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ABDUCTIVE METHODOLOGY: OPENING THE MYSTERY OF GENERATING THEORY THROUGH QUALITATIVE INQUIRY IN PRACTICE SETTINGS

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Abstract

The paper investigates abduction as a methodology for theoretical discovery in qualitative social and educational sciences. Abduction is now an established concept in the methodological literature. Abduction gives means for 'theorising', to describe and help to explain how theoretical concepts are constructed during the qualitative research process. Methodologically abduction is also trying to respond to the challenge of generalisation in qualitative research that is based on the singular and unique. However, the actual practice and nature of abductive inquiry remain somewhat mysterious in the methodological literature. In this paper, we discuss and develop different interpretations of abduction as a basis for forming solid methodology of abductive analysis. Abduction operates at different methodological 'layers' which makes it challenging but at the same time a fruitful methodological concept. In this paper, we discern three layers of abduction in the methodological literature: 1) Abduction used for opening up methodological questions on theory construction with related epistemological and philosophical challenges, 2) Abduction interpreted as methodological model that delineates long term processes of concept formation (within one research project, or also across individual research projects), 3) Abduction helping to conceptualise detailed analytic steps and processes in qualitative research. We explicate the role of abduction in each phase of the research process from lived through experiences in the field to generating concepts in working with data to articulating and testing new concepts to and with wider audiences and settings. We give examples of practical decisions related to abduction during the research process through our own work doing participatory ethnography and discourse analysis.

Keywords: abduction, theorising, concepts, generalisation, qualitative analysis.

1 INTRODUCTION

How do theoretical insights 'emerge' from qualitative data analysis? And how do they turn into 'theories' which might have something wider to say about social/educational phenomena? Is abductive methodology a way to conceptualise these processes?

This paper brings together researchers developing language and methodology for rigorous theory construction in and through empirical qualitative fieldwork involving educational practitioners in schools, early years settings, healthcare and beyond. The paper investigates *abduction* as a methodology for theoretical discovery in qualitative social and educational sciences.

Abduction is now an established concept in the methodological literature. We argue that abduction gives means for theorising, to describe and help explain how theoretical concepts are constructed during the qualitative research process. Methodologically, abduction is trying to respond to the

challenge of generalisation in qualitative research that is based on the singular and unique. However, the practice and nature of abductive inquiry remain somewhat mysterious in the literature. This may be partly because abduction combines seemingly contradictory elements in the analytic process. How these contradictory elements come together, and what such analytic engagement may look like, is often less clear. The aim of this symposium and paper is to explore different interpretations of, as well as ways of engaging in, abduction in qualitative analyses to outline a productive framework for theory-generating qualitative educational research on/in practice. Our focus is particularly on actual 'logic-in-use', how it fits or contrasts to 'reconstructed logic' contained in methodological literature (to use Kaplan's (1), classic distinction).

Abduction operates at different methodological 'layers' which makes it challenging but at the same time a fruitful methodological concept. In this paper, we discern three layers of abduction in the methodological literature: 1) Abduction used for opening up methodological questions on theory construction with related epistemological and philosophical challenges, 2) Abduction interpreted as methodological model that delineates long term processes of concept formation (within one research project, or also across individual research projects), 3) Abduction helping to conceptualise detailed analytic steps and processes in qualitative research. We discuss and develop different interpretations of abduction as a basis for forming solid methodology of abductive analysis, exemplified through empirical examples.

2 WHAT IS ABDUCTION?

Abduction seems to include contradictory claims. What are the dynamics of abduction depicting insightful theorising as a part of methodological processes?

Abduction was originally presented by Charles Peirce in the 1860s as a third main mode of reasoning alongside induction and deduction. Peirce was a logician and semiotician developing various formulations of abduction during his long life (see (2), 21-30, 46-47). Abduction was a long neglected topic in methodology, but slowly gained prominence with growing interest in the so-called context of discovery ((2), 31-45).

Peirce described abduction as a 'weak' form of inference. It "merely suggests that something may be" when deduction "proves that something must be" and induction "shows that something actually is operative" ((3) 5.171–172, 1903). One basic formulation of abduction is ((3) 5.189, 1903, (4)):

The surprising fact, C, is observed;

But if A [a hypothesis] were true, C would be a matter of course.

Hence, there is reason to suspect that A [the hypothesis] is true.

