PEIRCEAN PRAGMATISM AND INFERENCE TO THE BEST EXPLANATION

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Abstract

In the current literature about Inference to the Best Explanation (IBE) it is usual to treat it both as a synonym of 'Abduction' (or at least, intimately related with peircean Abduction) and as encompassing non-deductive inference. However, Peirce not only distinguished between abduction, induction, and deduction, he did it in the framework of a very peculiar idea of experience, in which 'experience' is understood as future-action-oriented, rather than past-cumulative-data, more proper of the empiricist tradition. As a consequence, these two philosophical attitudes have a very different understanding on the role of evidence in the inferences. The purpose of this presentation is twofold. On one hand, to propose three criteria to distinguish between Peircean Abduction and Induction and to explain the role that Peirce's ideas of experience and evidence have in them. On the other hand, to contrast these criteria and philosophical framework with those proposed by contemporary IBE's theorists.

Keywords: ABDUCTION, INDUCTION, PRAGMATISM, INFERENCE TO THE BEST EXPLANATION, EXPERIENCE.

Peircean Abduction and Induction

Let me begin by stating that Peircean abduction and induction can be differentiated sharply by three criteria: a formal, a methodological, and an epistemic one. First, from a formal point of view, *throughout his career*, Peirce conceived his Hypothesis or Abduction as an inference to an antecedent from a consequence and consequent (*e.g. W*2: 219n, *CP* 5.276n1, 1868)[1], and his Induction as an inference to a consequence from an antecedent and a

[1] References conventions are mentioned at the end of the paper.

consequent[2]. This point is commonly known as the 'Rule, Case, Result doctrine' for the different kinds of inference, popularized in the famous example of the bag of beans (*CP* 2.623, 1878).

Secondly, since the very beginning of his career Peirce introduced methodological elements in his Logic (*e.g. W*1: 175, 1865; *W*1: 433, 1866; *W*1: 420, 1866; *W*2: 48; *CP* 2.515, 1867) and in 1878 he stated that "synthetic inference is founded upon a classification of facts, not according to their characters, but according to the manner of obtaining them" (*W*3: 305, *CP* 2.692; EP1: 169; *cf. CD*: 3081, 1889; MS 766: ISP4, c.1896). It seems to me that Peirce included some methodological features in both his Abduction and Induction in the framework of his doubt-belief model of fixation of belief. Concerning Abduction, I consider the following to be the canonical statement of Abduction (CSA):

> The surprising fact, *C*, is observed;
> But if *A* were true, *C* would be a matter of course,
> Hence, there is reason to suspect that *A* is true (*CP* 5.189, 1903).

In the first premiss I hold the 'surprising' factor to be related with the claim that we must start an inquiry in virtue of a genuine doubt (*cf. W*2: 212, *CP* 5.265, 1868). We are compelled to abduce when we do not know either how to explain or to do something, otherwise Abduction is not required. In this sense, the facts which give origin to Abduction are *not* looked for, but present themselves to our experience, and the methodological role of the first premiss of CSA is, in this sense, twofold: first, to explicit that something must be solved (see also *W*3: 326, *CP* 2.624, 1878); and second, that we have to entertain the facts found as our first abductive premiss.

Concerning Induction, Peirce *defined* it in a methodological manner in 1878:

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[2] For abduction, see for instance, *W*2: 46, *CP* 2.511 (1867); *W*2: 58; *CP* 1.559; *EP*1: 9 (1867); *W*3: 328; *CP* 2.623; EP1: 188 (1878); *W*4: 419, *CP* 2.706 (1883); *RLT*: 139 (1898); *RLT*: 139 (1898); *CP* 5.189, *EP*2: 231 (1903); *NEM*3: 205 (1911). For induction, see *CP* 2.511; *W*2: 58; *CP* 1.559; *EP*1: 9 (1867); *CP* 2.623-25; *EP*1: 188 (1878); *CP* 2.702; *W*4: 416 (1883); MS 397, NEM4: 357 (1894); RLT: 138 (1898); NEM3: 197, 199-200 (1911).

> *The inference that a previously designated character has nearly the same frequency of occurrence in the whole of a class that it has in a sample drawn at random out of that class is induction.* If the character be not previously designated, then a sample in which it is found to be prevalent can only serve to suggest that it may be prevalent in the whole class. We may consider this surmise as an inference if we please -- an inference of possibility; but a second sample must be drawn to test the question of whether the character actually is prevalent (*W*3: 313, *CP* 6.409, 1878; original emphasis).

