Towards Epistemic and Interpretative Holism
A critique of methodological approaches in research on learning

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Abstract
The central concern of this thesis is to discuss interpretations of learning in educational research. A point of departure is taken in core epistemological and ontological assumptions informing three major approaches to learning: behaviourism, cognitive constructivism and socioculturalism. It is argued that all three perspectives provide important insights into research on learning, but each alone runs the risk of reducing learning and interpretations of learning to single aspects. Specific attention is therefore given to Intentional Analysis, as it has been developed to account for sociocultural aspects that influence learning and individual cognition. It is argued that interpretations of learning processes face challenges, different kinds of holism, underdetermination and the complexity of intentionality, that need to be accounted for in order to make valid interpretations. Interpretation is therefore also discussed in light of philosopher Donald Davidson’s theories of knowledge and interpretation. It is suggested that his theories may provide aspects of an ontological and epistemological stance that can form the basis for interpretations of learning in educational research. A first brief sketch, referred to as ‘epistemic holism’, is thus drawn. The thesis also exemplifies how such a stance can inform empirical research. It provides a first formulation of research strategies – a so-called ‘interpretative holism’. The thesis discusses what such a stance may imply with regard to the nature and location of knowledge and the status of the learning situation. Ascribing meaning to observed behaviour, as it is described in this thesis, implies that an action is always an action under a specific description. Different descriptions may not be contradictory, but if we do not know the learner’s language use, we cannot know whether there is a difference in language or in beliefs. It is argued that the principle of charity and reference to saliency, that is, what appears as the figure for the learner, may help us decide. However, saliency does not only appear as a phenomenon in relation to physical objects and events, but also in the symbolic world, thus requires that the analysis extend beyond the mere transcription of an interview or the description of an observation. Hence, a conclusion to be drawn from this thesis is that the very question of what counts as data in the interpretation of complex learning processes is up for discussion.

Keywords: interpretation of learning, Intentional Analysis, conceptual change, epistemic holism, interpretative holism, principle of charity, salient features.

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Liza Haglund
To my beloved family
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Finally, this project has come to an end. It has been a journey which in some sense has meant a trip in circles, eventually ending up pretty near, but far from exactly, where it started.

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Introduction

Cognitive constructivist research on learning in the early 1970s showed the importance of acknowledging learners’ pre-instructional knowledge in science learning (Driver and Easley, 1978). This means that constructivism can be regarded as a reaction to behaviouristic research, which did not account for the subjective aspect of learning. However, focusing on “the inside” of learning resulted in a severe attack on the validity of constructivist research. In the early 1990s, sociocultural-oriented researchers from different disciplines interested in human development criticised cognitive constructivism and the clinical method (Piaget, 1929/1951), arguing that it rests on a dubious ontology (unobservable entities). Constructivism, it was argued, also fails to acknowledge sociocultural and situational aspects in the study of learning and knowledge acquisition (cf. Resnick, Levine & Teasley, 1991; Schoultz, Säljö, & Wyndhamn, 2001). On the other hand, socioculturalism do not account for inside aspects of learning. The relation between individual cognition and sociocultural aspects became a core issue in research on learning; another major issue was how to conceive of the relation between mind and what is uttered in, for instance, an interview, and where in this span to locate knowledge (Cobb, 1994). The aim of this thesis is to continue and contribute to the discussion on interpretations of learning in educational research.

Based on the proposition that methodological considerations are inextricably connected, or even follow from epistemological and ontological assumptions (cf. Bereiter, 1994; Strike & Posner, 1976), my method will be to highlight core assumptions that inform major perspectives on learning, that is, behaviourism, cognitive constructivism and socioculturalism. Epistemology as a branch of philosophy deals with several profound questions. My concern is roughly how the different perspectives are positioned with regard to the nature of knowledge and knowledge acquisition in terms of their relevance for educational research on learning, and the implications that might follow with regard to methodology.

In this thesis, I thus highlight the critique that has been directed against the different perspectives, behaviourism, constructivism and socioculturalism.
Particular attention will then be given to a certain methodological approach, *Intentional Analysis* (Halldén, 1999), since it has been developed in order to account for both sociocultural and cognitive aspects in research on learning. The objectives of Intentional Analysis are to account for the complexity of processes involved in learning, that is, both sociocultural aspects and cognitive competences. In other words, the different perspectives (subjective and intersubjective) that have been argued to be of relevance for our understanding of learning (e.g., Vosniadou, 2013; Schoultz, et al., 2001). Thus, it aims at addressing part of the sociocultural critique referred to above without losing the inside aspect of learning.

I stress that all perspectives point to important aspects of learning and research on learning. I conclude, however, that each one taken alone runs the risk of reducing learning to particular single aspects. I argue that none of these perspectives serves as a basis for the formulation of research strategies that have the potentiality to adequately interpret learning processes. At the fore is the validity of the interpretations in question.

**Challenges in interpretation**

Validity, according to Mills and Gay (2016), has historically been related to the evaluation of quantitative data. However, validity in educational qualitative research is concerned with “…whether or not the data reflect what they intended to measure” (Ibid, p. 572). Maybe the term “measuring” gives rise to wrong connotations when working with qualitative data. Nevertheless, empirical research relies in one way or another on data which is used not only to theorise about causal relations in learning processes but also to infer learners’ beliefs and concepts of a subject matter or to describe learning processes from the learners’ perspective (Halldén Scheja & Haglund, 2008/2013; cf. Vosniadou, 2013). Whatever kind of data we are concerned with in research on learning, that is, quantitative or qualitative data, or both, it would probably not be controversial to say that the data has to be interpreted. Data does not speak for itself. In what follows, I will therefore briefly mention what I regard as the challenges that interpretations of learning processes meet, that is, *holism, complexity of intentionality* and that *theories are underdetermined by the data*. This thesis does not provide an argument for these challenges; they are rather to be regarded here as premises. I will briefly describe these challenges below.

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1 Validity in relation to qualitative data has been described in relation to concepts like “trustworthiness” and “understanding” (Golafshani, 2003).
Interpreters of learning processes face the contemporary and rather uncontroversial thesis that scientific theories consist of interconnected theories as well as auxiliary hypotheses. This has been referred to as *confirmation holism*, (cf. Stanford, 2016). It implies that it is quite difficult to decide which part of a theory is or is not on a par with the observations. If the aim is to describe the intentions and beliefs of the learner, as in Intentional Analysis, it is also a premise that intentions do not come neatly isolated from each other. The interpreters rather meet a *complexity of intentionality* (cf. Downes, 1998). Answering a certain question in an interview, for instance, may at the same time involve the intention to make oneself understood, to communicate beliefs about the topic in question, to stress a certain detail and so on and so forth. And beliefs are also interrelated, so the interpreter does not meet single beliefs but rather a “web of beliefs” (cf. Downes, 1998, p. 353). Such holism of the mental, the proposition that beliefs have logical relations (Davidson, 2001b, p. 124-126) and the complexity of intentionality, can be paired with “meaning holism” (cf. Jackman, 2014), the idea that the meaning of words in a language is interdependent. It has been defined as:

> The determinants of the meanings of our terms are interconnected in a way that leads a change in the meaning of any single term to produce a change in the meanings of each of the rest. (Jackman, 2014)

Thus meaning holism relates beliefs to language use. As such, it poses problem for the interpreter, who neither knows the learner’s beliefs nor can take the meaning of utterances for granted, as that would be to assume what is to be explained. On the other hand, if we do not regard beliefs to be interrelated with other beliefs, it is hard to explain the fact that we understand complex utterances as well as combinations of words we have never heard before. I regard meaning holism to consist of holism of the mental and a holistic view on language. Confirmation holism and meaning holism will in the following be referred to as holism when there is no particular need to distinguish between the two.

Holism implies that interpretative theories are undetermined by the data. Underdetermination has been described by Psillos (2005) as “…a relation between the propositions that express the (relevant) evidence and the propositions that constitute the theory.” (p. 575; cf. Quine, 1951). It relates to the fact that the same piece of language can be used to do quite different things. Language is vague and ambiguous, and we may be facing quite a number of possible meanings of the same utterances (Downes, 1998).

There are different kinds of underdetermination (Newton-Smith & Lukes, 1978; Stanford, 2016). A strong version of the thesis states that there is always another theory that can explain the data equally well (but cf. Psillos, 2005). A
weaker interpretation of the thesis states that there can be underdetermination (Newton-Smith & Luke, 1978). The American philosopher Willard Van Orman Quine (1951) showed what he regarded as the implication of holism and underdetermination in a famous example in which a speaker of an unknown language says “Gavagai” when a rabbit is passing by. “Gavagai” may be translated into the English word “rabbit.”. However, there is nothing in the observation that rules out other interpretations or determines which interpretative theory is correct. There may be other translations that fit equally well, such as “undetached rabbit parts” or “food”. Transferred into an interview situation with a teacher, we can imagine a teacher saying “context is decisive in learning”. One theory is that the teacher means that it is how the learning situation is framed that is most important in learning while the rival theory says that the teacher means that the conceptual frame constructed by the learner determines what the learner learns. That is, depending on whether the teacher works from a sociocultural perspective, or from a cognitive constructivist, the term ‘context’ takes on quite different meanings in the total theory. The data does not determine meaning. The constructivist perspective refers to a conceptual context within the mind of the learner, while the sociocultural perspective takes ‘context’ to refer to the situation as such.

I regard underdetermination, although seldom if ever referred to by that term in the method literature in educational research, as constituting quite a challenge in the interpretation of data that aims at describing learning processes. It may also invite scepticism. The sceptical conclusions follow from the idea that two different, incompatible interpretations may “…score equally well on the criterion of coherence with the observed facts.” (Martin, 1994, p. 57). In sum, holism and underdetermination constitute certain challenges in the interpretation of learning processes. If we are concerned with learners’ beliefs and intentions communicated in, for instance, interviews, the particular form of holism referred to as meaning holism and the complexity of intentionality constitutes a particular challenge (cf. Rönnström, 2006).

In order to account for the challenges briefly referred to above, I will also discuss interpretation in the light of the philosopher Donald Davidson’s (e.g., 2001a; 2001b) theories of knowledge and interpretation. I will suggest that his theories can form parts of a stance that is able to account for the complexity of sociocultural and cognitive aspects involved in learning situations. That is, his view on knowledge account for subjectivity and intersubjectivity, but also objectivity, that is, empiricist ideal on science, without getting caught in the problems related to positivism.

2 cf. Stanford, 2016 on contrastive underdetermination.

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This thesis is a compilation of four papers and this integrative narrative. The papers are examples of how concepts from Davidson can form part of an epistemological stance and also how such concepts can constitute specific research strategies in the analysis of data. In the concluding discussion, I thus make a modest attempt to draw a first, brief sketch of a so-called Epistemic holism. The aim is to deal constructively with holism, underdetermination and the complexity of intentionality in interpreting learning processes; it is also a similar modest attempt to sketch a framework comprising certain research strategies, in terms of concepts for reflection, to be applied in interpreting learning processes. This is an attempt to work with a basis of a methodological approach, Interpretative holism, that can inform interpretations of learning in educational research.

Epistemological and ontological assumptions in learning theories

Although it may be argued that epistemological and ontological questions run the risk of taking educational research far too deeply into philosophy, it is important as these questions may direct how research is designed and conducted (cf. Cohen & Manion, 1994, p. 6). Owing to the format of an article, however, it may be hard to reveal the particular epistemological and ontological assumptions underlying empirical research because such a discussion is seldom given space (cf. Mason, 2007). I adhere to Greeno, Collins, & Resnick, (1996), who have roughly distinguished three general research perspectives on learning, which they matched with corresponding views on knowing and learning: behaviourism / empiricism, constructivism / rationalism and situated- sociohistorical perspectives / pragmatism. This is, of course, a simplification of complicated matters with regard to both the division between research perspectives and epistemological perspectives and matching between them. The aim is to sketch some core differences between research on learning with regard to their respective epistemological (including aspects of ontology) and methodological assumptions, assuming that they provide a rationale for meeting various challenges and conditions within the particular perspective. Subsequently, I will argue that each perspective contributes in important respects to educational research on learning. I will also argue that none of these perspectives alone serves as a basis for the formulation of research strategies that are able adequately to interpret learning processes. That is, if we accept the proposition that learning involves a complexity of
external/sociocultural aspects and internal/cognitive and motivational aspects. And, in addition, that valid interpretations need to account for such complexity, hence working from a stance that can provide a basis for investigating the complexity in question.

In my description below, I do not claim to have captured all the nuances, benefits or critiques that have, or can be directed towards each perspective. I rather intend to provide a picture that captures some core differences.

**Behaviourism**

Behaviourism can be divided into three main kinds: methodological, psychological and analytical (Graham, 2015). Methodological behaviourism tells us how to conduct research. Behaviour, rather than mental states, can be objectively measured by correlations between input and output, hence also making it possible to quantify. Behaviourism is often associated with the work of John Watson. Psychological behaviourism\(^3\) comprises a research program emanating from the work of early empiricists such as John Locke and David Hume, later developed by Ivan Pavlov, Edward Thorndike, John Watson and B. F. Skinner. Associationism is a label covering different interrelated theories on learning that share the core assumption that “…associative learning is supposed to mirror the contingencies in the world without adding additional structure to them.” (Mandelbaum, 2015). Associative learning has, since Skinner, developed in many different directions. In modern times, similar ideas are to be found in, for instance, connectionist models (Rumelhart, & McClelland 1986). Behaviourism is characterized by knowing in terms of a connection between observable stimuli and responses. Learning is the process by which “associations and skills are acquired” (cf. Greeno et al, 1996, p. 16), by weakening, strengthening or extinguish certain connections by reinforcement and non-reinforcement. Without reinforcement or consequence, there is no mechanism that supports learning. Analytical behaviourism, on the other hand, is concerned with the semantics of mental concepts (cf. Fisher, 2011). Analytical behaviourism can also be differentiated from methodological behaviourism by regarding our ordinary use of mental language as actually already being about behaviour (cf. Braddon-Mitchell, 2016).

Graham (2016), in a section on behaviourism entitled “Why be a behaviorist”, stresses three main reasons that speak in favour of behaviourism. First it is epistemic, where evidence is based on observed behaviour. Second, it does not rely on assumptions about inherent rules that constrain learning. Third, it

\(^3\) For a different categorisation of behaviourism, see Hauser (2016).
shuns reference to the mental as the cause of behaviour. “It aims to refrain from accounting for one type of behavior (overt) in terms of another type of behavior (covert)” (Graham, 2016). Learning in terms of association between stimulus and response has, on the other hand, been criticised on several points (Mandelbaum, 2016). It is, to take but one example, hard to explain why children learn language very fast. Cases have been shown where children develop new concepts with expressive power which could not be constructed out of their input (Carey, 1978). In a view on research strictly concerned with observed behaviour, as within methodological behaviourism, learning is reduced to a change in behaviour. Psychological behaviourism takes the environment alone as determining what it is that the learner learns. Learning is to make the correct associations between aspects in the environment, that one thing causes another, rather than having a deeper understanding of why. It implies the view that change comes about as the result of a response to an external stimulus. Phrased differently, learning can be regarded as constrained by the physical environment, or a response to the environment, rather than thinking. Analytical behaviourism takes the language which we may normally use in learning situations like, for instance, ‘believe’, ‘concept’ and so on to describes the learner’s disposition to behave in a certain way, rather than saying that the learner has the belief in question. As a result, the aim in teaching may invoke a practice of simple transference of information from the teacher to the learner, maybe most effectively ruled by punishments and rewards rather than teaching for understanding.