Abduction is reasoning used by detectives (see (5)). Detectives recognise little cues (surprising facts based on observation) and are good at finding explanations or ideas with meticulous inquiries that make originally surprising or anomalous observations (or disturbing details) understandable as a matter of course.

While abduction is a promising form of reasoning, several controversies, or ambiguities, exist (see (6)):

1. Abduction is often presented as a 'logic of discovery', but its critics have maintained that formulations of abduction do not seem to clarify how ideas are generated but rather operate with ideas that have already been discovered (by some other means).

2. Basic formulations of abduction seem to start from observation (or data), but, on the other hand, abduction seems to require theoretical concepts (like hypotheses). Does abduction then start from observations or from theoretical concepts?

3. Abduction is supposed to be a mode of reasoning but is often formulated based on operations (also by Peirce) that do not seem to be reasoning, like a 'guessing instinct', or insight.

4. Good examples of abduction seem to be momentary insights (with a lovely hypothesis explaining surprising details of the case), yet abduction seems to require a long-term search and development of ideas.

5. Peirce, especially in his later works, argued that abduction is based on a guessing instinct; however, many commentators nowadays highlight that a basis for fertile hypotheses and abduction is social interaction (see e.g. (7)).

We think that these seemingly contradictory claims on abduction are mainly based on too narrow and static views of abduction. In the philosophy of science, the questions on the validity of abductive reasoning are often highlighted, but a dynamic view of abduction requires the *strategies* of putting several phases, and moves together ((2), 206–211). If abduction is interpreted dynamically, those elements that might at first seem to be contradictory actually function together. For example, abduction does not start either from observation (data) or theoretical concepts, but is based on back-and-forth movement with hypothetical elements between observation and theoretical ideas. Similarly, the dynamic view requires that long-term development of ideas is considered even when the process includes some crucial and central insights happening at specific time and place. The abductive process of searching fertile hypotheses can also be based both on detailed insights by individuals (with non-conscious reasoning) and on conscious, social interaction.

Methodological literature on qualitative research has somewhat different interpretations on abduction. This is not a surprise when both Peirce's original formulations and later developments have left room for different emphases. Different methodological articles complement each other also when depicting abductive elements as part of theory construction. We briefly present three influential examples.

Timmermans and Tavory ((7); see also (8)) analyse theory construction in qualitative research. They start with grounded theory, which has been a natural methodological approach to discuss the role of abduction in qualitative research. They maintain that theoretical innovation has been scarce with grounded theory and that is why abduction is needed. Their approach "rests on the cultivation of anomalous and surprising empirical findings against a background of multiple existing sociological theories" ((7), 169). Instead of a natural instinct, they emphasise social interaction as a basis for theory construction. Abduction is about iterative, back-and-forth movement between data and theory requiring theoretical sensitivity.

Dubois & Gadde (9) write about methodology for case research and how it deals with theory development. They develop an approach called "systematic combining" grounded in abduction. While they do not specify abduction in detail, it is a part of long-term processes (often multi-year case studies) where the theoretical framework, empirical fieldwork, and the case analysis co-evolve. They argue that the framework in this kind of research is not prestructured and tight (deductive approach) nor loose and emergent (inductive approach), but rather "tight and evolving" (abductive) ((9), 558). The emphasis is not on theory generation, but rather on theory development where the original framework is successively modified with unanticipated empirical findings, but also with theoretical insights during the process. Systematic combining "can be described as a nonlinear, path-dependent process of combining efforts with the ultimate objective of matching theory and reality" (ibid, 556).

Kelle (10) also discusses conflicting understandings of the relationship between data and theory in grounded theory, maintaining that grounded theory has suffered from an "inductivist self-misunderstanding" and naive empiricism. He points out that the qualitative analysis requires theoretical sensitivity (see (11)). Kelle does not detail abduction, but has good descriptions of research processes aligned with abduction. In making abductive inferences, researchers depend on previous knowledge but not as something into which empirical facts are forced. Kelle also highlights that

contrary to inductivist understanding, the research process based on abduction is consistently fallibilistic.

While the three articles differ somewhat in their interpretations, they depict research processes as dynamic and iterative, fallible, combining and reinterpreting different elements, based on path-dependent evolution of ideas and back-and-forth movement between a theoretical framework and insights, research case and data.