From this definition we see that Induction requires predesignation and sampling. By predesignation we establish –and this absolutely crucial– *before the observation* which characters are going to be tested. Sampling is understood as usual. In this sense, predesignation and sampling answer *what* and *where* we must to look for in Inquiry.

Peirce retains these rules from 1878 until 1911[3]. But in 1898 Peirce introduces Induction as the third stage of Inquiry, and by 1911 he affirms that we must suspect of the soundness of an Induction if it is not *preceded* by an Abduction (L231: ISP21; NEM3: 178). This means that Induction is literally the third stage of inquiry also *methodologically*.

These rules have, on one hand, a *proscriptive* role: they prevent the introduction of subjective elements in reasoning, as the examples of poets (*W*3: 313, *CP* 6.408, 1878; *W*4: 435, *CP* 2.738, 1883) and biographies (*CP* 1.96, 1898) show. On the other hand, they have a *prescriptive* character: Induction requires sampling, predesignation, and precession, with predesignation playing a pivotal role, because *without it Induction becomes Abduction* (*W*3: 313, *CP* 6.409, 1878; MS 842: ISP161, 1908). This point has a very important consequence: given that in Abduction what is empirically found is not looked for, but in Induction it must be deliberately looked for and founded, *the facts stated in the first premiss of Abduction do not count as evidence for Induction*.

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[3] *cf. CP* 6.408-409; W3: 313, 1878; MS 747: ISP 26, 1881; *CP* 2.726; W4: 427; *CP* 2.737; W4: 434; *CP* 2.738; W4: 435, *CP* 2.738-739; W4: 436-438; 1883; *CD*: 4682, 1889; *CP* 6.41-42, 1892; MS 397, NEM4: 357, 1894; MS 441, RLT: 136-138, MS 440, ISP26-29; RLT: 171-172; *CP* 5.584; RLT: 194-195; *CP* 1.96, 1898; MS 1147A: ISP97, c.1900; *CP* 2.784; *CP* 2.789-790, 1901; *CP* 7.209, 1901; *CP* 7.120, 1903; MS 842: ISP161, 1908; L77, *CP* 8.234, 1910; L231, ISP39, NEM3: 178, 194-195, 1911.

Thirdly, there is an *epistemic criterion*: notice that the 'surprise' of CSA's first premiss testifies an epistemic state: *our ignorance*. The "hence" of the last proposition of CSA gives us the epistemic permission to 'suspect' that *A* is true. However, to "suspect" is not to "believe". In other words, when we get the abductive conclusion, we are still ignorant. In that sense, Abduction is ignorance-preserving (Gabbay & Woods, 2003, 2005, 2006), *i.e.* it maintains the epistemic status of the original epistemic 'genuine' doubt. This is why Peirce insisted in that the abductive conclusion must be put as question (*CP* 2.634, 1878), as a suggestion (MS 440: ISP34, 1898), and must be "entertained interrogatively" (*CP* 6.524, 1901). So, even if we have an irresistible inclination to believe our guesses, if we want to behave scientifically, we must not surrender to that inclination (*CP* 6.469-470, 1908).

With Deduction we develop hypotheses' meaning (this is the pragmatistic connection, see *infra*.), and with Induction we test them. When the testing is favorable to the hypotheses, we are justified to *believe* them (Hookway, 2005: 103), or better, to hold them as 'scientific opinions' (*CP* 1.635; RLT: 112, 1898; cf. *CP* 7.185).

By its very nature, Abduction cannot prove anything: the word "proof" cannot apply to it, because the meaning of "proof" is concerned with removing a *real doubt*. Instead, "proof" is applicable to Induction (*CP* 2.782, 1901-1902), because the epistemic role of Induction is precisely to remove doubts by justifying beliefs or scientific opinions.

For Peirce, abductive –scientific- conclusions (suspicions) will always have an inferior epistemic status than inductive conclusions (scientific opinions) or, as contemporary logicians say, abductive conclusions are epistemically *sub-par* relative to background knowledge and inductive conclusions. Abductive conclusions are conjectures, no less, but not more: Abduction begins with a lack of knowledge and ends in the same way; the conjecture is a promise of knowledge, but not knowledge at its full rank. If we were to have the permission to believe our guesses, we would stop the inquiry when we arrived at them, without any need of deductive or inductive work. But this is not the case, at least for Peirce.