Taken together, behaviourism stands in stark contrast to earlier references to mystic powers. Early empiricists such as Locke, Berkley and Hume were occupied with the question of how knowledge relates to sense experience. The “idea theory” of meaning assumes that all ideas originate from sense impressions. These impressions will result in a copy of the impression that will come to us when we hear the corresponding word. According to traditional empiricism, knowledge is acquired by making associations between, for instance, words and facts. Interpretation is possible because the teacher’s words cause the same ideas in the mind of the learner (cf. Scruton, 1995, p. 87).

Thus, empiricism emphasises evidence in which our perceptual abilities play a crucial role. The idea that the main source of knowledge relates to our perceptions is attractive, as is the concept of causality as relevant in understanding our interactions with the world. Empiricism may also serve intuitions such as that there exists a reality which is independent of our perception, and understanding the meaning of utterances is to correctly decode the message.
Empiricism in its classical formulations by, for instance, John Locke has met quite strong critique (cf. Scruton, 1995). Empiricism constitutes a first-person perspective that knowledge originates from experience. As such, it needs to give an account of how our private ideas, based on our own experiences, can be transmitted and shared. Another crucial question is: What is meant by ‘idea’?

An empiricist view on science is known as positivism⁴ and logical positivism (Cohen & Manion, 1994). The main goal of positivism was to rid philosophy and science of metaphysics. Logical positivists, who were particularly concerned with the meaning of language, followed the traditional empiricists, but instead of asking: What is the meaning of a sentence? they asked: Is the sentence meaningful? (Martin, 1994). The verification theory of meaning can be summarised as “the meaning of a (synthetic) statement is its method of verification”. The aim was to construct an extensional language. The idea of an extensional language is briefly the idea that bits of linguistic expressions get their meaning from what they refer to, their extension, so to say (Martin, 1994, p.143). We know the meaning of a sentence if we know what it takes for the sentence to be true, namely, if what is predicated about the names, terms and so on in the sentence, is satisfied or not. A famous example is Wittgenstein’s *Tractatus logico – philosophicus* (1921/1992), in which he might have given an intuitively appropriate explanation of meaning in his ‘picture theory’. This view on language and meaning was however later severely criticised, by himself not the least, because it does not capture the social nature of language (Wittgenstein, 1953).

Empiricism does not give an acceptable answer to the question: How do we make the right connection between ideas, words and things? - not to mention the problem of understanding sentences. It has, for instance, been argued that meaning cannot be distilled from single words. (cf. Martin, 1994, pp. 22-27; cf. Scruton, 1995). Overall, the criticism undermined the empiricist project of creating an autonomous scientific language. When language is dependent on private ideas, it also raises questions such as: How is it possible to have knowledge about another person’s knowledge? Paradoxically, although the empiricist goal was objectivity, it appears to end up in scepticism, that we can only have knowledge about our own experiences. So, empiricism after all, does not manage to transcend knowledge as subjective. This has implications in educational research. Rönström (2006), for instance, problematizes empiricists’ assumptions about meaning (cf. Roth, 2009), stressing core

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⁴ Cohen and Manion, (1994, p. 11) stress that ‘positivism’ has been given quite diverse meanings by philosophers as well social scientists, but that the different meanings involve some core assumptions, such as that the methods applied in natural science may also be applicable in social science.
problems that arise from looking at communication in terms of coding and decoding messages.

Quine (1951) argued against the empiricist idea that it is possible to make a distinction between analytic and synthetic propositions. Meaning holism is hence the opposite view to what has been put forward by logical positivists: the building-block theory and contemporary theories that stress the compositionality of language proposed by, for instance, Jerry Fodor (cf. Jackman, 2014). Holism implies that theories cannot be tested in isolation or, in other words, be justified one by one. When conducting an experiment, there are several theories and auxiliary theories in play at the same time. One consequence is that the observed behaviour may fit different theories about the relation between input and output, and there is no simple way to decide which is the correct one. In other words, our interpretative theories are underdetermined by the data.

Researchers in educational research on learning may disregard empiricism and behaviouristic research due to an interest in understanding human behaviour rather than explaining and predicting it. Learning theories based on empiricism, such as behaviourism, exclude dimensions of learning connected to intentions, meaning and action, and they hold that they can do without much of the vocabulary that is at the heart of our common-sense views of learning. Their outside-in understanding of learning leaves out aspects we may find essential to learning in ordinary life as well as in schools and elsewhere. In other words, a great deal of what learning is about is left out (cf. Cohen & Manion, 1994, p. 26). I draw the conclusion that when the focus is set on objectivity, it comes at a price.

On the other hand, behaviourism and its empiricist foundation is quite an impressive idea, which may also capture our intuitions about an external reality, hence hard to overcome in practice. Empiricism and its core epistemological and ontological assumption also point to aspects that a theory of interpretation might want to acknowledge. It seems, for instance, reasonable to think that observations of learners’ activities, that is, observable behaviour, play a crucial role in understanding learning. And although the building-block theory project failed, the very idea that language is extensional, relating to an objective world, appears as an important aspect for the validity of interpretation. According to analytical behaviourism, the extensionality of

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5. Quine (e.g. 1960/2013), himself an analytical behaviourist, may be interpreted as drawing sceptical conclusions with regard to epistemology as a certain field that can explain thorny issues about knowledge and knowledge acquisition. According to him it is rather a question of science to investigate how observations relate to theories.
mental terms is preserved by claiming nothing more than the learner’s disposition to behave in a certain way towards a stimulus. On the other hand, if linguistic communication in learning situations and interpretations of them become the act of coding and decoding utterances, it reduces the learner to a passive receiver of information. As pointed out above, it appears that behaviourism does not capture interactional aspects of communication, and intentional action is neglected in favour of the study of behaviour.

Given the brief summary of the critique that has been directed against behaviourism and an empiricist perspective, I take the empiricist idea of language as extensional as an ideal that is worth trying to preserve. If we do not assume that language relates to an external reality, which we can talk about and which we can be right or wrong about, how can we know when we are not in agreement? We may differ in language rather than opinion. Objectivity plays an epistemologically decisive role in interpreting learning processes; an important aspect of objectivity is, in other words, the possibility to refer to an external reality and to relate observed behaviour to aspects in the world.

In the next section, we will see that constructivism accounts for learners’ understanding, making space for learners’ individual interpretations of a subject matter. Thus constructivism solves what is lacking in behaviourism, that is, explaining the internal, psychological aspect of learning. This implies that learners are individuals forming theories about their surroundings. In what follows, I will briefly review some core assumption of constructivism and its rationalistic foundation, leading up to a critique that shakes its very foundations.

Constructivism

Cognitive constructivism can be regarded as a reaction against behaviourism and its empiricist foundation and positivist view on social science. Phillips (1995) differentiated several forms of constructivism; the main concern here is cognitive constructivism. An important epistemological point of the research conducted by Jean Piaget (e.g. 1936/1970) and his colleagues was that knowledge could not be viewed as the result of an individual’s pure observations that are mapped into the mind⁶. Constructivism was hence a reaction against empiricism, viewing learning as a process in which the learner passively responds to environmental stimuli. The learner is not looked upon as a tabula rasa, which was significant for early empiricist and psychological behaviourism. The learner rather constructs knowledge and is depicted as an “alone, inventive young scientist, struggling to make independent sense of the

⁶ The aim is not to make detailed assertions about Piaget’s epistemological position or contributions to research; for such discussions, consult Berlin (1992).
surrounding world.” (Phillip, 1995, p. 9). Constructivism acknowledges the mutual interaction between biological aspects of learning and the environment, taking into account individual differences. The explanatory range of constructivism can thus cover not only individual differences between learners but also the mutual interaction between biology and the environment within the individual learner.

There was also a methodological development of importance. In *The child’s conceptions of the world* (1929/1951), Piaget not only discussed the interview as a way to reveal knowledge about children’s conceptions and the nature of intellectual development; he also proposed a classification of children’s utterances. The aim was to differentiate between those which could reveal information about the child’s conceptions of a given phenomenon and those that in different ways were the result of the situation. In other words, what children utter in an interview needs to be interpreted (cf. paper III; Halldén, Haglund & Strömdahl, 2007). This so-called *clinical method* has been decisive for understanding learning from a constructivist point of view. It can be said to be the main methodological approach for revealing the learner’s knowledge, particularly in the field known as conceptual change (cf. Vosniadou & Brewer, 1992). I will try to uncover some main assumptions that can be associated with a particular form of constructivism that tries to make sense of what they take to be learners’ difficulties to learn scientific theories. As such, this brief description may work as an explanation of the force, with regard to explaining learners’ so-called misconceptions of scientific explanations that this kind of research is able to provide.

In quite a number of studies in the early 1980s, it was found that conceptions formed in everyday activity, so-called *alternative frameworks* (Gilbert & Watts, 1983) often impede the acquisition of scientific explanations taught in school (for a bibliography, see Duit, 2009). In explaining how students come to make these alternative interpretations, researchers often referred to the interrelation between the human being as an innovative theory-creator in relation to data, in contrast to a strictly empiricist way of conceptualising science (Driver & Easley, 1978). The alternative framework movement started from the idea that it is not possible to make an observation independently of some theory (cf. Popper in Needham, 1995, p. 162). Learners’ subjective understandings of phenomena can be viewed as reasonable and relevant, seen from an everyday perspective.

Research on learners’ alternative conceptions was also influenced by Thomas Kuhn’s (1962) theory of scientific development. According to one interpretation of Kuhn, researchers work against a backdrop of a shared set of assumptions and beliefs which, together with certain practices, constitute a paradigm. When several new findings emerge that give rise to new puzzles
that could not be solved within the existing paradigm, so-called anomalies, a scientific revolution occurs. This picture was applied to learners in their processes of coming to grips with the content presented in formal education. Consequently, learners’ alternative theories formed in everyday activities were taken to be incommensurable with the corresponding scientific theory. Analogous to Kuhn’s theory, Posner, Strike, Hewson, & Gertzog, (1982) formulated different conditions that had to be met for the learner to accept the scientific explanation. Learning requires *conceptual change*, a fundamental change in conceptions or existing beliefs. It differs in important sense from surface learning and the accumulation of facts (Vosniadou, 1994, 2013). Knowledge, in other words, is acquired through self-organisation, and the learners’ prior knowledge is essential for the construction of new knowledge.

Hence, constructivism focusing on individual and psychological aspects of learning and on the learner’s ability to draw conclusions, to form hypotheses and to critically reflect on learning tasks. Constructivists emphasize from a rationalist perspective on knowledge that by placing knowledge within the mind of the learner, it is possible to speak of knowledge as something “that can be acquired, developed and changed” (Vosniadou, 2007, p. 56). Thus knowledge as a product is distinguished from knowledge as a process. Knowledge as a process is something that can be acquired by taking part in sociocultural activities (ibid). However, this appears to raise a problem at the level of methodology. If knowledge is acquired socially, the question arises how a learner’s knowledge can be assessed and differentiated (in, for instance, an interview situation) from that of the interviewer. As mentioned above, constructivist research relies heavily on the clinical method. Interviewing, it is assumed, can reveal the learner’s beliefs and conceptions. And, although Piaget distinguished between different kinds of answers, hence tried to account for the situation, this assumption falls back on the view that learner’s utterances in, for instance, interviews mirror beliefs in an unproblematic way (Mercer, 2007; cf. Halldén et al., 2007).

Although the rationality of the learner appears to be decisive for understanding learning in terms of explaining conceptual change, it seems that what the rationalist gains by focusing on the subjective aspect of learning, leaving important behaviouristic principles aside, comes at the cost of objectivity in research. This raises the question how we can know what the learner knows when knowledge is primarily in the mind. Data is often analysed by using a scoring key7. In order to increase the validity of the interpretation of the data, two independent judges may be used to check agreement. Differences can be

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7 For an example, see Vosniadou and Brewer’s (1992) study on children’s conceptions of the earth. The data was scored twice, at the model level and at an item level.
resolved in discussions between the judges (cf. Vosniadou & Brewer, 1992). If agreement is not reached, the data in question can be left out. Using a scoring key, however, seems to rest on the idea of a shared understanding between learners and scorers with regard to the meaning of words. However, even though the learner knows what s/he means by uttering a certain sentence, this does not mean that his/her meaning is the same as for the interpreter. In other words, holism and underdetermination are seldom, if ever, explicitly acknowledged.

Much of the critique directed against constructivist research, some which will be reviewed below, emanates from sociocultural researchers having a situated perspective as their point of departure. In what follows, I try to show that sociocultural research points out important methodological implications that appear to follow from sociocultural research and which also become a problem for constructivism/rationalism - more specifically, the need to account for situational and relational aspects influencing the learning processes. I will review the critique levelled at constructivism in general and the clinical method in particular. I will also give a brief account of core assumptions that sociocultural research shares, trying to show that it also raises problems. Socioculturalism argues that knowledge is intersubjective, stressing also the social nature of language. Language is a mediator which enables us to see the world from a certain perspective. However, although sociocultural aspects have a strong impact on learning situations, individual cognition appears to be left out in the interpretation of learning processes. Constructivist interest in individual learners’ subjective understanding of learning tasks, and the corresponding rationalist idea that in general, if not always, we know what we believe ourselves, appear, in other words, to be important aspects of an epistemological stance that need to be preserved. I will argue that sociocultural theories about learning are also underdetermined by evidence, and without the possibility to refer to an external world, it seems as if the validity is as much a problem as it is in constructivism. And, if knowledge is not in the head, and language does not represent true aspects of the world but rather puts the world in perspective, how can we ever have knowledge? Researchers (and teachers) appear to lack the possibility to refer to a common world.

Socioculturalism

Paralleling research on conceptual change the early 1990s saw an upsurge of research in which the study of learning departed from different versions of situated and socioculturally oriented perspectives (e.g., Resnick et al., 1991. Sociocultural and situated perspectives have “a shared notion of social actions
Socioculturally oriented researchers showed the vast influences of culture on human development (e.g., Rogoff, 2003). In a sociocultural framework, knowledge is often regarded as something that exists exclusively in a social practice, or, as stated by Roger Säljö “The origin of knowledge is simply in interaction, and not in internal psychological processes.” (2011, p. 68, my translation). In the introduction chapter in *Perspectives on socially shared cognition* (Resnick et al., 1991) Resnick’s opening sentence states that: “This volume is about a phenomenon that seems almost contradictory in terms: cognition that is not bounded by the individual brain or mind.” (p. 1). Cognition, in other words, is conceived of as something happening “in between”. Learning from a situated perspective is studied as an activity taking place between participants in different social contexts. It was argued that the kind of learning that can come about depends on the specific cultural contexts in which it is situated. Studies conducted outside laboratories and ordinary school contexts added profoundly to our knowledge about learning and cognition (e.g., Rogoff, 2003; Saxe, 1991). Moreover, knowledge mastered in one situation did not seem to transfer easily to other situations (Lave, 1988). If knowledge acquisition is viewed as basically an individual act, as assumed by constructivists, and that learners may perceive a situation so differently that it is hard to even assume that they have participated in the same activity, how can it be explained that people coordinate their actions and come to know the same thing? In other words, it was argued that knowledge transfer cannot be adequately accounted for by constructivism.

Learning, it is argued, is situated and viewed as enculturation into different social practices and cannot be studied independently from the particular historical and social situation in which the activity takes place. Schoultz, Säljö and Wyndhamn (2001) argued that studies relying on the clinical method have produced results that can be considered a product of the situation rather than reflecting the learners’ knowledge. According to the critics, the clinical method does not pay due attention to the situated nature of learning and social and relational dimension in research on learning. As an example, they criticised studies focusing on children’s conceptions of the Earth (e.g., Vosniadou & Brewer, 1992; Vosniadou, 1994). They stress that in the Vosniadou/Brewer study, the researchers do not account for the fact that the interview is a situation which is hierarchical and stressful for the children, who have to answer quite a number of questions in a short time. It is also argued that interviews belong to a certain discourse, with rules and norms for acting. As such, what children answer should rather be looked upon as contribution to the dialogue. Interviews constitute a specific activity that can be described as a co-production of meaning rather than revealing information about the
child’s thinking about a particular object or phenomenon. In other words, it is claimed that the clinical method fails to do the work it is employed to do.

