claiming sign arguably forms the most elementary step among the logical endeavors of the third, synthetic consciousness. Combining an

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icon and an index in that specific way so as to function as predicate and subject, respectively, is a different kind of synthesis than that of the melody or of gestalts of the visual field, to be sure, but still a synthesis most often spontaneously accomplished, with the result that a sign is processed as professing a truth by claiming two aspects of itself being involved with the very same object. Most probably, that is a process facilitated by brain architecture in many higher species (cf. Stjernfelt 2014b). But viewed from the consciousness inside, this synthesis is made possible by the co-localization of the subject and predicate token parts of the proposition within a pretty narrow spatio-temporal window. There could be no far spatio-temporal distance between subject and predicate, neither in thought nor in external propositions representations, in order for the unity of the proposition to be established (cf. Bellucci 2014; Stjernfelt 2014a). Simultaneously, that synthesis involves the structure of a proposition—one as[illegible], the subject, referring to some object, and another, the predicate, describing that same object.[22] The assumption of that object, then, is what unites the specific propositional use of the space-time consciousness window. Hence, this is a more or less implicit knowledge which self-control must put to use when critically examining the validity of a proposition: does the claimed predicate actually hold for the object pointed out by the subject? A similar synthesis is repeated for the next step—the relation between premises and conclusion of an elementary inference. Their synthesis also requires co-localization of the parts in a spatio-temporal window of consciousness.[23] Again, that is not to say that all propositions or inferences in that window are necessarily fully conscious; probably most of them are acritical and below the level of consciousness. But when the critical examination of them is performed by a conscious act, that must involve a synthetic overview which is, simultaneously or in short sequence, conscious of all relevant parts, now measuring it, as Peirce says, on the leading principle of the inference. Those must form the two elementary, nested windows of logical conscious control. The internal or external dialog between the "utterer" and the "interpreter" in self-control must be stepwise co[illegible]hensible or overviewable so as to be able to immediately compare pro-con-pro sequences, even if the total argument may have a scope so as to escape one synthetic glance.[24]

22 That this synthesis *itself* is predicative, iconic, was Peirce's idea with the "continuous predicates" mentioned above—such predicates being extended structures not further analyzable.

23 This proximity, juxtaposition, or co-localization is not metric, rather topological in the sense of belonging to the same, connected space-time frame, cf. Stjernfelt (2019b).

24 How big is that window? Some empirical guidelines here may be the average maximum size of a period in spoken (time) or written (space) language. Another indication may come from the more general (not only logical) window of consciousness—the maximum time lapse between two ensuing notes of the melody or beats of a rhythm. As soon as that present now is transgressed, the

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The *size* of those windows in human beings, of course, is an empirical issue of psychology. For all his emphasis, however, on conscious self-control of reasoning, Peirce's argument is philosophical and general, as we saw in the R 293 quote above. As no conscious, reasoning agent could be omniscient nor all-seeing, *any* possible consciousness must work in such a consciousness window able to synthesize a spacetime window, smaller or larger, its scope dependent upon species, individual talent, education, situation, intoxication, etc.[25]

The other end of self-control, the cumbersome struggle to teach oneself new habits, belongs in the other end of the third mode of synthetic consciousness. Here, the immediate window is transgressed and the whole process only kept together by the overarching purpose, recruiting any number of the small proposing-inhibiting steps of the former kind. This synthesis is possible only with intense use of short-term and even long-term memory, fueling imaginations of future acts with memories of what went wrong in earlier past attempts at that act, diversifying future act in subtypes after type of purpose and type of situation, synthesizing whole narrative scenarios in short-term memory but relying upon the small immediate window anytime some detail of the process requires special scrutiny—just like the whole of the action sequence should be overviewed in one, albeit vaguer glance. Obviously, in developing this distinction, we are extemporizing on indications only briefly given, primarily in Peirce's 1905 developments of conscious-self-control.

But Peirce's important reinterpretation of the Kantian notion of human freedom certainly belongs to the latter. Peirce rarely uses the important Kantian notion of "autonomy," but his doctrine of self-control obviously addresses exactly this issue: "the propositions that the laws of nature are not absolute and that important physical events are due to human reasoning are far from proving that human action is (in any important degree) free, except in the sense that a man is a machine with automatic controls, one over another, for five or six grades, at least. I, for my part, am very dubious as to man's having more freedom than that, nor do I see what pragmatic meaning there is in saying that he has more" (Peirce CP: 8.320). In a certain sense, Peircean self-control forms an attempt at analyzing further Kantian autonomy, also in the sense of its involving the building of character,

melody dissolves into isolated notes, the thought into independent signs, and we pass to the realm of short-time memory in order to maintain synthesis.

25 Some might claim God would not be subject to such limits to synthesizing consciousness; yet we saw Peirce doubting God has any consciousness at all: "Since God, in His essential character of *Ens necessarium*, is a disembodied spirit, and since there is strong reason to hold that what we call consciousness is either merely the general sensation of the brain or some part of it, or at all events some visceral or bodily sensation, God probably has no consciousness" (Peirce CP: 6.489).

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human dignity, capability of ethical judgment, the strive for ideal goals etc.—the famous capacity which, to Kant, was a source of awe paralleled only by the starry skies above. In that sense, Peircean conscious self-control, initially seeming so fragile and marginal, may end preserving and even developing a central Kantian Enlightenment notion—but deprived of the large-scale Kantian dualism of Freedom and Necessity which no continuist pragmatist would be ready to accept, making it a fragile and never fully achieved result of human perfectibility rather than a given metaphysical realm.

Acknowledgments: Thanks to Francesco Bellucci and Winfried Nöth for comments.

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Bionote

Frederik Stjernfelt
Aalborg University, Aalborg, Denmark
stjern@hum.aau.dk

Frederik Stjernfelt is a Professor of Semiotics, Intellectual History, and Philosophy of Science at Aalborg University Copenhagen. As to semiotics, he takes a strong interest in Charles Peirce and his philosophy of iconicity, diagrams, propositions, and reasoning, cf. the books *Diagrammatology (*2007) and *Natural Propositions* (2014). In intellectual history, he is preoccupied with the history of ideas of the Enlightenment, most recently the two volume work *Grov Konfækt* on Danish Press Freedom 1770–1773 (with historians U. Langen and H. Horstbøll). In philosophy of science, together with David Budtz, he has had a series of projects mapping current humanities and the relevance of philosophical anthropology to research and democracy. He is a member of the Danish Royal Academy of Science and Letters and of the International Advisory Committee for the Charles S. Peirce Society. In Denmark, he participates in public debate as a critic and columnist with the Copenhagen weekly *Weekendavisen*.