Next, we give two concrete examples of our dynamic view of abduction in action. We highlight the processual nature of developing what often starts from 'weak' empirical notions into stronger theoretical concepts that have a potential to develop into theory.

3 ABDUCTIVE CONCEPT FORMATION IN AND THROUGH ETHNOGRAPHIC CASE STUDIES

This section describes how a new theoretical concept ('ambivalence as a form of student engagement, (12)) was born in a series of ethnographic case work. The process started from weak (but still haunting) 'instinctual' remarks and notions during fieldwork, evolving into a more conceptually driven systematic analysis of video-recorded interaction, finally developing into a theoretically defined new concept that was then 'tested' in new empirical settings and in discussions with academic and practitioner audiences.

Abductive reasoning seems particularly needed – or well-suited – for ethnographic research which has suffered from "theoretical ambivalence" (13). Ethnographic case studies aim for understanding phenomena "in their whole" from the participant perspectives (14), (15). One research paradigm is thus often not enough to grasp this 'whole'. Consequently, a common misunderstanding is that ethnographic tradition is eclectic or atheoretical. Instead, ethnographic research has offered science strong new theoretical concepts of different social phenomena (see (13)). Ethnography's strength lies in its potential to connect 'messy' everyday expressions and experiences from real life with long-developed 'neat' academic theories. Abduction can work with everyday terms and articulations that often play a crucial role as middle-level analytical concepts, or sensitising concepts (11) that bridge the (too) neat theory and (too) messy real life (16), (17). In ethnography, theory development is strongly embedded in real life. *How* this happens, and particularly, how this kind of lived-through singular knowledge becomes *generalisable* (that is, knowledge instead of information or a story), remains poorly explicated in methodological literature. We aim here to give a glimpse of one such process.

Step 1: Living through the field and 'guessing from cues': The researcher, Anna, participated in youth theatre workshops as part of larger multi-disciplinary research on children taken into care in Finland (18). The idea of the sub-study was to understand the process of participation in art-based theatre activities from the young people and the theatre instructors' perspective: what did the young people experience while participating in the arts-based project? What phases, change processes and emotions did the group face as a community and what kind of processes did the individual participants undergo? Anna was an active participant in the workshops and collected, together with the young people, video data from the art sessions.

Early on, we adult participants noted that the participation of these young people in the activities were contradictory and unpredictable. Certain questions were repeated in Anna's mind during her participation in the workshops, for example: *Why did Sean always talk of "jumping out of the train on his way to the workshops" but then last minute choose to join us? Why was it so hard for the theatre instructors to reach these youth or to be sure whether they would even show up – but then suddenly get very close to them?* The theatre instructors spoke of this difficulty too. When Anna discussed these

empirical notions in a research seminar, a colleague noted that the participants seemed quite *ambivalent.* This same ambivalence had become a very embodied experience for the researcher too. Anna felt herself often *torn between mixed feelings* during and after the fieldwork. Also, it was something that the existing literature of children's participation, agency, engagement and coping did not capture very well. The picture was often too neat, too either-or, in the literature.

S*tep 2 (finding a 'telling case' to seize the 'lived through' phenomenon, to make it visible and workable)*: Anna then asked herself: *Where or when did I (as a researcher) feel this ambivalence most strongly?* This led her to go through data from one evening, final rehearsals of the shadow theatre performance: a 10-minute video episode in which Sean, one of the participants, repeatedly challenges the other participants by pulling away and getting involved. This interestingly leads to theatre instructors embracing his provocations, building on them, with the episode ending up with a more sustained participation of Sean and even new ideas for his role in the performance. How Sean expresses his ambivalence and how it turns into a productive force in this social interaction with the young people and the theatre instructors – and how this interaction develops Sean's agency in the activity - is analysed closely elsewhere (19). The episode can be thought of as a crystallisation of something very telling of the mode of being in this activity, it can be named as a "telling case" (20) of the potential of ambivalence for developing young people's agentive engagement in social life. However, before reaching this interpretation of ambivalence in this data set, Anna read a considerable amount of literature in psychology, sociology, and even philosophy, in which the term of ambivalence had been defined theoretically. The notions from the data did not spring out inductively, but were a result of simultaneous theorising.