This critique may be read as bringing out anomalies in constructivism to the extent that we are facing the need for a paradigm shift. And, sociocultural research was not presented just as another perspective; it targeted the very basic assumptions on which constructivist research relied, as shown in, for instance, the formulation below.

The theoretical perspective employed in these studies gives undue preference to unobservable entities of a rather dubious ontological status, and a corresponding disregard of the situated nature of children’s reasoning. (Schoultz et al., 2001, p. 109).

It is argued that it is problematic that results within constructivist research depend on inference of entities not available to the human eye. Children’s reasoning has rather to be understood in relation to the specific situation in which it occurs. This critique, however, is formulated from a situated perspective with its particular assumptions. In relation to Donald Davidson’s (2001a) theories, the very proposition that the assumption of beliefs is ontologically dubious makes little or no sense. That we can have knowledge about the learner’s individual beliefs is rather a prerequisite for communication (cf. Rönnström, 2006).

One basic assumption that can be associated with situated perspective is that there is nothing deeper in words than what we convey in our practical use. Meaning is not in the head or to be explained by correspondence to an external world. It is rather recognised as “meaning is use”, associated with Wittgenstein’s Philosophical Investigations (1953). It is also stressed that objects and events can be constituted differently depending on the situation in which they occur (Schoultz et al., 2001). While that would be quite an uncontroversial proposition, it is less trivial when paired with the view that meaning is essentially discursive and that language constitutes and constrains our understanding of the world.

This relationship - that concepts get their meaning not by direct correspondence with reality but by being part of systematic discourses which describe the world from certain perspectives – is another way of stating that language is a social phenomenon in which meaning and sense are determined by social conventions and rules (Wittgenstein, 1953). (Säljö & Wyndham, 2002, p. 30- 31, my translation, emphasis added).

From this quote, it appears that language is not only essentially social but also a mediator which enables us to see the world in a certain manner. It is also regarded as constitutive for our thinking and even for what we see.
Researchers within the field of language acquisition and communication have also argued that language “…profoundly shapes world views and social relationships” (Resnick et al., 1991, p. 9). This gave new fire to the Saphir-Whorf hypothesis (Whorf, 1956) – which (in a strong interpretation) asserts that language sets a limit on our thinking and knowing about the world (for an elaborated argument against this idea, see Rönnström, 2006, p. 244).

If meanings are looked for only in discursive practices, the researcher does not need to worry about learners’ intentions and the complexity of intentionality. Confirmation holism and underdetermination, on the other hand, cannot be avoided. Any analysis of learning processes has as its basis methodological and epistemological assumptions, political positions, maybe theories about power and the like (cf. Newton-Smith & Lukes, 1978, p. 98). Interviews, classroom discussions or the like may consequently be given rather different interpretations, although they may all be focusing on language use or discourses. Situated perspectives appear to run the risk of losing the connection with an external world. The question then arises if there is something outside language. Or even if there is, can we ever have knowledge about an external world if language puts the world in a certain perspective? Or how should we conceive of the ontological status of the learning situations? Interpretations of learning associated with situated perspectives appear to perceive situations in a way that may end in a position where we get caught up in language and discourses (cf. Rönnström, 2011).

Reducing learning to processes taking place between subjects also misses the learner’s subjective understanding. It is then hard to explain why learners do not follow the norms for acting or solving tasks in the intended way. Deviation from discourses becomes mainly a change of discourse rather than a change in beliefs and understanding, aspects that have been claimed to be crucial for understanding learning. Nevertheless, sociocultural research has contributed greatly to our understanding of learning and is widely acknowledged and accepted (cf. Cobb, 1994). And a stance that attempts to form the basis for interpreting learning processes needs to account for intersubjectivity, as stressed by socioculturalists, as well as acknowledging the sociocultural argument of the need to account methodologically for the interplay between the learner and researcher/teacher, and other sociocultural aspects that may influence learning processes.
A possible merger?

The critique directed against the clinical method and research that shows the impact of sociocultural dimensions in learning (Schoultz et al., 2001; Resnick et al, 1991; Lave & Wenger 1991) left constructivism with questions to be answered. It generated a response in a series of papers published in *Educational Researcher* 1994 concerning the validity of constructivism and the question whether it is possible to combine lessons drawn from both sociocultural and constructivist views on learning. Cobb (1994), for instance, argued that any analysis of learning must account not only for psychological, individual constructions but also for the sociocultural practices in which learning takes place. Constructivism alone could not account for the complex social practices taking place in the classroom. It was argued that constructivism and sociocultural perspectives should be considered complementary. Driver, Asoko, Leach, Mortimer & Scott, (1994) made a similar point, although they argued that science is primarily a social activity, dealing with a symbolic world8 (cf. Duit, Roth, Komorek and Wilbers, 1998).

So, albeit the merits of constructivism as being able to explain individual differences and the psychological dimension of learning, there is a growing consensus within the field of conceptual change research that sociocultural aspects are of crucial importance in learning and the study of learning (cf. Mason, 2007).

The question of the possibility to combine aspects of the different perspectives is, however, not resolved, much due to the epistemological and ontological diversity. It has been stressed that discussions on the need to combine cognitive and sociocultural approaches do not pay due attention to core assumptions, making them principally incompatible (cf. Säljö, 2009; Packer & Goicoechea, 2000). There is an important ontological claim within the constructivist framework that ‘knowledge’ refers to individual cognition, whereas from a situated perspective, knowledge is looked upon as being “in between” subjects (cf. Smith, 1995). Säljö (2009) has also criticised attempts to combine the different perspectives.

Alexander et al. do not give sufficient recognition to the significant epistemological and theoretical differences between traditions; differences that make them incompatible in important respects, for instance, with respect to their units of analysis. (p. 202).

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8 A symbolic world refers to a world made up of theoretical constructs such as concepts, models, theories and the like, and learning is, from situated perspectives, looked upon as “appropriation of [such] cultural tools” (Driver et al, 1994, p. 7)
Thus a genuine merger appears to be out of reach. In what follows, I will turn to a methodological approach, Intentional Analysis. It can be viewed as a “meeting point” (Halldén et al., 2007, p. 38) as it accounts for the interplay between the learner, researcher and sociocultural aspects influencing the learner’s interpretation of the subject matter and the individual learner’s conceptions. In this way, both individual cognition and sociocultural dimension in learning processes can be accounted for in the analysis. I will therefore shift the focus from ontological and epistemological issues to a methodological discussion, although such core issues are lurking in the background. Here I will present the core ideas and distinctions in IA. Intentional explanations, contrary to empiricist assumptions about coding and decoding a message, require that the interpreter ascribes intentions and beliefs to the learner. Intentions do not arrive neatly distinguishable from each other. The interpreter is thus dealing with a web of intentions that are nested in complex ways (Downes, 1998).

Language is looked upon, not as mirroring the learner’s beliefs but rather as something we use in order to do something, that is, a view on language use that can be recognised in speech act theories (cf. Austin, 1962). It implies that underdetermination may exist to quite a high degree. My general point is that, although IA accounts for situational aspects influencing the interpretation of learning processes, by reference to intersubjectivity, the basis for choosing interpretations remains to be explained. That is, there appears to be no objective ground to fall back on.

**Intentional Analysis**

Piaget saw as early as 1929/1951 a problem in drawing conclusions about children’s conceptions based on what they uttered in an interview. The clinical method aimed at differentiating between answers related to the situation and answers representing the child’s original beliefs⁹. We can, however, recall the criticism that the clinical method does not account for the interplay between researcher, learner and the situation (Schoultz et al., 2001). Intentional Analysis (IA) has been developed in relation to the discussion emanating from the sociocultural critique. Rather than taking utterances as mirroring the learners’ thinking, IA look at verbal behaviour in terms of actions. Actions are situated, but IA preserves the constructivist idea that learners “…do in fact

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⁹ In Paper III we argue that Piaget based his classification of utterances on two kinds of principles, utterances and actions.
hold conceptions” (Halldén, 1999, p. 53). This means keeping the constructivist interest in the individual learner, providing a methodology that aims at making sense of the learner’s (alternative) knowledge. It builds on research on the learner’s alternative framework referred to above (Driver & Easley, 1978). The aim is further to reveal the potentiality such knowledge has for understanding conceptual change and learning\textsuperscript{10} (cf. Halldén et al, 2013). This strand of research has grown and gained certain recognition in conceptual change research (Vosniadou, 2013).

IA has as its starting point a distinction between a task, presented, for instance, by a teacher, and the learner’s interpretation of the task: the problem or project the learner gets engaged in (Halldén, 1988). Thus, it conforms to an intentionalist model of action (Halldén, 1999). This is not to be confused with research in which the main project has been to causally relate learners’ intentions and motivation to conceptual change (Sinatra & Pintrich, 2003). The point of an intentional analysis is rather to make adequate sense of the learner’s interpretation of the task in question, and from such understanding infer beliefs and conception about the subject matter. In other words, it aims at investigating what the learner knows rather than the contrary (cf. Rommetveit, 1978).

Scientific concepts get their meaning by being part of a theory, that is, a conceptual context. Caravita & Halldén (1994) describes such a structure, or system, as comprising three different levels: a meta-level consisting of concepts of laws and principles, a conceptual level accounting for theoretical concepts and an empirical level accounting for data. For instance, historical documents, events and artefacts may constitute the empirical level for the historian. The conceptual level may consist of colligatory concepts such as: “Sweden’s era of greatness” and at the meta-level, concerns about what counts as an explanation in history. Concepts at the meta-level determine what counts as data. The point is that learners’ alternative ideas have a corresponding structure. Learners’ conceptions are, in other words, embedded and interrelated, taking the form of a web of conceptions (Larsson & Halldén, 2010; Vosniadou, 1994; cf. Downes, 1998)\textsuperscript{11}. The meta-level consists of a

\textsuperscript{10} There have traditionally been mainly two different perspectives dealing with the core question about the structure of learners’ alternative conceptions. Psychological development researchers (e.g. Vosniadou, 2008; 2013) describe learners’ conceptions as being coherently structured forming theories, hence based on a rationalistic perspective. From a “knowledge in pieces” and basically empiricist perspective, it is argued that learners’ knowledge is best described as fragmented (diSessa, 1988, 2013). What appear as coherent theories are merely on the surface and the focus must be on a sub-conceptual level. Intentional Analysis constitutes a third road in this debate (see Paper I).

\textsuperscript{11}As noted above, diSessa (1988) argues against this idea, describing learners’ conceptions as far more fragmented.
certain worldview, which determines concepts at the conceptual level and how to interpret experiences and perceptions. This can be regarded as a holistic view on learners’ conceptions and a corresponding view on language that is a kind of meaning holism referred to above.

Making valid interpretations must therefore, according to IA, take into account the fact that concepts belong to “different domains of understanding” (Caravita & Halldén, 1994, p. 106; cf. Linder, 1993). Terms such as ‘force’ and ‘heat’, to take an example, have quite different meanings in everyday situations than in a scientific context.

If the challenge for the learner is to form coherence between the different levels in a conceptual system, the challenge for the interpreter is to reveal the kind of coherence that the learner has constructed. In order to account for a learner’s individual contextualisation’s, Halldén (1999) draws on von Wright’s (1971) discussion of how to analyse actions. This is done by way of a model for differentiating between individual cognition and the individual’s conceptions of aims and duties related to situational aspects, as well as adherence to certain discourses and norms for actions. In this respect, it addresses part of the sociocultural critique of constructivist research: of not paying attention to sociocultural aspect (cf. Halldén, Petersson, Scheja, Ehrlén, Haglund, Österlind & Stenlund, 2002).

Actions are analysed with the focus on modelling the individual learner’s meaning-making (in terms of contextualisation) with the aim of drawing inferences about the learner’s conceptions of, for instance, a learning material. Actions are therefore modelled with regard to an “outer”, or external, dimension, which is the observed behaviour, and an “inner” dimension, that is, the intentional aspect of the actions. By ascribing aims and beliefs to the observed behaviour, the behaviour qualifies as an intentional characteristic and becomes a particular action. As such, it can be formulated as a practical syllogism, an inference referring to the aims and desires of the individual learner in the circumstances. The syllogism constitutes an argument that explains the action retrospectively. It can take the following form:

A person \( P \) intends to do \( x \) (where \( x \) is a verb of verb-phrase).
\( P \) believes he cannot do \( x \) unless he does \( y \) (where \( y \) is a verb or verb-phrase).
Thus, \( P \), does \( y \). (Halldén, 1999, p. 54).

The syllogism is not to be interpreted as a prediction or hypothesis about a future action. This is a logical connection argument that concerns the relations between the premises in the practical syllogism. Intentional explanations in this sense are thus conceptual; they are “mediated not by causal laws but by explanatory principles…” (Stoutland, 1986, p. 41; but cf. Matta, 2015).
By making an analytical distinction between two kinds of determinants of actions, it is possible to differentiate between the learner’s conception of the subject matter and conceptions related to the situation (Halldén, 1999, with reference to von Wright, 1971, 1979). Competence-oriented determinants of actions (or internal) refer to the learner’s abilities, beliefs and desires, held irrespective of the situation. This constitutes a cognitive context for interpretation. Discourse-oriented determinants of actions (also sometimes referred to as external) refer to the individual’s conceptions of aspects of the situation (cf. Scheja, 2002 on intrinsic and extrinsic determinants of actions). It may be in terms of how the situation is interpreted by the learner as requiring a certain kind of action. It may be that the learner follows a certain norm, or conventions or rules for action, rather than giving voice to some particular knowledge about the phenomenon in question (for examples, see for instance Ehrén, 2008; Halldén, 1999; Jakobsson-Öhrn, 2005; Lundholm, 2003; Petersson, 2005; Scheja, 2002). However, it should be noted that both are mental, although one kind is about social or discursive aspects that the researcher assume are of relevance for the learner. In other words, discourse oriented resources account for a sociocultural dimension influencing the learning processes (cf. Larsson & Halldén, 2010 for a discussion of different dimension of contexts). In addition, actions more or less unreflectively imposed by a discourse can be accounted for with reference to discourse-oriented determinants.

The determinants for actions are thus not regarded as causally preceding an action such as when beliefs are seen as being part of a prior intention (cf. Searl, 1983) but form part of an intention in action: the action actually carried out. By way of the distinction in question, it is possible to elaborate on the kind of competence that is brought to the fore in the action. The application of the distinction in the analysis has been described as a way of accounting for the “variation in viewpoints involved in the rationalisation [i.e. the researcher’s rationalisation] of an action” (Scheja, 2002, p. 65), for instance in analysing how learners approach and tackle learning tasks in various educational settings. So, the researcher can look at these different aspects when trying to make sense of the learners’ meaning-making.

A particular strength of IA is that behaviour can be explained by revealing coherence between the learner’s aims, beliefs and intentions in two senses. Firstly, with reference to what can be called individual coherence and secondly, with reference to social coherence. The possibility to refer to discursive aspects, that is, social coherence, has been used as an argument for the validity of an analysis.
The idea of taking the social setting into account is thus to facilitate an empirically grounded analysis that takes not only cognitive but also discursive aspects into consideration, thus strengthening the validity of interpretations… (Sternäng & Lundholm, 2010, p. 7).

With reference to the distinction in question, it is possible to differentiate between conceptions of two kinds. The interpreter can understand utterances to be meaningful by reflecting either on the individual’s cognitive competence or by looking at it as related to, for instance, the learner’s conceptions of norms for actions, that is, discourse-oriented competence. Exactly how the researchers account for the situation, that is, the ground for making the claim in question, is not spelled out. As such it poses questions at the level of epistemology. How, for instance, can we know that the learner sees the situation in the same way as we do?

