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From steps and phases to dynamically evolving abduction

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Abstract

In this paper interplay between Peircean abduction and modern literature on methodology is analyzed. Abduction is used in methodological discussions on qualitative methods, for example, in relation to grounded theory, case study methodology, and ethnography. Basic uses of abduction in this literature are presented. They provide a perspective on abduction treated dynamically besides more traditional outlooks on abduction as specific reasoning steps or as a first phase in methodology. Abduction gives especially means of seeing the role of theorizing and the interaction between theories and observations in methodology. A list of abductive strategies (seven in all) are presented which are in line with a dynamic view on abduction. Peirce provides elements for this kind of an interpretation even though methodeutic was the vaguest and the least developed area of his theory of logic.

Keywords: Abduction, qualitative methodology, grounded theory, reasoning strategies, methodeutic

Introduction

For long after Peirce's death abduction was treated quite marginally in methodological discussions. Abduction itself woke up little interest, and for long an analysis of the logic of discovery was seen to be outside of methodology. Abduction was analyzed within such fields as the Peirce scholarship (Fann 1970), the philosophy of science (Hanson 1958, Nickles 1980), or semiotics (Eco & Sebeok 1983) which came close to methodological questions but were not concentrating on them.

This has changed rapidly after the turn of the 21st-century. Abduction has found its way to methodological handbooks and discussions especially on qualitative methods. Peirce's basic formulations of abduction are seen to provide means for bringing up important elements of methodology.

These methodological discussions provide interesting means for developing Peircean abduction further. In his later writings Peirce himself developed abduction as a part of methodological processes (e.g. Peirce CP 7.202-219, 1901). Still, it seems that *methodeutic* (which is roughly the Peircean term for methodology – see CP 2.93, 1902) was the vaguest and the most underdeveloped part in Peirce's trivium of logic, that is, *grammar*, *critic* and *methodeutic* (Paavola 2004).

In this paper, I briefly analyze how abduction is interpreted and used in methodological literature. Secondly, I provide an interpretation on abduction emphasizing abductive strategies which is in line with a dynamic conception of abduction and methodology. Finally, I return to Peirce's writings on abduction, and

how to interpret them in relation to these methodological considerations. I maintain that modern discussions on methodology and on abduction can enrich each other.

1 Modern methodological interpretations on abduction

Abduction has woken up interest especially in discussions concerning *grounded theory* (Haig 1996; Kelle 2005; Bryant 2009; Timmermans & Tavory 2012). Grounded theory started with a claim that theories should be discovered from data systematically by being close to those phenomena that are investigated, not starting from grand theories deductively (Glaser & Strauss 1967). Many proponents of grounded theory have, however, maintained that especially grounded theory as developed by Glaser emphasized one-sidedly *induction*. Abduction is providing an alternative approach where the starting point is still importantly on data but theoretical concepts and preconceptions get a more prominent role (Strauss' approach has been more in line with abduction – see Bryant 2009). According to this, grounded theory has had an "inductivist self-misunderstanding" (Kelle 2005). The role of "theorizing" and "theoretical sensitivity " are then emphasized which means that it is good that the researchers know about existing theories and reflect on them while interpreting their data. It is also maintained that it is impossible to start from pure data inductively. The process cannot start from scratch which means that also theoretical preconceptions and alternatives have a key role.

This kind of logic of discovery does not mean purely "rationalistic" procedure. Abduction seems to provide means for understanding that research methodology is a combination of rational heuristics and spontaneous elements (conjectures, luck and

intuition) (Kelle 2005; Locke et al. 2004). This kind of ”imaginative theorizing” (Locke et al. 2004), and the use of ”sensitizing concepts” (Kelle 2005; see Blumer 1954) emphasize that even if theories are not developed inductively from data there is certain rational logic building on doubt, ambiguity and fallibilism in the process.

Similar uses of abduction are presented in other discussions on qualitative methods. Dubois & Gadde (2002) emphasize theory development in *case study methodology*, and continuous movement between the empirical world and model world where abduction is important. Agar (2006) has pointed out that the research methodology of *ethnography* is abductive meaning iterative, recursive and dynamic processes. In ethnography surprising findings, insights, little details and hunches are a basis for theory development and new concepts (Bajc 2012).

There are also some special fields of research where abduction is nowadays quite prominent. One of these is the methodology of organizational studies where abductive methodology is often brought up while discussing theorizing (see Locke et al. 2008, 908).