Induction begins with lack of knowledge (because Deduction, which should precede it, develops hypotheses, but does not make them either true or false) and ends with knowledge, in the sense of justified belief.

This being so, a justified Peircean *belief -i.e.* as a habit of action- is attained by Induction. But a well conducted Induction requires predesignation, sampling, and the precession of a well conducted Deduction and a proper Abduction. In this sense, only through Induction we attain (scientific) beliefs.

So, the abductive "Hence" differs from that of the Induction. Let me refer to them, respectively, as the "hence" which "preserves the genuine epistemic doubt condition" and the "hence" which "discharges the doubt condition".

My main point in this section is that there is a *qualitative epistemic* gap between everything which falls under the 'range of the suspicious' and that which falls under the 'range of scientific opinion' (*i.e.* belief attained trough scientific control, and not by another fixation-method). If the difference were *quantitative*, *i.e*. a matter of degree, the epistemic difference between Abduction and Induction would be a matter of degree[4]. Nonetheless, there is an approach that sees the process as a quantitative matter: Inference to the Best Explanation (Thagard, 1981a, 1981b; Harman, 1965; Lipton, 2004).

Inference to the Best Explanation (IBE)

The notion of IBE was introduced in the mid-sixties of the past century (Harman, 1965). Harman's original idea was that there are cases of enumerative inductions which are not warranted cases of non-deductive inference, and he proposed to call this reasoning IBE. In this reasoning

[4] In this analysis is not the case that Abduction provides beliefs and Deduction and Induction make those beliefs secure, as Misak (1991: 87) has proposed.

> One infers, from the fact that a certain hypothesis would explain the evidence, to the truth of that hypothesis (Harman, 1965: 89).

The qualification 'better' is given because there can be many hypotheses and one must choose one among the competitors (Harman, 1968: 530), based on methodological criteria such as simplicity, plausibility, etc. (Harman, 1965: 88); besides, the probability relative to the proper evidence and fitness relative to prior knowledge (Harman, 1968: 530-531) is important. Later on Thagard gave three more precise criteria for IBE: consilience, simplicity, and analogy (Thagard, 1978a: 79; 1988: 86-99).

Since Harman's papers many authors have supposed that IBE and peircean Abduction are synonymous, or at least, are closely related[5]. Now, as the quote shows harmanian IBE justifies the assertion of its conclusion, whereas in Peircean abduction that is not the case. In other words, according with IBE's followers, with IBE we obtain new knowledge, whereas according with Peirce, scientific abductions do not afford new knowledge, and only inductions can do it. This later point leads us to Harman's remarks on generalization. To him the cases of enumerative induction can be characterized as instances of IBE, and therefore, enumerative induction becomes a special case of IBE (Harman, 1965: 88-91). Thus, from the observation that "all observed A's are B's" we can infer that "all A's are B's" because this is the best hypothesis (*e.g*. the simpler one) which explains the observation. But in Peircean terms it is also abduction, and not (Peircean) induction, because it is not enough to project from samples for ranking an inference as induction. It is necessary to draw consequences from the hypothesis, select the predesignated characters

[5] Among them are Harman himself (1965: 88), Thagard (1978b, 1981, 1988), Lipton (2004: 56), Morado (2006); Ramírez Figueroa (2006), Psillos (1996), Ladyman et al (1997: 305), Flach (2002), Walton (2004: 10), Wirth (2005: 203, 205, 207), Moroni, Manzolli & von Zuben (2005: 345), Díez & Moulines (1998: 396), Misak (1991: 95) and Magnani (2001). Recently it has been considered (Thagard, 2005; Aliseda, 2005: 363; 2006: 366; Kiikeri, 2001) that IBE is a special form of Abduction and, furthermore, Gabbay & Woods (2005: 270) think that it is its most common form, although, there are others (Schurz, 2007) that think, contrarily, *i.e,* that Abduction is a specification of IBE. However, there are some authors who reject the assimilation between Abduction and IBE. Among them I will mention Hintikka (1998), Kapitan (1992), Minnameier (2004), Lugg (1985), Hookway (2005), and Tiercelin (2005). I must add that they differ about the *reasons* for rejecting the assimilation mentioned. Although I accept some of their claims, I will try to propose additional reasons for the rejection mentioned.

among them, and then to put it to the test. This kind of inductive generalization can be represented in the following way:

Antecedent: These consequences are predesignated consequences of the hypothesis A
Consequent: These consequences are true,
Consequence: Hence, all the consequences of the hypothesis A are true
Hence, the hypothesis A is true

And only if the testing is positive, we can hold (provisionally) that the hypothesis is true, and not merely by generalizing the predicates of the accumulated observations (traditional induction).