As noted above in relation to definitions of a conceptual context (Caravita & Halldén, 1994), we know that the interpreter does not face utterances that can be interpreted one at a time; beliefs do not come neatly distinguished from each other. There is rather a “web of beliefs” (Downes, 1998, pp. 351; cf. Quine, 1960/2013). Meaning holism and underdetermination mean that although an argumentation in which researchers rationalise actions by reference to situational aspects may make full sense, there can be several different interpretative theories that fit equally well with the utterance in question. The force of underdetermination in relation to IA comes to the surface when we reflect on how many intentions one and the same utterances may serve at the same time. When someone says, “There is no bread”, it may be with the intention to declare that there is no bread, but also that “You have to buy bread” or maybe, “That is why I do not want the soup”. When looking at an utterance in terms of the realisations of intentions, we can note that they are multi-layered, or as stated by Downes (1998) “there is a complex of intentionality in the performance of a single utterance” (p. 395, italics in original; cf. Rönnström, 2006). Bits of language (sentences) may, in other words, also be used to communicate information indirectly. We may as well utter a sentence which has a certain grammatical form, for instance, formulated as a question, but with the intention of communicating something else. “Do you serve children milk?” may mean, “I assume (that) you do not serve children milk as it is not good for them”. Or it could be interpreted as an order. “Do not serve children milk”. Therefore, there may be a difference between what people say in the literal sense of a given language, and what they actually mean. Just as a sentence may mean different things at the same time, different sentences may be used in order to communicate the same content.
Some utterances are also to be regarded first and foremost as phatic acts (Downes, 1998, p. 400), to speak just for the sake of speaking rather than reporting information about beliefs or opinions held by the speaker. Children answering questions about the shape of the Earth, for example, may also be more concerned with the act of performing well in the interview in terms of politely answering every question, rather than dealing with the concept under investigation (cf. Schoultz, et al. 2001).

With regard to the multiplicity of intentionality, we may, in the analysis, narrow our search down to aspects of actions relevant to the research question by explicitly defining which aspects are to be considered in the analysis. We may, for instance, focus on the kinds of solutions to a problem that children suggest, in a group discussion, thereby disregarding other (possible) dimension of intentionality, such as, for instance, whether the children are trying to compete with each other or making jokes (cf. Wistedt, 1994). Nevertheless, the problem remains, as we still need to understand the meaning of utterances. In other words, why assume that the utterances mean this rather than that?

Researchers working together and applying IA also sometimes face the situation of arriving at different interpretative theories of the same verbal behaviour. Different interpretations arose, for instance, in a study but was “…discussed until full agreement was reached” (Murstedt, von Reybekiel Trostek, & Scheja, 2015, p. 9; cf. Sternäng & Lundblad, 2010, p. 7). The particular criteria applied in such decisions are rarely, if ever described. The grounds for an agreement and the application of the distinction between the determinants for actions appear to rest on an intersubjective understanding of the observed behaviour. There seem to be no objective, or external, grounds on which decisions can be made.

Despite challenges such as holism, underdetermination and the complexity of intentionality that meet the researcher applying Intentional Analysis, it provides the interpreter with what I regard as important distinctions: first, the distinction between the task as formulated by the teacher or researcher, and how this is interpreted by the learner, that is, the problem that the learners get engaged in; and second, the distinction between the determinants for actions. And meaning holism implies that if we know some of the learner’s beliefs, we can readily infer several other beliefs at the same time, as beliefs have logical relations. The question remains, however, how to account epistemologically for the application of this distinction. It appears to lack an objective ground from which the researcher can argue for a particular interpretation.

All this points to the need for further clarification, or maybe a new stance for research on learning, a stance that takes seriously the complexity involved in
learning processes, as well as the challenges (holism, underdetermination and the complexity of intentionality) related to interpretations of these processes. This means continuing the discussion and re-appropriating what interpretation of learning can be about.

In what follows, I will summarise the conditions that an adequate stance concerned with the interpretation of learning processes needs to account for in order to handle the complex internal (within the subject) and external (sociocultural, e.g. communication) processes involved in learning.

Towards a new approach to interpretation of learning

In the previous section I tried to show that each epistemological perspective referred to above, and IA, has its respective merits and provides aspects that are important for understanding learning processes in educational research. Empiricism emphasises verification and objectivity but ends up in what appears to be a subjective position, even ending up in solipsism. Rationalism cares for the subjective aspect of learning, and situated perspectives stress intersubjectivity, the sociocultural and collaborative dimensions of learning. Intentional Analysis account for both subjectivity and intersubjectivity and stress the need to understand how the learner make sense of learning tasks by pointing to crucial distinctions to be made in interpretations. However, each perspective alone risks reducing interpretations of learning to subjective or intersubjective aspects. Although research is necessarily about some kind of reductionism (Säljö, 2009), I do not necessarily regard it to mean leaving out, in interpretations, the outside observed behaviour or the inside psychological aspect of learning, or the interplay between interlocutors.

I will therefore continue the discussion by raising the idea of the possibility of formulating a new stance that can provide a basis for analysing complex learning processes; the argument is that there is a need, given the criticism reviewed above, for interpretations of learning to be able to deal productively with the complex conditions involved in learning situations (cf. Cobb, 1994). And that a merger between the different perspectives appears to be out of reach.

However, the crucial aspects that each perspective provides should not be forgotten. As argued above, I regard the objectivist ideal associated with empiricism to be worth retaining, or maybe reclaiming: the possibility that we can be wrong with regard to how the world is and with regard to interpretations
of the meaning of utterances. The idea of an extensional language then seems to be of importance. Constructivism, on the other hand, acknowledges the importance of keeping an interest in the individual learner’s prior knowledge and rationality, as well as the corresponding assumption, originating in rationalism, that in general, if not always, we know what we ourselves believe. Socioculturalism stressed the intersubjective aspect of learning and showed the need to account for it methodologically as well. The interplay between learner and researcher, and other sociocultural aspects when interpreting learning processes is accounted for in Intentional Analysis by way of analytical distinctions to be applied in the analysis. First is the need to work from a distinction between the task as it is formulated by the teacher or researcher, and how it is interpreted by the learner. Another decisive factor is the distinction between the determinants for actions.

The philosopher Donald Davidson argued that subjectivity, intersubjectivity and objectivity are interrelated aspects in an all-embracing concept of knowledge, constituted by “three varieties of knowledge” (Davidson, 2001b, pp 205-220). Educational researchers such as Rönnström, 2006, Roth, 2009, and Wahlström, 2010, 2016 have also discussed Davidson’s view on knowledge. Rönnström (2006), in his discussion of the particular conditions for communication in an educational context, takes his point of departure in Davidson’s theory of knowledge. Communication is understood in terms of in-determined interpretation processes in which speakers use idiosyncratic languages (idiolects) that do not represent anything but are still causally related to a shared world. The fact that language is a social phenomenon (as, for instance, stressed by Säljö & Wyndham, 2002 above) can also be distinguished from looking at language as necessarily public.

The public character of language means that communication must be publicly accessible so that the members of a language community can learn to speak intelligibly and in accordance with other speakers, but they do not necessarily follow the same rules or conventions in the same way. What is important is that they can make themselves understood in communication and can interpret the speech acts of others (Rönnström, 2011, p. 175, emphasis in original)

A major point in the quote above is that communication is possible without reference to shared conventions. Learning to communicate rather relies on language being public in the sense that what people say and mean can be interpreted by others. This requires triangulation: at least two speakers directing their attention towards an object in a shared environment with the aim to interpret each other. Wahlström (2016) refers to triangulation and the need to assume an external reality in her discussion of cosmopolitanism as communication, leaning on Davidsons’s theory of externalism. In another paper (2010), she argues, with reference to Davidson, that speakers’ intentions
are not hidden in the mind of the learner, unreachable for the interpreter. Intentions are observable through the observation of actions. This relies on the assumption that there are causal relations between our beliefs and the world that makes it possible to interpret each other.

According to Davidson, a theory of truth links speaker with interpreter, it describes in a basic way how the speaker intends his utterances to be interpreted. Davidson’s thesis is that a theory of truth conditions gives an adequate answer to the question of what is needed for understanding the literal meanings of an utterance; viewed as an empirical theory, this is tested by its relevant consequences. /…/ The interpretation of speech is not a trial-and-error event; interpretation is possible because the intention of the speaker is part of publicly observable behaviour… (Wahlström, 2010, p. 439).

In the quote, it is stressed both that utterances relate to a shared world, which the theory of truth implies, and that meaning is a public affair (cf. Roth, 2009). Hence Davidson’s theories may constitute aspects of a stance that can form a basis also for interpreting learning. Such an interpretative stance on learning needs to deal adequately with the conditions outlined above, and which I regard crucial in the study of learning processes.

I therefore take it to be one of my main concerns to work from the critique that has been directed against the different perspectives as well as the contributions they have provided and thereby try to open the door for a new approach on interpreting learning processes. I will do so by trying to give a characterisation of Davidson’s view on knowledge and interpretation and frame it in an educational context concerned with interpreting learning, on the assumption that it may contribute to an interpretative stance that does not assume what is supposed to be explained, that is, the meaning of learners’ utterances. The fact that the learner may use words in an alternative way, that is, alternative to science and what formal education aims to teach, is not a new idea (cf. Watts & Gilbert, 1983). However, interpreting qualitative data such as interviews is often treated as “…unproblematic revelations of what people think…” (Mercer, 2007, p. 76). It appears, in other words, to be relying on early empiricist views of the simple transfer of messages and coding models. In what follows, I will thus formulate the specific aim and research question for the thesis.
Aim and research questions

The aim of this thesis is to discuss interpretations of learning in educational research. I will also discuss interpretation in the light of the philosopher Donald Davidson’s theories of knowledge and interpretation with the aim to characterise his theories, in order to invite further discussions about how ontological and epistemological aspects may form parts of a holistic stance. Such a stance should have the potentiality to form the basis for interpretations of learning processes. This means formulating research strategies that takes the complex conditions of learning seriously and can meet the requirement of descriptive adequacy by addressing holism, the complexity of intentionality and underdetermination. I will work from Intentional Analysis since it has been developed in order to account for sociocultural aspects influencing learning situations as well as individual cognition. In other words, concepts from Davidson will be tried out within the framework of IA. The particular research questions are:

1.) How can Davidson’s theories of knowledge and interpretation constitute aspects of an ontological and epistemological stance, in order to form a basis for interpreting learning in educational research?

2.) How can such a stance inform empirical research, by addressing conditions such as holism, underdetermination and the complexity of intentionality when interpreting learning processes?

3.) In what sense may such a stance provide an alternative to earlier perspectives with regard to epistemical and ontological assumptions as well as specific research strategies?
Davidson’s holistic view on knowledge and interpretation

In the following section I will outline Donald Davidson’s theories of knowledge and interpretation. The aim is to provide a basis for discussing interpretations of learning in educational research and subsequently make a first sketch of an ontological and epistemological stance. Thus, this thesis does not deal with the philosophical problem of interpretation or with the philosophical critique that has been levelled at Davidson’s theories.

Davidson discusses interpretation in order to solve the problem of meaning: how words come to mean what they do (Davidson, 2001a). He argues for a theory of meaning that relates the meaning of utterances to observable behaviour by developing the work of Quine (1960/2013). Instead of asking for an explicit definition of meaning, we should ask what we need to know in order to understand a person speaking a foreign language, and by which means it would be possible to reach such knowledge. Davidson (2001a) refers to such a situation as a case of “radical interpretation” (p. 125). The situation is radical as we do not understand any of the foreigner’s utterances, nor do we have direct access to the speaker’s aims and beliefs.

It may be argued that such intellectual experiments take us too far away from the kind of interpretation that is our concern that is, interpreting learning and conceptual change. However, I will, with reference to Davidson, try to show that the assumptions on which radical interpretations rest are of the utmost concern for interpreting learning processes. And, rather than working from the problematic position of encoding and decoding meanings, a theory of interpretation, in order to be successful, ought to be based on accurate descriptions and explanations of how we actually go about and perform these activities.

We manage to coordinate our actions and make ourselves understood fairly often, though not always. The assumptions for successful interpretations appear then to constitute an important start. We cannot, however, assume that the learner uses words in a conventional way, as that would mean taking for
granted the things we are supposed to understand or explain. According to Davidson, it is not because people in the same country or geographical area share a language that they understand each other. In a sense, he argues, there are no languages, in the way that philosophers and linguists have traditionally thought about them, but rather different idiolects (Davidson, 2001b; for a discussion of how this view influences communication in educational contexts, see Rönnström, 2011). This has been formulated by Davidson (2001a) in the following way:

The problem of interpretation is domestic as well as foreign: it surfaces for speakers of the same language in the form of the question, how can it be determined that the language is the same? Speakers of the same language can go on the assumption that for them the same expressions are to be interpreted in the same way, but this does not indicate what justifies the assumption. All understanding of the speech of another involves radical interpretation. (p. 125)

According to the above quotation, the assumption that we understand each other because we recognize words is illegitimate. It implies that we cannot assume that there is determinate literal meaning conveyed in the utterance or that we understand each other because we assume that we speak the same language. There is nothing to guarantee that we use words in the same way, as we do not know whether the learner adheres to the same linguistic convention as we ourselves do. The learner might have learned the word in other situations, using another idiolect. Understanding a learner can therefore not rely on conventions or rule-following. We rather have to get hold of what the learner intends to communicate with the utterances in question (Davidson, 2001a, pp. 265).

Davidson (2001b) stresses that beliefs have logical relations and having beliefs also means having intentions, memories and desires, which are interrelated in complex ways. This was referred to above as holism of the mental (cf. Davidson, 2001b, p. 124–126). The actual linguistic dimension or counterpart, the language by which a speaker conveys his or her beliefs, can be regarded as having a similar complex systematic structure. Davidson argues that beliefs and meaning are interwoven in the sense that if we know what the learner believes, we would also know the meaning of utterances, and if we know the meaning of an utterance, we know what the learner believes. The problem is how to break into the circle.

Interpretation means to formulate a theory that explains the meaning of the utterances. The reason why it can be called a theory is that single conceptions and beliefs, as argued above, are embedded in a complex system. This means that when the interpreter ascribes a certain meaning to an utterance, setting the utterance in a specific context, a complex of beliefs and intentions, is already implied. Davidson hence makes a distinction between prior and passing
theories (Davidson, 2004b, p 237). The speaker’s prior theory concerns what he believes the interpreter’s prior theory to be. Davidson argues that the speaker’s and the interpreter’s prior theories do not need to coincide for successful communication. He does so by stressing that we are, for instance, often able to understand when a speaker uses a word in an incorrect way, a so-called malapropism. People may also use language in idiosyncratic ways, yet everyday communication works well enough. So, if prior theories are what we come with, passing theories are how we actually interpret. For the interlocutors to understand each other, their passing theories need to coincide. Communication relies on the ability to construct passing theories on the run, that is, in the communicative situation. This means putting specific utterances in a context, hence assuming quite a number of other intentions and beliefs.