2 Dynamics and strategies of abduction

What kind of lessons can be learnt from these methodological discussions on abduction presented above? Even when these papers are not mainly targeted at developing *abduction*, they provide an interesting perspective on abduction as a part of methodological processes.

My own interpretation on methodology, especially when it comes to the area of discovery, highlights certain kind of a paradoxical nature of discovery. Processes of discovery contain ”essential tensions” (see Kuhn 1977), that is, require combining things which seem to be in opposition to each other, like knowing the previous tradition and being able to transcend it, or having ”convergent” (focused) thinking and ”divergent” thinking (and playfulness), or highlighting individualistic achievements but also cultural and social processes. Gruber (1981) has argued that two seemingly opposed approaches to creativity, that is, creativity as sudden moments of insights and creativity as a slow growth process are actually complementary in science. Similarly it has been argued that concept formation builds on a paradox of categorization, it starts both (”deductively”) from theories and (”inductively”) from data which are traditionally seen as opposites (Bulmer 1979).

A standard interpretation of abduction emphasizes that abduction starts from data and facts and on their basis forms hypotheses and theories (see CP 5.144-5, 1903; CP 8.209, 1905). This has resulted in one classic criticism against abduction, that it provides too little material to be a realistic account of the scientist’s reasoning (see Nickles 1980, 23).

Abductive *strategies* provide means of seeing how abduction, even when it starts from data, operates importantly in between theory and data. Next, I suggest a tentative list of abductive strategies (cf. Locke et al 2008, 911-916; Paavola 2012) with remarks on how this kind of a strategy can be found in methodological literature using abduction:

1. Searching somehow anomalous, surprising, or disturbing phenomena and observations.

One central strategic point of abduction is to emphasize *anomalous* or somehow uncommon phenomena as a way of searching hypotheses (see the basic formula of abduction - CP 5.189, 1903). This is a way of finding what is important, interesting and potentially novel in the case. This is often emphasized also in methodological literature (e.g. Locke et al. 2004). The purpose is to find such ”rich points” which are signals for a need to learn and understand (Agar 2006).

2. *Observing details, little clues, and tones.*

This is close to the first strategy. It is not just explicit anomalies but also small details and tones which provide material to be used when new explanations are sought for. In methodological literature this means that the roles of intuition, hunches, and insights are emphasized as well as ”engaging the data” (see Locke et al. 2004; Bajc 2012).

3. *Continuous search for hypotheses and noting their hypothetical status.*

People who make discoveries often continuously search for new ideas (and new puzzles) and keep in mind that all theories are basically hypotheses which might turn out to be insufficient. In methodological literature, related ideas have been presented, for example, by ”nurturing hunches” and ”cultivating the generative potential of doubt” (Locke et al. 2008), and by taking into account an ongoing and dynamic process of searching new concepts and findings (see Agar 2006).

4. *Aiming at finding what kind or type of explanations or hypotheses might be viable to constrain the search in a preliminary way.*

This means that the inquirer uses tentative ways of constraining the search for certain kinds of explanations. This kind of thinking was emphasized by N. R. Hanson (1961) but it seems that this is not much explicitly used in methodological literature. Similar ideas are provided, however, by Agar (2006) who emphasizes the iterative nature of ethnography: ”early abductive moves constrain what comes next by moving history away from its old constraints while at the same time adding new ones that the encounter itself has produced”, or by Dubois & Gadde (2002) who delineate an evolving framework where a successive refinement of concepts is emphasized, or by Bulmer (1979) with interactions between observations and categories.

5. *Aiming at finding explanations (or ideas) which themselves can be explained (or be shown to be possible).*

It is usually not enough to find a tentative explanation or interpretation, even a tentative one if that explanation itself cannot be explained or shown to be plausible. In this sense, abduction is a way of searching for an “intermediate component” (between data and theory), that is, finding an explanation which itself can be shown to be true or viable. I think there is similarity to what Agar (2006) calls the ”recursive” nature of abduction: the aim of solving some surprises often produces new ones until the study ends, or what Timmermans & Tavory (2012, 180) call iterative dialogue ”between data and an amalgam of existing and new conceptualizations”.