Thus, from Harman's point of view there is not qualitative difference between (Peircean) Abduction and Induction, and therefore, the process of beliefs justification, it is to say, the epistemic change from a genuine doubt to a 'warranted' belief is gradual, and thus, quantitative. This position is adopted explicitly by Thagard (1977, 1978a, 1978b: 166-167, 1981b, 1988: 86-99). According to Thagard,

> [IBE] consists in accepting a hypothesis on the grounds that it provides a better explanation of the evidence than is provided by alternative hypothesis (1978a: 77).

But it is important to notice that in the quote, "evidence" means *accumulated* evidence, and not *looked for and founded* evidence. This implies that in IBE predesignation has no role. Thus, in IBE there is no difference between evidence founded by a 'surprising fact' (Peircean abductive evidence) and that which is predesignated (Peircean inductive evidence); and therefore (at least presumably), whereas in Peirce different kinds of evidence have different methodological and epistemic reach, that is not the case in IBE. It also means that IBE does not account (either) of Peircean Induction.

Furthermore, Thagard proposes that IBE is an alternative to the Hempelian model of confirmation (Thagard, 1978a: 76). It means –as Hookway (2005: 141) pointed out- that IBE lies on inductive testing. However, in so far Peircean Abduction does not contemplate confirmation; IBE is not an alternative to Peircean Abduction, but to the whole Peircean model of the three stages of Inquiry. However, the criteria proposed for IBE (*e.g.* Thagard's consilience, simplicity, and analogy) do not fulfill the same function as the criteria proposed by Peirce for the Economy of Research, which only count for the 'logic of scientific abduction' (see *e.g. CP* 7.220-223, 1901)[6]. And this is so because Abduction is not the inference to the *best* explanation, but to the best hypothesis to put to the test, even if we have good reasons for thinking that the hypothesis is false (*CP* 7.222, 1901).

Summarizing, IBE has a different methodological and epistemic approach to the dynamic of science than Peirce's three stages of inquiry.

Concerning the formal structure of IBE, a standard statement is advanced by Josephson (1996: 5):

> D is a collection of data (facts, observations, or given events
> H explains D (or at least, if H were true would explain D)
> No other hypothesis explains D as well as H does
> Therefore, H is probably true

According to Josephson (2000) –who also thinks that IBE and Abduction are synonyms (1996: 5) – 'smart inductions are abductions': you first look at the sample, then you find some salient features in it, and then proceed to generalize them; the 'abductive' step is to find the relevant salient features[7]. This proposal can be (roughly) represented in this way:

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[6] In MS 637 (1909) Peirce introduced the difference between *practical* and *scientific* abduction. The main difference among them is the *time* one has to solve the problem at hand. Typically in everyday issues the time available is scarce (think in a physician in an emergency room), but in science the time available is longer. So, the recommendations of the 'Economy of Research' apply only to scientific abductions (which I am concerned here), not to the practical ones. Here we have other difference with IBE, because its criteria are proposed by its supporters for every inductive practice: from everyday life to science.

[7] Josephson coincides in this with others abduction theorists. See, for example, Psillos (2000), Flach (2002), Aliseda (2006).

Consequent: $(Fa \wedge Ga)$, $(Fb \wedge Gb)$, $(Fc \wedge Gc)$, etc.

Consequence: $[\forall x\,(Fx \rightarrow Gx)] \rightarrow \{(Fa \wedge Ga), (Fb \wedge Gb), (Fc \wedge Gc)$, etc.$\}$

$\therefore$ *Antecedent*: $\therefore\ \forall x\,(Fx \rightarrow Gx)$ [8]

Under a Peircean point of view this is Abduction-like, and not Peircean Induction, because of both the absence of predesignation and the inference being to an antecedent . Hence we can conclude that by Abduction a generalization can be obtained. Thus, *generalization* is not a central feature of neither (Peircean) Abduction nor Induction.