As mentioned above, intentions do not appear neatly distinguished from each other. The interpreter faces what above was referred to as a complexity of intentionality (Downes, 1998), which poses specific problems, as described above (cf. Davidson, 2001a, p.159). It was also concluded above that any theory about the meaning of an utterance is underdetermined by the empirical evidence. Underdetermination can be differentiated from indeterminacy of interpretation (Davidson, 2001a, p. 227). According to underdetermination, empirical evidence does not in itself determine interpretation. As there can be other interpretations that equally well fit the given evidence, ‘indeterminacy’ means that there are no empirical reasons for preferring one theory to another. This means that there is a lack of empirical grounds for deciding whether a learner uses idiosyncratic language or has beliefs that deviate from ours. Ramberg (1998) has expressed the problem as “…Davidson conceives of any indeterminacy of translation as an indeterminacy as to what language is being spoken.” (p. 100). How then can the interpreter decide whether the learner is wrong about the problem discussed? Or whether the learner is correct about the topic in question, but uses language, for instance certain words, in a sense that deviates from ours? (cf. Davidson, 2001b, p. 80). If there are no empirical grounds for choosing one theory of interpretation rather than another, the conclusion is that interpretations that account equally well for the data are not incompatible, hence not a problem. Davidson takes it to be analogous to a situation in which one person describes the temperature in Celsius and another in Fahrenheit. If they are aware of this fact (that they are using different languages), they can decide whether they agree or not on the temperature. Davidson is, in other words, not worried about indeterminacy, and takes the principle of charity to lessen the effect (but cf. Baghramian, 1998a). So, while Quine, for instance, appears to adopt a relativistic position, that we should favour “our” theory (cf. Psillos, 2005), Davidson, by reference to his version of the principle of charity retains objectivity, and by that avoiding a sceptical
Davidson (2001a) discusses holism and indeterminacy of interpretation by taking as his point of departure reasons for action, and how such reasons relate to physical circumstances. Interpreting (the learner) means in this context understanding what the learner intends to communicate. As beliefs and intentions are intertwined, the question is: How do we get into this circle, and how can we start our interpretative efforts? Davidson’s solution is to start with beliefs. Knowing the conditions under which a learner holds a sentence to be true means knowing the meaning of the utterance. “A speaker holds a sentence to be true because of what the sentence (in his language) means, and because of what he believes.” (Davidson, 2001a, p. 134). Thus the interpreter has to have a methodology by which it is possible to get hold of such sentences. It is by “…holding belief constant as far as possible while solving for meaning” (p.137). This means focusing on utterances of the kind that are meant to report thoughts with propositional content. Propositions that report the learner’s attitudes¹³, opinions and beliefs about certain states of affairs constitute important points of departure for constructing a theory about the utterances, as this makes it possible to connect the mental of the learner to a shared world by observing the learner’s responses towards proposed interpretations. The more interaction that takes place, the more possibilities to converge with regard to the interlocutors’ respective passing theories. Davidson argues that there are no particular rules that can guide such interactions, only general “maxims” (Davidson, 2002). So, what are these maxims that may guide the interpreter in the task of revealing the learner’s intended meaning? Davidson provide the radical interpreter with some theoretical constraints, or in other words, assumptions that interpretation necessarily relies on in order to be successful. In what follows, I will try to show that the principle of charity can be used to constrain the number of possible interpretations, hence accounting for holism, underdetermination and the complexity of intentions.

The principle of charity

¹² The problem of indeterminacy, however, has been argued by Quine (1960/2013) to severely restrict our knowledge of what the reference of an utterance is. This problem has been referred to as the “inscrutability of reference” (Davidson, 2001a, pp. 227).

¹³ Propositional attitudes can be recognised in a sentence containing “that”, followed by, for instance, the description of a belief. “John says that Rome is the capital of Italy”. They have a predicating character and concern the cognitive relation people have towards propositions. They are of the kind that has content in terms of being about things in the world. They describe a psychological state about facts or affairs in the world and can be distinguished from hunger, pain and the like (Martin, 1994, p.104).
In order to minimize the possible negative effects of holism, underdetermination and the complexity of intentions, interpretation works from assumptions summed up under the principle of charity (Davidson, 2001a)\textsuperscript{14}. The word charity here has little or nothing to do with being kind to people. It is the condition for understanding them at all. We have to assume that the learner has mostly true beliefs about the world because disagreement can only be detected against the background of a shared world and what is mostly true. “Charity is forced on us” (Davidson, 2001a, p.197). The assumption that learners have true beliefs should not be understood to mean that all beliefs are true beliefs, or that they have the same beliefs as ourselves.

Charity prompts the interpreter to maximize the intelligibility of the speaker, not sameness of belief. This entails, as Lewis says, that interpretations must take into account probable error due to bad positioning, deficient sensory apparatus, and differences in background knowledge. (Davidson 2001a, p. xix)

Interpretation means understanding properly the position from which the learner starts out in two senses. One is the actual situation and how the learner is situated; the other is with respect to what we can assume about the learner’s prior knowledge, perceptual resources and so on. That is, Davidson should not be interpreted as claiming that the principle of charity requires that the speaker “has the same (true) beliefs as the translator”, which was what for instance D’Oro claimed (2004, p. 201). We need, however to assume that the learner is rational and the interpreter has to see the rationality. We would otherwise have no reason to think that they had any beliefs at all (Davidson 2001a, p.137). It does not imply that the action has to be considered rational according to our own standard, or that we see everything in exactly the same way. The learner may have false beliefs or act under “the weakness of the will” (Davidson, 2004a p.174). Cases of “inner inconsistency”, that is, when a learner does not follow his or her own standards of what would be considered good judgment, could also principally be rationalized (cf. Roth, 2011, p. 288). The point is that the principle of charity requires that although we may have many false beliefs and irrational thoughts and we may act against obvious known facts, taken together we must assume that most beliefs are true although they never even need to be pronounced or represented.

\textsuperscript{14} The principle of charity has been used in the philosophical literature, construed in different manners and for different reasons (for an overview, consult Saka, 2007). For Davidson, it plays a prominent if not sole role in his theory of meaning. In the introduction to \textit{Inquiries into truth and interpretation} (Davidson, 2001a), the phrase and the main idea are accredited to Neil Wilson (1959). The principle of charity has also been discussed as a practical tool in classroom activities, as an alternative to emphasizing students’ mistakes (Porter, 2001).
We should interpret so that utterances make sense, given that the surrounding conceptual context forms a coherent pattern in relation to the situation and other information possessed. The principle of charity makes it possible for the interpreter to interpret holistically and the meaning of a certain word charitably, even though it may deviate from what we regard as common language use. The following may serve as an example. Assume a child participating in a conversation about the importance of taking care of the environment, which both the child and a preschool teacher agree about. The child then goes on to state that his family does that; for instance, when they buy milk, they buy “egoistic milk”. As the word “egoistic” appears odd, the charitable teacher interprets it to mean “ecological”. This is the most reasonable interpretation, given the rest of what the child has said, and that it is also correct according to the teacher’s own standard. She also suggests what the child means is “ecological”, to which he assents by nodding his head. So they were in agreement concerning the topic talked about, but they did not use words in an identical way. In order to make most sense of the child’s utterances, the teacher assigned to them quite a few true beliefs and intentions. Imagine instead that the teacher assigned to the child the conception that milk can be egoistic. That would have been at the cost of the assumption that a large part of the child’s utterances is anomalous. What, for instance, would the child think that caring about the environment means, and not the least what “buy milk” means for the child?

The principle of charity, in other words, constrains interpretations in such a way that we should interpret learners’ utterances so that they become as intelligible as possible. The validity of interpretations, in terms of teleological explanations, relies, in other words, on two kinds of coherence. Coherence, Davidson (2001a) argues:

...includes the idea of rationality both in the sense that the action to be explained must be reasonable in the light of the assigned desires and beliefs, but also in the sense that the assigned desires and beliefs must fit with one another. (p. 159)

The first kind of coherence mentioned in the quote relates the assigned desires and beliefs to the observation (which takes place at a specific time and place). The other coherence is between the constituted elements in the teleological explanation; belief and desires are assigned in a sense that, together with the conclusion, they form a coherent pattern. The principle of charity can therefore be divided into two parts: 1. A principle of coherence - ascribing to the learner some degree of logical consistency in his or her thoughts. 2. A principle of correspondence – assuming that the speaker responds to basically

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15 This example is inspired by, but not identical to, a short information program (or commercial) from a pension company that was shown on Swedish television in 2015.
the same salient feature of the world as you would under the same circumstances (Davidson, 2001b, p. 211). The principle of correspondence implies that we would not be able to understand people if we did not assume a world perceived in a similar manner. It implies a causal connection between the contents of learners’ thoughts and the world. Therefore, Davidson takes the physical situation to be causally related to the beliefs in the sense that, for instance, the presence of a table gives perceptual evidence, by physically causing a belief that there is a table in front of us (cf. Davidson, 2001b, p. 213). This is not to be interpreted in terms of a one-to-one correspondence between objects and events in the world and beliefs (and the language in which beliefs are expressed). The principle of charity rather account for a meaning holism, and interpretation is understood in terms of triangulation (Davidson, 2002).

Triangulation

Basically, triangulation16 refers to a situation in which at least two speakers direct their attention towards a common object with the aim of saying something true about the object (cf. Pagin, 2001, on different kinds of triangulation in Davidson’s writings). We can picture a line that goes from the learner to an object or event, another from the researcher to the object in question, and a third line between the researcher and the learner. The problem of the interrelation between belief and meaning (implied by holism) can, according to Davidson (2001a) be solved by:

...holding belief constant as far as possible while solving for meaning. This is accomplished by assigning truth conditions to alien sentences that make native speakers right when plausibly possible, of course to our own view of what is right. (p. 137)

The method for arriving at the meaning is by formulating a hypothesis about the learner’s cognitive attitude to something in the shared view17. According to the quotation, this implies that the learner’s sentences match features in the

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16 Triangulation in this sense has nothing to do with the different types of methodological triangulation discussed in research method literature (e.g., Cohen & Manion, 1994). It is rather similar to Janson (2004), who discusses the interaction between children, or a child and preschool teacher who direct their attention towards an object. Having their own unique perspective based on their prior experiences and position in the local space, their comprehension can be confirmed or rejected by the “Other” in the dialogue.

17 Thus the kinds of utterances that are at the fore are what was referred to above as propositional attitudes.
environment in a manner that appears reasonable when translated into the teacher’s/interpreter’s language. It assumes that we can discern and identify the same features that the learners are directing their attention towards.

Knowing the conditions under which the learner holds a sentence to be true is thus the starting point from which we can go on to interpret other utterances. Triangulation in its most basic form starts out from sentences which contain references to our perception, reporting the learner’s propositional attitudes. These, however, stand in relation to other propositions (e.g. Davidson, 2001b, pp. 159; cf. Bergström, 2001), and consequently do not in themselves constitute final grounds for interpretation. Therefore, although perceptual sentences bear a certain relation to the situation, they are not given priority in interpretation (cf. Joseph, 2004, p. 6). On the other hand, the radical interpreter presumably understands such sentences first, “…they are an entering wedge into language, and perceptual sentences generally are what connect empirical thought and talk to the world.” (Davidson, 2001d, p. 291). Perceptual sentences need to be evaluated together with an overall assumption of coherence and rationality (cf. Joseph, 2004, p. 61).

Klaassen and Lijnse (1996), within an educational context aimed at understanding learning, describe their method of analysis based on Davidson’s theory (e.g. 2001b) in the following way:

First detect under which circumstances she selectively holds true her sentence: then, match her expression to expressions of our own, so that her holding true her sentence and our holding true our matching sentence are systematically caused by the same features of the world. /...

Assign such meaning to a speaker’s expressions that she comes out as consistent and a believer of truth.

(Klaassen & Lijnse, 1996, p. 129)

The interpreter starts out from the assumption that the learner is correct from her point of view. The task is to grasp the particular sentence the learner uses for the utterance to be true, regardless of how the sentence is formulated (see also Klaassen, 1995).

Davidson (2001c) discusses another form of triangulation that aims at clarifying why triangulation works. It reveals the conditions necessary for triangulation to be possible. This kind of triangulation is in a learning situation in which the learner has not yet acquired a language. The teacher points at an object, such as a table and the learner, in order to learn, has to direct her attention towards the table. The child then tries to apply the word to other objects, perceived as similar to the table pointed out by the teacher (or parent). Some might be tables but some might not be. By carefully attending to the teacher’s responses, the child will learn when the word is applicable.
Ostensive learning is therefore crucial from the beginning and makes triangulation possible. It works as long as both the learner and the teacher attend in certain ways to the activity. The learner has to relate the teacher’s actions and responses to features in the world, and how this relates to what is uttered. The triangle comes into being when the table is perceived by both the teacher and the learner as the relevant stimulus for their respective responses. The triangular situation makes the learner aware of the possibility of being wrong. The kind of triangulation described here is not supposed to exemplify how we learn a language, or how the process of the relevant stimulus comes about. It rather aims at showing *that*, not how; the learning activity *is possible* due to the assumptions about the learner, the teacher and how they act within a shared perceptual field (Davidson, 2001c, p. 293).

The interpreter can do nothing but start out from his or her own frame of references, assuming that the learner perceives the world similarly enough to make the right sort of interpretation. However, as interpreter we apply different kinds of information. Davidson's point has been summarised by Joseph (2004):

> We make use of whatever we know about an agent’s personal history and his psychology, and we also (implicitly, perhaps) rely upon general canons of inductive and deductive inference and decision theory; much of it, though, comes down to simple common sense in thinking about how a speaker is situated in his local environment and how that bears on his beliefs. (p. 69)

The importance of the relation between the situation and how it relates to the speaker’s belief is stressed in the quote. The point is that for an utterance to be viewed as meaningful, it must be possible to be described, forming a coherent pattern that seems reasonable in relation to how the speaker is situated. We need not, and should not assume any meaning entities.

> The goal of interpretation is not to map meanings onto a speaker’s words, but to understand the role his utterance of those words plays in his life. …/ …what matters is newer the interpretation of an isolated utterance, but rather the relation utterance bears to the complex situation that embeds it. (Joseph, 2004, p. 82).

It appears reasonable to conclude that there is not a one-to one relation between words and world. Yet there is a relation between words and world. In the following paragraph, the relation in question will be elaborated by way of the concept of *salient features*. Triangulation as described above rests on the assumption that we can see the same salient features as the learner.
Salient features

As pointed out above, meaning and beliefs are interrelated and this is solved by the interpreter keeping beliefs constant as long as possible. This may be done by trying to relate the learner’s sentences to features perceived by ourselves in the environment. This requires that there is a match with regard to perceptions (the learner’s and the interpreter’s), that they are able to perceive similar things in the environment and categorise in a similar sense in the particular situation. The ability to classify in a similar sense and the classification is not a single enterprise. Classification, according to Davidson, relies on speakers and their correlation of responses to perceptual evidence which appears to be salient. “Evolution and subsequent learning no doubt explain these patterns of behaviour” (Davidson, 2001b p. 212). This starts early on in triangular situations when we are learning our first language and we have to single out certain objects; a lamp, car, dog and so on which an adult is pointing to. Eventually we try to apply the words to other lamps and dogs and we will realise that we are sometimes right and sometimes wrong. The main points are according to Davidson (2002) two.

The first is that the possibility of communication, and hence of understanding others, depends on the fact that our natural powers of discrimination are so very much alike. The same objects, events and properties are salient for most of us; this shows in our behavior, behavior which is, in turn, salient for most of us. This double salience makes triangulation possible, thus providing the ground for objectivity and the appreciation of error. Indeed, it is triangulation that gives meaning to the concept of salience. (p 85-86)

In other words, we are similar when it comes to how we perceive certain features in the world, and that goes for behaviour as well. Often, however, we deal with topics concerning theoretical objects, concepts, theories and the like, or distant objects. But theories can also be described by reference to salient features (cf. Blakeley, 1966). So interpreting sentences that are theoretically complex or referring to things that are not in front of us follow the same principle.

I want to apply the principle of charity to theoretical sentences as well as to others: I consider it a count against a theory of interpretation that it makes aliens wrong (by my account) about anything. (Davidson, 2001a, p. 284)

The degree of indeterminacy will, according to Davidson, be less when the interpreter applies the principle of charity, although in the absence of physical objects or discussions concerning theoretical constructs, it relies largely on relations between beliefs.