6. *Searching for “patterns” and connections that fit together to make a reasonable unity.*

This is a continuation to the previous strategic points but a broader one. Basic formulations of abduction are often simplified in a sense that they analyze the search for hypotheses as if it starts from one anomalous fact and produces only one specific hypothesis. There are, however, always several facts and issues which must be taken into account. The aim of finding hypotheses which place all relevant clues and information as a part of a promising pattern gives directions to the inquiry. Dubois & Gadde (2002) highlight the meaning of systematic combining and the difficulty of handling the interrelatedness of the various elements of the research work. Kelle (2005) points out that abduction does not start ”ex nihilo” but modifies and combines several elements of previous knowledge (cf. CP 5.181, 1903).

7. *Paying attention to the process of discovery and its different elements and phases.*
This strategy emphasizes more generally processes of searching for new ideas and hypotheses, developing and modifying them, and verifying them. It differs from an inductive focus one-sidedly on *data* and a hypothetico-deductive focus on *hypotheses testing* by emphasizing ”imaginative theorizing” and the close interrelatedness of data and hypotheses (Locke et al. 2004; also Agar 2006), and rational heuristics (Kelle 2005). It aims at making more explicit the process of discovery which has often been hidden from research reports (van Maanen et al. 2007).

The combination of these strategies shows that even if, at least in typical cases, abductive methodology starts from observations and data, the role of (previous) theoretical perspectives is important (also Dubois & Gadde 2002; Kelle 2005). Theorizing and observing are tightly linked as emphasized by Francis Darwin on his father’s, Charles Darwin’s methodology:

> He [Charles Darwin] often said that no one could be a good observer unless he was an active theoriser. This brings me back to what I said about his instinct for arresting exceptions: it was as though he were charged with theorising power ready to flow into any channel on the slightest disturbance, so that no fact, however small, could avoid releasing a stream of theory, and thus the fact became magnified into importance. (Darwin 1892, 95)

In this sense, abduction is *not* a first phase in methodological process in any absolute sense but a part of the ongoing and overlapping processes of inquiry

3 Interpreting Peirce

Peirce's writings provide material for a multitude of interpretations on abduction. In his early writings Peirce usually treated abduction as an ”evidencing process” (Burks 1946), that is, as a weak form of inference which has its basis on an inversion of the deductive syllogism. Abduction (or ”hypothesis” as Peirce called it then) is ”where we find some very curious circumstance, which would be explained by the supposition that it was a case of a certain general rule, and thereupon adopt that supposition” (CP 2.624). Later Peirce treated abduction from the ”methodological perspective” (Burks 1946). Abduction is then interpreted as a first phase of inquiry where hypotheses are developed , followed by deduction and induction whereby the effects of hypotheses are clarified and tested (see CP 6.469-673, 1908; CP 7.202-219, 1901). Later Peirce also treated abduction to be close to, or even the same as, some kind of a guessing instinct. Some formulations of Peirce emphasize an instantaneous

nature of abduction: ”The abductive suggestion comes to us like a flash. It is an act of insight, although of extremely fallible insight” (CP 5.181, 1903).

I think that basic interpretations on Peirce’s abduction are underdeveloped when it comes to a dynamic view on methodology. Peirce sometimes emphasized the meaning of *methodeutic* in relation to abduction (e.g. Peirce NEM 4:62) and it has been maintained that Peirce emphasized the strategical aspects of reasoning even if he did not use the concept of ”strategy” explicitly (Hintikka 1998, 515). Still in his trivium of logic, *critic* (which classifies arguments and determines their force) and *grammar* (the nature and meanings of signs) were more emphasized than *methodeutic* (emphasizing a processual viewpoint).

A dynamic viewpoint of abduction should take into account two misconceptions of the scientific method pointed out by Haig (1996). The first misconception is that scientific method has a natural beginning (being it with observations, theories or problems). Another misconception is that the problem component of method is a temporal phase which is then followed by another, and so on (ibid.). Although it is possible to discern abductive steps or phases *analytically*, in the dynamics of inquiry these steps and phases operate together.

4 Conclusion

In this paper I have briefly analyzed a dynamic, methodological viewpoint on abduction, and how abductive strategies give means for further analyses. This kind of a perspective can be seen emerging in modern methodological literature. It aims at

understanding how abductive steps and phases are connected to the long-term processes of research where different elements are combined. These elements are not in opposition but are working together (cf. Gruber 1981).

Peirce provides ample material for different interpretations on abduction. He did not have time, however, to develop much the methodeutical aspects of abduction. Even when he emphasized the social aspects of science in general, cultural and social aspects were much *not* developed when it comes to abduction. There are then many potential links between Peircean abduction and modern methodological literature to be further developed.

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