Step 3 (testing and developing the concept). After the first case study, Anna widened her examination of the newly developed concept of ambivalence in different data sets such as young children's engagement in play-based activities in classrooms (21). Also, speaking about the concept to different practitioner audiences in the field of education often encountered strong resonance. The concept was developing, and one particularly useful remark was that *improvised play between adults and children* seemed to be a context in which ambivalent participation was developing children's agency (12).

Step 4 (generalisation of the research findings, developing into a theory): The concept of ambivalence is potentially becoming a generalisable concept that helps us understand how teachers and children co-regulate their ways of being in educational institutions that struggle to accept ambivalence (see (22)) and how this relates to a theory of student (dis-)engagement in education (read more in (2), (23)).

4 WORKING WITH DATA, ANALYTIC PROCESS AND STEPS: EXAMPLE 2 OF THE CONTEXT OF DISCOVERY

How can these iterative back-and-forth analytic movements be described beyond the conceptual context of discovery of specific research?

We suggest that the *difference-within-similarity* analytic approach outlined by Hofmann (24) presents an intermediate approach to working with qualitative data that illustrates abductive processes. This approach builds on a set of key ideas, which here are related to the principles of abduction. Traditional qualitative analyses often focus on grouping things into different categories (such as different ways vulnerable young people engage with arts-based activities), which may all describe a bigger thing (like their ways of engaging in educational activities). Such a process assumes that these 'things' are somehow distinct (e.g., young people either engage or disengage). Instead, the difference-within-similarity approach foresees insights into practice emerging from "*identifying things that are similar, and then identifying and examining differences within those*" ((24), p.44).

The challenge is knowing what similarity might be *analytically productive* (24). Abduction highlights that a linear, one-directional approach to analysis (where a 'similarity' is identified either from the data or from theory) often does not open the most fruitful context of discovery. In the above example, notions of 'engagement' in the literature seemingly presented a starting point ('similarity') from which to compare young people's different actions in relation to the arts-based activity. However, such an analytic approach would have grouped those actions in a dichotomous manner: either as getting involved or pulling away. Such an interpretation was not helpful for addressing the observation that instead young people's actions were often both; moreover, it was this movement between going in and pulling away that the researchers, and the practitioners, needed to come to understand and work with (cf. (19), (12)). Identifying the concept of ambivalence – through the back-and-forth movement between specific instances in the data, the researchers and participants' intuitions about those instances, the literature, and wider theory – enabled the development of a new context of discovery, a new (simultaneously conceptual and empirical) 'similarity' from which to 'gaze towards' (24) its different manifestations in the data.

This iterative back-and-forth movement overcomes the apparent contradiction in abduction, between starting simultaneously from data and from theory (6). While individual instances may play a key role in early analysis stages, abductive analysis further involves lateral movement across the data, to identify and compare different forms of the 'same' thing to understand the phenomenon studied (what Hofmann called 'differences-within-similarity'). We now illustrate the principles developed in Hofmann's (24) earlier work through an example from our shared work.

Hofmann (24) has referred to the analytic processes through which this iterative and lateral abductive trailing takes place as 'weaving', and the types of analytic steps this involves as 'repeats' and 'chaining'. Considering these analytic processes in relation to abduction highlights the systematic manner of this process – how the apparent contradiction between intuition about individual instances and systematic work with the (wider) data is overcome. We use an example from research on a year-long school-based 'Change Laboratory' intervention in a Finnish secondary school, aimed at helping the teachers address issues concerning students' disengagement (25), (26).

At the start of the project, when the participating teachers talked about their students, we initially observed two different explanations for why things were how they were: status quo ('this is how it always is in this village') and moral statements ('we should not try to change our students'). Working backwards from these observations, we identified them to be differences within the *same* underlying conceptualisation of (their) students: 'this is how these kids are (disengaged)'. The two ways of explaining this underlying conceptualisation drew on different reasons for why this situation could not change (that the teachers could not, or should not, try to change the way things – their students – were). However, we argued that the underlying understanding behind these was the 'same' – that their students are disengaged and 'that's that'. (25) Reading the theoretical literature alongside the analysis led us consider this talk in relation to the concept of stabilisation and possibility knowledge (27).