However, in relation to the general assumption that features in the environment give perceptual evidence for having a specific belief, Davidson
distinguishes between a proximal theory and a distal theory (Davidson, 2004b, p. 334). We should remember that interpretation here means interpreting the learner’s utterances (idiolect) into our own language. The proximal theory takes two propositions (in different languages or the same, for that matter) to be synonymous when the same pattern of stimuli gives rise to a similar response. The distal theory, on the other hand, takes propositions to be synonymous because of the way meaning is connected to the conditions that make them inter-subjectively true or false. As in the proximal theory, it also depends on how we respond to perceived stimuli. The difference is that the stimulus response, in order to count as meaning, is correlated to another speaker’s responses emanating from the same source, a shared object. Not until a shared object can be detected can the triangle be formed. So, objectivity depends on an external world and triangulation (cf. Verheggen, 2007). Interpretation consequently acknowledges the view that language is social and that meaning is determined in social interaction. The distal theory, according to Tersman (2001), is:

...nothing but an application of Davidson's well known Principle of Charity. Indeed, the Principle of Charity and the distal view do not represent different strands in Davidson's philosophy. They are both manifestations of the same fundamentally externalist view on meaning. (p. 275)

An externalist theory of meaning takes language and thought to be anchored in the world by acknowledging how the world actually is organized. Meaning, in Davidson’s version, however, is socially determined by triangulation between at least two speakers and an object. However, this also works the other way around; that is, communication in terms of triangulation is constitutive for meaning but also for thinking. Learning a language and thinking develop together and it is in triangular situations that our thoughts also develop.

When looking at interpretation in terms of triangulation, we can sum it up as a particular view on the relation between inner phenomena and observable behaviour as linked to a shared world, and as such, meaning can be regarded as public. We gain knowledge about the learner’s knowledge through triangulation. Our ability to triangulate, on the other hand, relies on communication, which has also developed in triangular situations. For the researcher in the field of education, much interpreting concerns work with qualitative data in terms of transcribing interviews or paper and pencil tasks, which require a certain approach, or a kind of triangulation that accounts for the lack of direct communication. Starting out from a third-person perspective, we do not have the same opportunities to test our hypotheses as if we were in the actual interview situation. When analysing interviews, we may look at the
participants as they are triangulating more or less successfully\textsuperscript{18}. Looking from a third-person perspective, we are also triangulating, maybe in what can be called a second-order sense. We conduct our interpretations based on what we know about the learner, the situation and anything else that can help us make most sense to us. In principle, the general maxim is the same: ascribe coherence and assume correspondence and saliency.

### Three varieties of knowledge

Knowing what the other means by his or her words relies, according to Davidson (2001b) on different kinds of knowledge. He distinguishes between three kinds, or \textit{varieties of knowledge} (pp. 205-220), which are all in play simultaneously. They are decisive when making sense of what is going on in triangular situations, that is, the communication between the interlocutors and interpretation.

The first kind of knowledge is \textit{self-knowledge}, knowledge that we normally have direct access to, as when we know what we ourselves believe. A second form is \textit{inter-subjective knowledge}, meaning that it is possible to gain knowledge about other people’s beliefs, though always in an indirect way. The researcher has to infer the learner’s beliefs. Such inferences are bound to be based on our own frames of references. The third form is \textit{objective knowledge}: that is, states of affairs in the shared world are in principle accessible for other interpreters and they are public. The different forms of knowledge stand in a dependent relation to each other, Davidson puts it as: “The three sorts of knowledge form a tripod: if any leg were lost, no part would stand” (Davidson, 2001b, p. 220; cf. Rönnström, 2006, p. 133; cf. Roth, 2009; Wahlström, 2010). The application of the principle of charity rests on these three different forms of knowledge and is decisive in interpretation, defined as triangulation. Moreover, the implication is that knowing what we mean and think ourselves is dependent on what other people mean by their words. It is constitutive for meaning. But as we learn to speak at different times and in different situations, we may speak different idiolects. It is therefore also necessary to recall the starting point: that is, that interpretation takes the form of radical interpretation.

\textsuperscript{18} This is exemplified in paper III.
As mentioned above, empiricism and the accompanying verification theory explain meaning by taking a sentence to be meaningful if the truth value can be verified by observations. Ascribing meaning to observations, expressed in observation sentences, traditionally also relied on a view of language as atomistic (referred to above as the building-block theory of meaning). Davidson (2001d; 2001a, pp.183-198) argues that the problem with empiricism is the implied dualism between scheme and content, an idea that has attracted a good deal of attention in philosophy, particularly through Kant (cf. Baghramian, 1998a), and the corresponding idea of intermediaries, entities assumed to be working between language and what language is about (cf. Roth, 2009, who discusses this problem in an educational context). The scheme and content dualism leads to conceptual relativism, which according to Davidson (2001d, p. 286) is an intelligible idea. Davidson also argues that if knowledge is something unconceptualized (e.g. sense data), it cannot “…serve as a reason for an empirical belief, or for anything else, since the relation of a reason to what it supports is conceptual and so demands that the reason have a propositional content.” (p. 286).

Empiricism leaves out what many educational researchers are interested in, that is, the content of learners’ conceptions and beliefs (cf. Vosniadou, 2013). Nor does empiricism account for communication beyond coding models (cf. Rönnström, 2006). Rejecting empiricism and endorsing holism, on the other hand, puts a certain stress on the interpreter as it entails the problem of indeterminacy. However, holism provides the interpreter with contexts in which single utterances attain meaning.

Davidson (2001, a) disputes the idea proposed by researchers, arguing that language “…profoundly shapes world views and social relationships” (Resnick, et al 1991, p. 9; cf. Säljö & Wyndham, 2002, p. 30-31). Such a view, according to Davidson, relies on the above-mentioned distinction between scheme/content (Davidson, 2001a, 183-214). Conceptual schemes are identified as having a language and as such “a way of organizing experiences” (Davidson, 2001a, 184). Davidson argues that it is not possible to make sense of the idea of conceptual schemes.

The main problem that Davidson argues against is the implication that speakers of different languages may have very different views of the world. “Reality itself is relative to a scheme: what counts as real in one system may

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19 It has been argued, however, that Davidson argues against a particular kind of scheme, namely, “…the Quinian notion of conceptual schemes and its underlying Kantian scheme-content dualism” (Wang, 2009, p. 142).
not in another.”, hence inviting conceptual relativism (Davidson, 2001a, p. 183). According to Davidson, the idea of different conceptual schemes could only be made intelligible if it was not possible to translate the language into our own language. However, if we do not assume that it is possible to interpret a foreign speaker, we have no reason even to think that the speaker is saying something meaningful at all. Having a language implies assuming that he or she is fairly rational and coherent, as this is required in order to learn a language and to communicate with others in that particular language community. In other words, Davidson agrees with Wittgenstein (1953) that having a private language is not possible. We need other people in order to decide if we are using a particular language rule in the correct way. Conventions, he admits, play a role in everyday communication; they make it smoother, but they are not decisive for successful communication (cf. Ramberg, 1989, p. 101). All it takes is that the interpreter interprets the speaker in the way he or she intended to be understood. Interpretation from one language to another is possible because, as humans, we are similar enough and we respond in similar ways to aspects of the world. When we do not agree, we can calibrate, try to find out whether we use language differently or if we perceive the phenomena in an alternative way.

Shunning the scheme/content dualism, Davidson adopts a naturalistic account of knowledge (cf. Baghramian, 1998b). We stand in direct, unmediated contact with the world, and we do not need to rely on intermediaries, (or meaning entities referred to above) so we do not need to be sceptical about our possibility to have knowledge. Language and thinking develop simultaneously in interaction with other people and this is possible because we live in the same world, which we perceive in a similar enough fashion.

To sum up, Davidson, as outlined above, preserves empiricist ideals, in which objectivity relates to observable behaviour. It starts out from the idea of an extensional language, in which language relates to the world by way of triangulation, without the presumption of any intermediaries (Davidson, 2001a; cf. Roth, 2009). This relies on us being born into this world equipped with the ability to discern and respond to the same features in the world, hence that we are able to categorise in a similar sense. This preserves intersubjectivity but provides an alternative to situated perspectives by stressing an external reality, acknowledging that intentions and beliefs form important parts in the interpretation of learning processes. Hence such a stance also accounts for the subjective aspect of knowledge, recognised in rationalism, but without the problem of explaining knowledge transfer and how we can know what another person knows. Thus Davidson’s externalism and three varieties of knowledge may form the basis for a first formulation of a new stance for interpreting learning processes.
It is suggested that the epistemological holistic approach, the interrelationship with the three forms of knowledge, may constitute aspects of a stance that can account for holism, underdetermination and the complexity of intentionality. Moreover, I argued above that the application of the distinction between determinants for actions (cf. Halldén, 1999) as it stands does not seem to be able to provide an objective basis for choosing between interpretative theories. Davidson’s theories may serve as the basis for such deliberations because they explain how we can make the choices we do. Thus the interpretation of learning processes may start out from the assumption of a shared world and a so-called naturalistic view on interpretation.

Interpretations may be based on reflection on concepts which, according to Davidson, constitutes *a priori* assumptions in interpretation. These are assumptions we have to make when interpreting learning processes. These assumptions, I suggest, may also work as heuristics in interpretation. In what follows, and with regard to relevant aspects in the papers I take the core concepts of *triangulation*, *the principle of charity* (rationality, coherence) and *saliency* and use them to explain interpretations of learning in educational research. In the papers, we implicitly deal with the conditions/challenges described in terms of holism, complexity of intentionality and underdetermination; hence I will below draw attention to the way in which such conditions are addressed.
Summary of the papers and additional comments

It should be noted that I have framed the question about the validity of interpretation in the background in a sense which is not done in the papers. That is, holism, complexity of intentionality and underdetermination are not explicitly referred to in the papers (except in Paper IV). On the other hand, IA and the interpretations discussed in the papers aim at showing how to make valid interpretations.

Due to the time that has passed since the dates of publications of the papers, my understanding of Davidson’s theories has also undergone a change. I will make brief remarks with regard to particular conceptual change in the summaries below but leave an explication of the implication this may have for an interpretative stance based on Davidson’s theories to the concluding discussion. In short, Paper I is a theoretical paper mainly concerned with the first research question. It exemplifies how Davidson’s theories can form aspects of an ontological and epistemological stance, in order to form a basis for interpreting learning in educational research. Papers II-IV constitute empirical examples, answering mainly the second research question, showing how this particular stance can inform empirical research. In particular, they show how this stance informs empirical research by addressing conditions such as holism, the complexity of intentionality and underdetermination when interpreting learning.
The Contextuality of Knowledge: An Intentional Approach to Meaning-making and Conceptual Change

This paper is a chapter in a handbook on research on conceptual change. It is a theoretical paper which gives an outline of an intentional approach to conceptual change. It summarises conceptual change research and describes core assumptions and distinctions. It relates to the first question, which was to investigate how Davidson’s theories of knowledge and interpretation can constitute aspects of an ontological and epistemological stance, in order to form a basis for interpreting learning in educational research. In particular, we address the sociocultural critique that references to unobservable entities are dubious. We argue, with reference to Davidson, that making sense of learners’ utterances requires that we look at the learner as having a certain amount of coherent beliefs and that interpretation requires the application of the principle of charity. We introduce rationality as a prerequisite for interpretation, that the learner is rational in relation to the situation. Rationality here relies on a shared world, a world that we can be right or wrong about. This can be compared to earlier description of Intentional Analysis, stressing the need to apply a distinction between determinants for actions by distinguishing between two kinds of conceptions (cf. Halldén, 1999). The analytical distinction between determinants for action relies in this paper in an important way on the correspondence part of the principle of charity. This means an adjustment between coherence in learners’ meaning-making processes and what seem to stand out as salient features. Saliency is described as a relational phenomenon, contingent not only on the learner’s prior experiences but also on the situation at hand. (Saliency is further explicated in Paper III and IV). I regard it as a crucial ontological and epistemological aspect of a stance that can form a basis for interpreting learning in educational research.

We do not dwell on what saliency means with regard to epistemological and ontological assumptions or on further methodological implications that might follow. In other words, we do not explicitly refer to Davidson’s three varieties of knowledge, which I now regard as decisive if we are to make adequate sense of the principle of charity and salient features. Reference to salient features means that learners’ and researchers’ actions are causally related to a shared world by triangulation, but without the assumption of a one-to-one correspondence. It implies a kind of externalism, which I found crucial at the time but did not fully appreciate or understand its implications. I now take it as an important part of an epistemological stance, which also serves as a basis not only for explaining interpretation but also by accounting for
mental/intentional terms. This is a point that will be further explained in the concluding discussion.

II

Cognitive conflict. Actions taken in the process of conceptual change

The aim of this paper is to present evidence for the importance of the restructuring and reorganisation of beliefs already embraced by the children. The paper reports on a longitudinal study of 37 interviews with children 3.5 to 6 years old who were videotaped-interviewed every year for three years about their conceptions of the earth. The paper relates to research on conceptual change and in specific cognitive conflicts. It addresses the second research question, which was how a stance based on Davidson can inform empirical research by addressing conditions or challenges such as holism, underdetermination and the complexity of intentionality when interpreting learning processes

We take as our starting point Davidson’s theory of radical interpretation (Davidson, 2001a). Children’s utterances are therefore interpreted with a focus on ascribing coherence, that is, (the principle of coherence, one aspect of the principle of charity discussed by Davidson). The assumption of coherence as a condition for interpretation should not be confused with coherence in relation to children’s solving inconsistencies that they encounter in the interview. That is, empirically, we were concerned with how children were dealing with incoherencies within a conceptual structure; hence we looked at different ways by which coherence could be maintained by children.

We point to the somewhat trivial fact that the interviewer has to interpret the learner already in the interview situation (Davidson, 2001a, pp. 125), a proposition that we do not discuss. The reader may draw the conclusion that the radical aspect only applies to the interview situation, which, following Davidson (ibid), it does not; it is an aspect of interpretation overall. Coherence is regarded as a prerequisite, and a heuristic in the actual analysis, in the sense

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20 As stated above, in the paper we do not explicitly deal with the challenges as they have been outlined in the background of this thesis. The aim of Intentional Analysis, on the other hand, is, by way of the distinction task and problem and between determinants of action, to interpret action that captures what the learner aims to communicate. As such, IA implicitly tries to account for the conditions in question.
that we tried out our interpretation on the assumption that the child was correct from some perspective.

The children had to make meaning of various kinds of information about the earth, actualised during the interview and described in the form of a dialogue in which the researcher asks questions with the help of artefacts.

We do not discuss the problems or challenges deriving from holism, such as how to break into the circle of aims and beliefs when we have neither meaning nor beliefs. The analysis accounts for holism by stressing that ostension (that is, references to salient features in the shared view) is crucial in the triangulation in which the interviewer carefully attends to the children’s assent or dissent to the proposed interpretations. That the interviews were videotaped was therefore an important source of information. Although coherence is the heuristic that is, the focus of this study, this implies, tacitly but not explicitly, the other aspect of the principle of charity, that is, correspondence and assumptions about salient features.

In line with holism, we argued that for utterances to be understood, they have to be put in a context. Utterances then often made sense when interpreted as being related to two different contexts: an astronomical context and a terrestrial context. In particular, the paper provides a detailed discussion of the way we have analysed utterances. This is exemplified with an excerpt from an interview with a four-year-old girl. We show how her utterances makes sense when interpreted as relating information from two different contexts, an astronomical one and a nearby terrestrial one. We argue that she gave a coherent description of two places: the earth up in space and the nearby surroundings down here. These two places had several features in common and she is trying out the relationships between the earth in space (astronomical context) and the nearby surroundings (terrestrial context).