Experience and Evidence in Pragmatism and Empiricism

According to Lipton, IBE must be a model of the *effective* inductive practices (2004: 126, 142, 207), from everyday inductions to highly elaborated scientific theories (2004: 209). This *descriptive* approach strongly contrasts with Peirce's proposal, which is *normative*. In fact, the three stages of inquiry can be seen as a *normative* theory of scientific method, which, I think, it is related with his Pragmatism.

Let me sketch briefly my interpretation of Peirce's position: First, Peirce retains the rationalist idea that experience goes beyond sense-data. So, the sense-data do not exhaust experience, which then, is not marked by atomism as empiricism does. Second, experience is meaningful, and meaningfulness is intrinsically related with the idea purpose (cf. Short, 2007: Ch. 6). In this sense, experience in general, and perceptual experience in particular, behaves as an *anticipation* structure[9]. So, experience, to Peirce, *constitutively* gives us the possibility of adopting certain courses of action (including thought as a form of action). In my opinion, experience in Peirce's conception is *continua*, not discrete. Its continuity is backed up by Thirdness, which is always aiming at future courses of action. However, experience feeds also from both Secondness and Firstness: From Secondness, in the form of

[8] There are some formal restrictions which I have no time to develop, such as that the main conditional of the consequence must be understood as presumptive and that the order of the conjunction must be epistemically and/temporally marked.

[9] In this respect Peirce's notion of experience is similar to that proposed by Husserl (see *e.g.* Husserl, 1980).

the ‘outward clash’, the action/reaction indebted to brute facts; and, from Firstness, in the form of the immediate presence of qualities. I think that empiricism could accept (to a certain degree) Firstness and Secondness, but not Thirdness. Peirce called this attitude ‘Ordinary Nominalism’ (EP2: 180, 1903). So, if empiricism were the natural place of IBE (as it seems to me to be the case), it would not have room for Thirdness, as Peirce’s notion of experience requires (*CP* 5.181, 1903).

In my opinion, Peirce’s pragmatism sinks its roots in his notion of experience, which becomes the very core underlying the Pragmatic Maxim. The pragmatic meaning of a hypothesis consists in all the consequences with experiential bearing which would follow from the hypothesis. Now, those consequences are experiential anticipations (*e.g.* predictions) about observational and practical (in the sense of “apt to affect conduct” (*CP* 8.332, 1906)) affairs. In this sense, if we were to have a full understanding of the hypothesis’ pragmatic meaning, we would obtain the total comprehension of the hypothesis’ *content*, which consists, then, in the whole of those expectations. That is why, according to Peirce, if we *believe* the hypothesis, we are *prepared to act* in certain ways, and a *belief* becomes a *habit of action*. So, the pragmatic meaning of a hypothesis gives us some expectations (if the hypothesis were true) and prepares us for taking some courses of action. These expectations, then, are the possible predesignated characters, from which some subset would be tested. And these expectations are the result of an operating Thirdness.

Notice that nothing like this can be drawn from an empiricist point of view, because there *experience* means ‘accumulated outward (atomic) clash’[10]. And particularly in IBE, new evidence is summed up with the old one, under the principle of total evidence examination.

Concluding Remarks

[10] The lack of Thirdness in empiricism perhaps is related with empiricism’s puzzles of Induction (old and new). But this is the topic of other paper.

I would like to finish by summarizing with the main claims I have made throughout this presentation. First, IBE is neither Peircean Abduction nor Induction from a formal, methodological, and epistemic point of view. Second, empiricism and Peircean pragmatism notions of experience have some bearing in the role of evidence in Inquiry, the epistemic constraints, the methodological rules, and the formal features of those inferences.

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MS/L 1967-1971. *The Charles S. Peirce Papers*, 32 microfilmed rolls of the Manuscripts preserved in the Houghton Library, Photographic Service, Harvard University Library, Cambridge, Massachusetts. Numeration corresponds to the *Annotated Catalogue of the Papers of Charles S. Peirce*. Richard Robin. Amherst: University of Massachusetts Press, 1967 and/or to "The Peirce Papers: A Supplementary Catalogue", in *Transactions of the Charles S. Peirce Society*, 7 (1971): 37-57. "MS" designs the Manuscripts and "L" the Letters. "ISP" refers the page numeration as established by the *Institute for Studies in Pragmaticism* for MSS. "*MS*" refers to Peirce's own numeration in the MSS.

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