Through what we suggest can be considered a 'repeat' in the sense of Hofmann's (24) difference-within-similarity approach, we took this 'similarity' ('this is how our pupils are' (disengaged)) as a starting point, and looked for other instances of that, to examine if the same/different things happened when this idea was evoked by the teachers when discussing their experimentation with new approaches to teaching in the Change Laboratory context. While 'stabilising' talk was common at the start of the project (status quo and moral statements), particularly by the middle of the year, new observations became apparent. While the starting point for the teachers' talk remained the same (this is how our students are, disengaged), we differentiated (see 25) between several different new types of discourse within it.

Firstly, a discourse we referred to as dilemmatic tension (28) ('this is how our students are, and we don't know how to change it') opened a potential of seeing the original assumption ('this is how our students are') in a more open way (it might be changeable). Secondly, we identified surprise talk (students were suddenly engaged). This further challenged the idea that students' engagement was unchangeable, while continuing to explicitly link it back to the original assumption ('we all know how our students are so this was a real surprise'). Thirdly, we identified a form of talk which, while still using the same idea as its starting point, framed that idea as a focus of the teachers' work instead of a barrier ('this is how our students are and that is what we should work on').

Initially, based on the original concept of possibility knowledge, we considered all three as examples of the same new 'difference' in how the teachers were changing their stance towards their starting point – a move away from stabilisation to possibility discourse, opening new possibilities in how they viewed their students and the opportunities in their work. However, further analysis, which we suggest is akin to what Hofmann (24) called 'chaining', led to significant nuancing of the concept.

Starting from one of the findings of the previous stage and then moving laterally, we took one of the 'differences' identified above, surprise talk, as a new analytic similarity, our starting point to 'analytically gaze from' (24) and identified and compared differences in teachers' talk about their surprise in their observations about their students. This analytic process led us to identify different things that can happen *after* a surprise (i.e., evidence to contradict the idea that the students are disengaged and that is unchanging/unchangeable). This analysis identified that rather than stabilising talk giving way to possibility talk, possibility openings could be closed down (which we referred to as 're-stabilisation') or sustained without a solution (which we referred to as 'de-stabilisation') (25). Both represent new conceptual insights regarding possibility talk. This difference-within-similarity led us in the most interesting 'explanatory' element in the teachers' talk that helped to explain – at the level of discourse – why interventions often fail to change existing circumstances even at the face of evident success of those interventions for their participants (cf. (29), (30)), in this way, contributing to theory development in the field of teacher professional development (25).

CONCLUDING WORDS: OPENING UP A COLLABORATIVE CONTEXT OF DISCOVERY

The aim of this paper was to outline a collaborative methodological programme of inquiry to understand theory-generating practice-based analytic work. We argue that abduction opens up "the context of discovery" (see (31), (6)), that is, the area of research where hunches, insights, and creativity can be explored and linked with the theoretical literature in ways that are simultaneously open and systematic, to guide the methodological search for novel conceptualisations and ideas. Our paper contributes to methodological knowledge in qualitative research by addressing and illustrating through examples how engagement with abduction can enhance and make transparent our processes of thinking with qualitative data.

We began by identifying apparent contradictions relating to abduction and illustrated the kind analytic work that overcomes these. Abduction has been criticised for operating with existing ideas, rather than generating novel concepts. Our examples illustrate how abductive analyses, working with existing concepts, can significantly contribute to developing more nuanced theoretical understandings. Another puzzle related to the starting point of abductive analysis. We argue that from the perspective of research in and with practice, the idea of starting simultaneously from theory and from practice/data is no contradiction at all: research has clearly demonstrated that to transformatively engage at and with the dynamic interface between research and practice, academic and practitioner 'voices' need to be in an ongoing dialogue throughout the research process (32), (33), (23). Our examples illustrated through concepts and analytic processes how this dynamic work happens. The third puzzle concerned the relationship between instinct and reasoning in abductive analyses. We

illustrated the importance of instinct (or 'insight') in practice-based work, and the systematic processes which utilise such instincts to develop and probe hypotheses in the data (19). Lastly, we demonstrated an analytic approach, the difference-within-similarity approach (24) which ties together the key role of momentary insights with systematic iterative and lateral movements across wider and longer-term data in the search and development of ideas, hereby offering a way of making originally surprising or anomalous observations understandable within a revised theory. Our discussion illustrates a dynamic and holistic interpretation of abduction (cf. (2)) in which seemingly contradictory elements function together to develop conceptual insights.

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