In practice, the analysis also conforms to a holistic approach in the sense that individual interviews were interpreted against the rest of the data material: first, by relating single utterances to what is said in the individual interview; second, related to interviews with other children; and third, according to development at an individual level, that is, with an eye on the total series of interviews that each child has participated in, as well as development at a group level. Thus we were able to see how a specific interpretation fits in with what has previously been established and what happens later.
Conceptions and contexts. On the interpretation of interview and observational data

The aim of this paper is to discuss the possibility of combining sociocultural and cognitive research in the study of conceptual change. It is concluded that Intentional Analysis may work as a meeting point for the different research traditions, but they cannot be combined in a deeper sense due to different ontological commitments. In the paper, excerpts published earlier by Andrea diSessa and Bruce Sherin (1998) are reinterpreted. The original interpretation starts out from a theory of perception. Learners’ alternative knowledge is regarded as fragmented, and learning has to do with “shifting the means of seeing” (p.1117). The reinterpretation is based on Halldén (1999) and his discussion of how to analyse actions based on von Wright’s (e.g. 1971, 1979), and Davidson’s (2001a) theory of meaning and interpretation.

With reference to Davidson, we argue that it is possible to attain knowledge about learners’ conceptions, and that coherent beliefs are necessary in interpretation, rather than problematic. We also refer to triangulation as important for meaning. Thus it addresses the first research question by being an example of how Davidson’s theories can form aspects of an ontological and epistemological stance, forming a basis for interpreting learning in educational research.

It also addresses the second research question by serving as an empirical example of how a stance based on Davidson’s theories may inform research.

21 Intentional Analysis is described as taking knowledge to reside within the individual learner (see p. 38). However, although it is a question beyond the aim of this thesis, I regard this, the question of ontology, to be in need of further investigation, so I will briefly raise the issue in the final discussion, in relation to Davidson’s idea of “Three varieties of knowledge” (Davidson, 2001b, 205-220).

22 The other two authors conducted the actual reinterpretations. This requires subject knowledge about physics, which I do not have. The reinterpretation, however, is based on Davidson, and can as such be applied to any subject area. It should also be mentioned that a rather long time has passed since the publication of this paper. My interpretation of Davidson’s philosophy has therefore progressed towards a broader utilisation of the principle of charity and triangulation, eventually leading up to including part of his theory of knowledge. We may say, that the parts are there (in the paper), but my reading and understanding has developed, giving rise to the particular questions asked in this thesis.
on learning processes. We show in detail how the formulation of teleological explanations can relate utterances to the situation, by stressing that there are features salient to the learner. In particular, two excerpts are analysed in which a physics student called J is interviewed about gravity and balancing forces. We show in the first case that the original interpretation fails to see what she means by her words and what distinctions she actually makes. So the reinterpretation identifies a difference between the interviewer’s and J’s word use rather than a difference in the respective conceptualizations.

The second case is about forces and a book being pushed along the surface of a desk. The original interpretation by diSessa & Sherrin (1998) shows J to be unable to identify acting and reacting forces in a coherent manner. The reinterpretation rather proposes the interpretation that she does not contextualise the experiment in the intended way. The conclusion in the original interpretation, about her inabilities, is not conclusively determined by the data presented. In other words, all interpretations are underdetermined by the evidence.

The reinterpretation rationalises her actions by a detailed analysis of her reasoning. It implies reference to her conceptions of the situation. The analytical distinction between determinants for action accounts for that. The second premise in the logical connection argument is therefore also divided into two, in which her conceptions of the situation are formulated. However, this concerns J’s conceptions, that is, something which we do not have direct access to. They are inferred. We argue in the paper, however, that J’s contributions in the interview, what she is focusing on in the conversation, and how she talks about balancing forces is correct, relevant and rational. This is based on the assumption that she perceives other salient features in the experiment than the interviewer. More specifically, coherence in beliefs assigned to the interviewee can be seen not to rely solely on coherence between aims and beliefs. It accounts for conceptions about the situation (implied in the formulation of a logical connective argument). The reinterpretation, by its reference to saliency, can be understood to make a stronger claim. The principle of correspondence accounts for saliency, something that is intersubjectively available in a shared world. In my present reading, intersubjectivity presupposes objectivity, that there is a matter of case to agree or disagree about, referred to above as externalism (cf. Davidson, 2001c). Davidsons tree varieties of knowledge (Davidson, 2001b, pp. 205-220), is hence crucial but not acknowledged at the time.
Making meaning of historical evidence. The variety of salient features in a shared activity

The aim of the present study is to investigate learning processes in terms of students’ organisation of different kinds of historical evidence, the kind of history students relate to and how this can be methodologically accounted for when interpreting qualitative data. Fifty-five twelve-year-old students visited a history museum, the Vasa Museum in Stockholm, in order to learn about the 17th century in Sweden. The tour, which took about 40 minutes, presented both “the small story” (the everyday life of ordinary people at the time) and political and structural circumstances, that is, “the big story” (Öhman, 1990; cf. Björk, 1983), related to the shipwreck that took place off Stockholm harbour in 1628. Back in school, students were given a written assignment.

This paper addresses the second research question by serving as an empirical example of how a stance based on Davidson’s theories may inform research on learning processes. The focus is on individual learners’ meaning-making by way of Intentional Analysis (Halldén, 1999; Halldén, Haglund & Strömhall, 2007; Halldén, Scheja & Haglund, 2013). In order to make valid interpretations, that is, interpretations that capture the learners’ intended meaning, the interpretation starts out from theories of meaning and knowledge outlined by Davidson (e.g., 2001b) specifically by applying the principle of charity, with a focus on the correspondence aspect of the principle in question (e.g., 2001b, p. 211). Interpretations of the data therefore rely on the presumption that some features are salient, they make the figure stand out against a more diffuse background (cf. Wertheimer 1923; Merleau-Ponty 1945/1962). So students’ interpretations of the visit to the museum as well as their organisation of the information are considered to depend on what seemed salient for them at the museum, and, correspondingly, what features seemed salient for the interpreters (the author and one more person) when reading the students’ essays.

The study showed that the students organised the information mainly in three different genres.

1. An ethnographic genre consisted of detailed descriptions of life at the time and the construction of the Vasa ship.
2. An ethnographic genre, which also contains references to human action.
3. A genre similar to historical explanation, in which human action is
explained with reference to political circumstances by combining “the small story” with “the big story”.

These genres are derived from the students’ essays and what stood out as salient in their writing. Understanding this in terms of genres was made possible by assumptions about what stands out, what is salient, in the three different genres (cf. Blakeley, 1966). One conclusion to be drawn from the study is that there is quite a variety in what appears to be salient for the individual learner. The Vasa ship, however, is salient for most students, drawing attention to details directly related to the ship and the shipwreck, hence less to political and structural conditions. It is suggested that interpretations of learning history may gain from the researcher’s or the teacher’s readiness to look for what it is that constitutes the foreground for the learner, that is, what is salient, acknowledging that there can be quite a difference between students, even though they have participated in the same activity.
Concluding discussion

To sum up, the aim of this thesis is to discuss the interpretation of learning in educational research and also in the light of the philosopher Donald Davidson’s theories of knowledge and interpretation. The different epistemological perspectives referred to above, empiricism, rationalism and situated perspectives, have pointed out important aspects that have informed empirical educational research on learning. I argued that each perspective alone does not provide a basis for interpreting learning if we demand that it has to account for the complexity in learning processes and interpretations of the same. In this final discussion, I will therefore start with a reminder of how the different conditions or challenges (holism, the complexity of intentionality and underdetermination) hit behaviouristic, constructivist, socioculturalist and IA research, suggesting my interpretations of Davidson’s theories as candidates for managing the challenges in question. Davidson’s theories may form aspects of an ontological and epistemological stance that can provide a basis for interpreting learning in educational research. That is, a stance that tries to overcome the reductionism that follows when starting out from empiricism or rationalism or situated perspectives. I next present a first rough outline of a stance referred to as Epistemic holism. This constitutes a brief sketch of an interpretative stance of learning in educational research that has the potentiality to be developed as an alternative to the above-mentioned perspectives. As such, it may work as a subject for further investigation.

I will then discuss how such a stance may inform empirical research on interpretations of learning by recalling how the challenges or so-called conditions for interpreting learning (holism, the complexity of intentionality and underdetermination) have been addressed implicitly in the papers. I will further examine to what extent such research strategies diverge from behaviourism, constructivism and socioculturalism. Thus I make a corresponding first sketch of a holistic approach to the interpretation of learning. I refer to this approach as Interpretative holism.

After a critical note concerning the limits of charity, I will, in the last section entitled, In the light of Epistemic holism, discuss the third research question,
which was in what way such a stance provides an alternative to earlier perspectives with regard to epistemical and ontological assumptions as well as specific research strategies. I suggest that questions which have previously ruled the debate, that is, the question concerning the location of knowledge and the corresponding question about the epistemical and ontological status of the learning situation and beliefs, could benefit from being reformulated.

Accounting for the challenges – Davidson at work

At the outset of my thesis, I stated that interpretations of learning processes face various challenges: holism, the complexity of intentionality and underdetermination. Behaviourism need not worry about the complexity of intentionality as the aim is not to investigate that particular domain in question. Confirmation holism and underdetermination, on the other hand, appear to be on the table (cf. Quine, 1951). The problem was that an experiment involves several theories that are in play at the same time. As it may be hard to decide which part of a theory or auxiliary hypothesis is on a par, or not, with the observation, behaviourists face the possibility of several different relationships that equally well explain the observed behaviour. I propose that by turning to Davidson and his version of the principle of charity, we can reduce the number of possible explanations of the observed behaviour, hence avoiding scepticism. Like the behaviourist, the particular situation in which the learner is acting is of particular relevance. The principle of charity tells us to interpret so that the learner becomes as intelligible as possible, given the particular situation. Although we cannot assume that the learner uses words in a conventional way, language, according to my interpretation of Davidson, relates to an external reality, that is, it is extensional. But when the logical positivists failed in their extensional language project, Davidson explained the relation between language and reality (Martin, 1994). Rather than trying to develop more sophisticated coding models, he provided the missing social element in language and by way of triangulation connected language and beliefs to a shared world. Language is, in another word, public. The empiricists, who were striving for objectivity, ended up in scepticism, and solipsism, while I find in Davidson’s discussions about knowledge a theory that appears to have the potentiality to form a stance for interpreting learning processes. The kind of externalism implicitly referred to above preserves objectivity without losing subjectivity (Davidson, 2001b, pp. 205-220; Wahlström, 2016). Thus the psychological dimension of learning, stressed by constructivists (cf. Vosniadou, 2013), can be accounted for when interpreting learning processes. The constructivists appear to lack strategies to maintain the validity of interpretations and we can recall the devastating criticism of the
clinical method (Schoultz et al., 2001; cf. Halldén et al., 2007). Reference to independent judges who score equally relies on the assumption that language mirrors beliefs, and holism and underdetermination do not makes it easier. So, being concerned with interpretations of learning that can also account for subjective understanding of tasks, Davidson’s view may be a relevant alternative. Interpretation is based on the assumption that learners have beliefs and that we must assume that we agree about quite a lot in order to see where we differ in beliefs, or maybe in language use.

Sociocultural research accounts for intersubjectivity and rejects reference to mental concepts, with the argument that they are unobservable and ontologically dubious (e.g., Schoultz et al., 2001). Nevertheless, underdetermination poses an equal threat, raising question concerning interpretations and choices between interpretative theories. We may argue that the claim is only to present a perspective, and that there are other interpretations and perspectives (or units of analysis) that may have equal explanatory value. If research can be argued to truly represent situations in, for instance, schools, is it then not easier to make a strong argument for the need of change? And with regard to beliefs, which have been a main target for socioculturalists (Schoultz et al., 2001), they may very well come into view, for instance when we assent or dissent to proposed interpretations in triangular situations (cf. Wahlström, 2010).

I have also discussed the possibility to combine or merge the different approaches, but concluded that, due to their different epistemological and ontological assumptions, a merger was out of reach (cf. Säljö, 2009). On the other hand, Intentional Analysis was presented as a “meeting point”, insofar as it accounts for situational aspects and individual cognition (Halldén et al., 2007). Understanding the learner’s interpretation of a task, to formulate intentional explanations, requires dealing with not only with holism and underdetermination but also the complexity of intentionality (Downes, 1998). We can recall that IA provides the interpreter with a distinction between determinants for actions (Halldén, 1999). The application of this distinction relies on intersubjectivity, and the interpreters can calibrate their different interpretations in discussions (e.g. Murstedt et al., 2015). I stressed that although the situation, that is, how the learner has conceptualised the situation, plays a decisive role, the interpreter, in earlier formulations of IA, lacks an objective ground to refer to when deciding on one or the other interpretation. Davidson explains how such calibrations are possible. We are born into a society equipped with the ability to discern salient features in the environment, including human responses, and to categorise in a similar way as those from whom we learn to speak. The interpreters have therefore the ability to direct their attention to different aspects in the situation, choosing the interpretation that fits best, given the specific situation and anything else we know about the
particular learner and situation (cf. Joseph, 2004). This was shown in paper III. Reference to salient feature is therefore crucial, and as a concept for reflecting on interpretation, it may constitute part of a research strategy (cf. paper IV). I therefore regard Davidson’s naturalistic approach to knowledge as the missing piece that provides an analysis of learning processes on an objective ground as well.

To sum up, knowledge, according to Davidson, involves objectivity, subjectivity and intersubjectivity; not reducible to one or two kinds. I therefore regard Davidson’s theories as particularly relevant candidates for a stance that aims to form the basis for interpreting learning, since it accounts for holism, the complexity of intentionality and underdetermination. It preserves the inside aspects of learning, but also sociocultural and relational aspects, without losing contact with an external reality.

Towards Epistemic holism

The kind of stance which I suggest as an object for further discussion, Epistemic holism, has the potentiality to preserves empiricist ideals, in which objectivity relates to observable behaviour, but, as stressed above, without relying on a correspondence theory recognised in logical positivism. Language relates to the world in a natural way by means of triangulation, without the presumptions of any intermediaries (Davidson, 2001a; cf. Roth, 2009). It is a naturalistic approach to knowledge, meaning and interpretation (cf. Bahagramini 1998a; Rönnström, 2006). It relies on us being born into this world equipped with the ability to discern and respond to the same features in the world, hence that we are able to categorise in a similar way. Davidson’s holistic approach to knowledge takes beliefs and language to be structurally related to a shared world. Language and beliefs cannot accordingly be separated from the world.

In contrast to rationalism and learning theories such as constructivism, which locate knowledge in the mind of the learners, Davidson does not face the problem of how it is possible to know what the learner knows. His view on knowledge, the interplay with the “three varieties of knowledge” and triangulation, solves the problem in question (Davidson, 2001b, pp. 205-220; cf. Rönnström, 2006; Wahlström, 2011). Learners’ beliefs may actually be observable, or the potentiality is there in triangular situations. In other
words, we do not need to give up the first-person perspective which rationalism implies: that we seem to know what we ourselves believe and that we have direct access to our beliefs in a way that other people do not have (cf. Davidson, 2001b, pp. 205-220).

In contrast to knowledge from situated perspectives (e.g., Lave, 1988; Rogoff, 2003), which takes knowledge as essentially intersubjective, Epistemic holism preserves a notion of objectivity, thus shunning relativism as well as the scepticism that might follow. Knowledge, from situated perspectives, is regarded as being situated within certain practices or culture (e.g., Säljö, 2009). We can also recall the view on language as a mediator, constitutive for our thinking. It may even imply, or support the already mentioned Sapir–Whorf hypothesis, that our knowledge might differ to the extent that we can be said to live in different worlds. If language sets a limit on what we can observe, it also seems hard to explain how a learner will ever be able to use terms like the expert. And when all that is important to learning is reduced to discourses, rules and conventions, we not only lose the subjective aspect, how individuals engage in their learning processes, but it also seems as if the very interaction with a shared world is kept out. This leaves us with quite a sceptical view of the possibility to interpret speakers of a foreign language. Davidson (2001a, pp. 183-198), on the other hand, has argued against the possibility of the existence of language or idiolect that it is not possible to translate.

Although situated perspectives may account for communication and the social natures of language, it may therefore be on the risks of being caught in language. It appears to me that a stance that allows for reference to an external world, give room for the possibility to make a stronger case, by arguing how the world actually is organised rather than referring to discourses. It might be of particular value when it comes to various kinds of social injustice. Communication according to Davidson is rather the source of objectivity, and communication is possible due to our interaction in a shared world. Meaning and evidence is public by way of people communicating about objects and events in the world. In such interaction, we will sometimes experience that we are wrong, and we are also able to realise that this is due to an objective fact. A holistic stance, in other words accounts for objectivity, as required by empiricists, in which stimulus play a decisive role but in the sense, I referred to above as the “distal view”. Meaning and evidence according the distal view, in comparison to Quines approximate view, require a social element, that two or more individual directing their attention to the same object (Davidson, 2004b, p. 334). A distal view thus requires the

23 It should be noted that some situated perspectives claim a reformulation of the concept of objectivity, arguing that standpoint theory implies “strong objectivity” (e.g. Harding, 1993).
interrelation between subjectivity, intersubjectivity and objectivity, that is, “three varieties of knowledge” (Davidson, 2001b, p. 205). It handles radical interpretation and thus provides a stance for an interpretative approach that has the potentiality of interpreting people that speaks very different languages than ourselves; hence provide a base for intercultural learning (cf. Rönnström, 2011).

So far I have tried to show how Davidson’s holistic approach to knowledge and meaning, as outlined above, can form aspects of an ontological and epistemological stance, which has the potentiality to deal with conditions such as holism, underdetermination and the complexity of intentionality. In what follows I will discuss how such so called Epistemic holism, may inform empirical research on interpretations of learning by recalling how the conditions in question (implicitly) has been accounted for in the papers. I will do that with recalling ‘triangulation’ ‘the principle of charity’ and ‘salient features’, stressing that they have the potentiality to work, not only as part of a theory with epistemic status, but also in terms of research strategies. I will hence make a correspondingly first sketch on an interpretative approach, by highlighting how such stance differs from constructivist and sociocultural perspectives.

Interpretative holism

Based on my discussion on interpretation of learning theories and the critic that has been formulated to behaviourism, constructivism and socioculturalism I took a departure in Intentional Analysis since it has been developed in order to account for sociocultural aspects imposing on learning situations as well as individual cognition (Halldén, 1999; von Wright, e.g., 1971). However, intentional explanations in terms of the so-called, logical connection argument concern the relations between the premises in the practical syllogism (Stoutland, 1986). In addition, although we may formulate a logically accurate practical syllogism, it may not be in accordance with empirical fact, that is, what the learner actually intends to communicate. The premises may very well be false. Davidson (2001a) also has an explanatory pattern similar to that of the practical syllogism, which is based on what he refers to as two kinds of coherencies. The action to be explained must be reasonable in the light of the assigned desires and beliefs and also in the sense that the particular desires and beliefs fit one another (Davidson, 2001a, p.
So the distinction between determinants of actions, basic in IA, constitutes a crucial heuristic, aimed at accounting for individual cognition and sociocultural aspects involved in interpretation of learning (Halldén, 1999). Davidson’s theories, on the other hand, may serve as the basis for such deliberations; they explain how we can make the choices.

I have argued that when the aim is to capture the complexity of conditions involved in learning processes, the interpreter meets challenges, conditions that need to be accounted for in order to make valid interpretations. These conditions are mainly holism, the complexity of intentionality and underdetermination. Below, I will discuss how an interpretative holism can deal with the challenges in question by citing examples from the papers. This means that I also will compare this stance to the perspectives (behaviourism, constructivism and socioculturalism) described above.

**Radical interpretation and triangulation**

A conclusion to be drawn from this thesis is that it is reasonable to require of any interpretation that aims to gain knowledge about a learner’s knowledge or conceptions of a phenomenon, that the researcher understands the learner’s language. If our interpretation fails to make sense of a learner’s utterances, that is, if it does not rationalise the perspective of the learner in such a way that it appears reasonable, we should worry that we have not adequately understood the language of the learner. The studies presented in Papers II and IV and the reanalysis in Paper III give evidence of the need to account for the learner’s idiosyncratic language use and contextualization, not assuming it to be the same as the interviewer’s / researcher’s.

Radical interpretation requires triangulation. Triangulation has been discussed in this thesis in different senses. In one sense, triangulation is constitutive for meaning and thus the very ground on which communication relies, hence our ability to think and interact. Triangulation has also been described as a practice. A basic form of triangulation was exemplified in Paper II in relation to the argument that interpretation starts already in the interview. The interviews were videotaped, thereby obtaining a valuable source of information in which ostension plays a crucial role. We argued, with reference to Davidson (2001a), that the use of artefacts was crucial in deciding on the meaning of the child’s utterances. The interviewer could use the artefacts by pointing to certain features so that the child could assent or dissent with the specific use of words. Methodologically speaking, observations of the child’s behaviour were therefore regarded as crucial in the interpretation of utterances. We understand the meaning of the utterances because we can
observe actions and responses to proposed interpretations in relation to some shared point of reference. This description may give rise to the idea that words can be interpreted one by one, thus resting on a view similar to the old empiricist building-block theory of language. As we know by now, but which might need to be stressed, when Davidson (e.g., 2001b, p. 211) speaks of correspondence between beliefs and aspects of the world, it is not a one-to-one relationship that can be associated with empiricists such as Locke, or what can be found in contemporary “semantic atomists” such as Jerry Fodor (cf. Joseph, 2004, p. 78). Radical interpretation rather addresses holism and the fact that intentions are multilayered (Downes, 1998). According to a holistic approach to interpretation, meaning and belief are interrelated in the sense that if we know what the learner’s beliefs are, we also get at the meaning. The only way is to take beliefs as the basis, assuming that most of them are very much in line with what we ourselves believe, assuming that there is a correlation between our beliefs and what beliefs are about. We investigate how the learner relates to the environment, such as artefacts used in an interview or historical objects in a museum, as presented in Paper IV (cf. Davidson, 2001a, p.137). In this way we preserve the observability criteria that we may associate with behaviourism.

The interpreter therefore starts with beliefs, keeping them constant as far as possible, as we then have a way into the particular idiolect in question (Davidson, 2001a, p. 196; cf. Klaassen & Lijnse, 1996). Thus triangulation in the interview, as described in Paper II, is an example of taking perceptual beliefs as the starting point from which further beliefs and intentions can be inferred. The learner’s actions and responses to features in the shared environment work as a bridge into a more all-embracing view of a matter. It should, however, also be remembered that Davidson does not give priority to perceptual sentences. They need to be evaluated together with an overall assumption of coherence and rationality (cf. Joseph, 2004). This preserves assumption about the learner that we may associate with rationalism and cognitive constructivism, that learners may understand tasks differently.

Triangulation situates interpretations, but in contrast to sociocultural research, however, without assuming predetermined meanings or conventions, or that a learner follows norms for language use. Interpretation cannot rely on conventions or that learners follow linguistics norms, which would be to assume what we want to explain. On the other hand, as we argued with regard to the interpretation of the children presented in Paper II, we have to assume that the child is right from some perspective and that quite a number of the utterances cohere with some socially shared norm for action. Reference to socially shared norms and conventions, what can be referred to as social coherence, works as a resource from which interpretation of the individual is possible in the first place. This kind of social coherence occurs not only in
discourses; it relates to an external world shared by the interlocutors, in the sense that it forms a background for a shared understanding against which deviation from it can be discerned. The analysis in Paper II, for instance, showed that many children share the experience of long-distance travels with their parents. Children also share their everyday life at preschool, where a natural convergence in language use takes place. Such experience is inextricably linked with language use and language learning (cf. Davidson, 2001a, p. 136). That children adhere (to some degree) to linguistic conventions makes interpretation easier, but it cannot be assumed in general.

There is an obvious difference between the triangulation that takes place in an interview and interpretation from a third-person perspective. There, it is not possible to deal with the complexity of intentionality and underdetermination by proposing interpretations to which the learner can respond by assent or dissent. Neither can we ask questions for clarification. It is rather a kind of second-order triangulation. Underdetermination in such cases implies a greater risk of misunderstanding and misinterpretation of the learner. On the other hand, it relies on the same basic principles summed up under the principle of charity, which is assumed to lessen the effect of underdetermination (Davidson, 2001a, p. 228; but cf. Baghramian, 1998a). I will therefore now turn to the principle of charity; by citing examples from Paper III and IV, I will discuss how the principle of charity, together with reflection on salient features, may work as a heuristic. The principle of charity has, in other words, a double function. It works both as an a priori basis for interpretation and as a guiding device which constrains the possible interpretation. That is, we should not interpret the learners as having strange beliefs that do not make sense. I will argue that these examples show how an analysis can be related to features in the situation, and that without an explanation of how aims and beliefs relate to what is taking place in the situation, we tend to lose contact with the external world.

**The principle of charity and salient features**

We can recall that underdetermination implies that there can be radically different interpretations of a learner’s utterance that fit the same observed behaviour. This may be summed up as indeterminacy of interpretation, which means that when all evidence is in, there are no empirical reasons for preferring one interpretative theory to another. The evidence at hand, at the time, is insufficient to work on as a basis for deciding on a specific
interpretation (cf. Stanford, 2016). That would be a case in which we lack empirical grounds for deciding whether a learner uses idiosyncratic language or has beliefs that deviate from our own (Davidson, 2001b, p. 80).

On reflection, we may wonder whether the reinterpretation in Paper III and the original interpretation (diSessa & Sherin, 1998) are examples of when two theories, the original interpretation and the reinterpretation, fit equally well with the empirical evidence. Both explain the data, but the interpretations appear to be contradictory. The original states that the interviewee is unable to solve the problem under investigation, while the reinterpretation says that she is correct from her point of view. In the reinterpretation, the focus was on how situational aspects shaped the learner’s contributions to the dialogue24. So, rather than bracketing the interviewer’s actions, a holistic approach accounts for interaction. The reanalysis may therefore be looked upon as an example of when the question of what constitutes evidence, what counts as data, is at the fore. The reinterpretation makes reference to aspects in the situation which are of relevance for understanding the interviewee. That is, reference to external circumstances in terms of saliency is then crucial. Saliency was also decisive in the explanation of the second case, in which it was argued that the interviewer and the interviewee were not talking about the same thing. They were discussing balancing forces, but they were focusing on different aspects in the experiment.

The analysis conducted in the empirical papers rests on an (implicit) distinction between the “meaning relation” and a “perceptual relation” (cf. Rönnström, 2006, p. 246). Recall the second case in Paper III, in which a book is pushed by the interviewer over a table. Both relations apply to the book, the finger, paper and movement. The book, for instance, has a certain meaning, as we can take it to be a medium in which information, stories and the like are presented to a potential reader; but it is also a physical object possible to distinguish from other objects through perception. The point is that there are apparently things going on which are perceived by the interviewee. The conversation is concerned with questions about objects that are manipulated, such as a book being pushed over a table. The interviewee obviously responds to the experiment, though not in the expected way. She does not assign the same meaning to certain aspects in the experiment as the interviewer. The

24 At the time of the publication of the paper, we were mainly concerned with the sociocultural critique of constructivist research and the shortcomings of the clinical method. The task was to discuss whether a bridging between the different traditions is possible. The reinterpretations aimed to show the need to account for sociocultural aspects in an analysis, but with reference to Davidson 1984, also to argue that “contrary to sociocultural positions, [that] such conceptions [beliefs, conceptions etcetera] must be taken into account to understand what an individual is doing in a specific situation” (Halldén et al., 2007, p. 26).
same goes for the study reported in Paper IV. The museum is loaded with physical objects which can be perceived but nevertheless be given quite different meanings. A perceptual relation, however, give room for new meanings, making learning possible.

We explicitly argue in Paper I that the task for the researcher is “…an adjustment between what seem to stand out as salient features for individuals, and the coherence in their meaning-making processes”. (Halldén et al., 2013, p. 83, emphasis added). So the application of the distinction between resources for actions is conditional on the ability to see the same salient feature as the learner. In practice, this means making use of the principle of coherence and corresponding (which together constitute the principle of charity, although the papers focuses on one at a time).

The need to base interpretations on the possibility to refer to salient features, and the distinction between meaning relation and a perceptual relation might be clearer when reflecting again on the examples in relation to learning. If we take the interview in Paper III, we can imagine that the interviewer and the interviewee, by coordinating their respective perceptions and by communicating, could eventually have reached agreement on how to talk about balancing forces in different senses, depending on what they were focusing on (cf. Klaassen & Lijnse, 1996). We may call such activities an adjustment of our prior theories and the ability to formulate passing theories. The same goes for the students’ essays (Paper IV). This holds also for the “symbolic world”, although it may require more effort, the more abstract a concept is. Thus Interpretative holism means that we can distinguish between, hence reflect on, three kinds of coherences: (i) coherence in beliefs, (ii) coherence between aims and beliefs and (iii) coherence between aims, beliefs and salient features in the shared world. (In other words, what is summed up under the principle of charity.) These are to be compared with the two kind of coherence implied in intentional explanation as described in IA above, referred to as individual and social coherence.

In Paper II we focused on the principle of coherence and in Papers III and IV mainly on the principle of correspondence. In practice, it is the interaction between the two aspects of the principle of charity that helps us to formulate valid intentional explanations. There are, however, no detailed rules how actually to set about this business. Interpreting learning rather may conform to a naturalistic view on interpretation similar to the way Rönnström (2006) formulated a theory of communication in educational contexts, a “Communicative naturalism”, based on Davidson’s theory of meaning. Thus we may make use of everything we have in order to make most sense of the learner (Joseph, 2004).
Nevertheless, there is, needless to say, much more to develop. The need to reflect on the limitations of the principle of charity is one such issue. This has also been put forward in a discussion within the philosophy of psychology. Before making some final reflections on Intentional Analysis in the light of Epistemic holism, I will briefly report the main arguments.

The limits of charity

The communication that takes place in triangulation requires that the interlocutors have beliefs about the other, that there is joint attention. Each of them assumes that the other person is trying to communicate something meaningful, and that it is possible to be wrong. The principle of charity, in other words, also implies certain abilities on the part of the learner. These are that the learner has certain beliefs about the interviewer, researcher or teacher, and his actions. The learner must be able to infer the interviewer’s intentions and assume that the interviewer is directing his attention towards the same object as the learner. It can, however, be questioned if it is reasonable to assume such abilities in children as young as 3.5 years (cf. Paper II). Is that not to presume too much rationality?

Researchers in the philosophy of psychology (e.g. Andrews, 2002; Andrews & Radenovic, 2006; Bouma, 2006) have discussed the above-described requirement of “joint attention”. Children from about four years of age may have a notion of other people’s minds and conceptions and that beliefs can be mistaken (Andrews, 2002). There is, in other words, empirical evidence that questions children’s abilities. The meaning of the child’s utterances may be more in the head of the interviewer than part of the intention of the child. Andrews (2002) argues that the principle of charity has been empirically refuted because high-functioning autistic children do not meet the requirement of being able to attend to a shared point; they lack a theory of other minds even though they are competent speakers (Andrews, 2002). Bouma (2006), on the other hand, showed by means of an excerpt from a dialogue with a high-functioning autistic boy that, according to his responses, he must have some sense of other people’s minds. Having a theory of mind might then be a matter of degree. And an empirical question is: To what degree does a specific child understand the interviewer’s actions and intentions? This raises the need to reflect on the limits of charity in the actual interpretations of learning.

The status of the principle of charity is by no means clear within the philosophical context (cf. Glüer, 2006). But, if given a priori status, as has been done here, it is not open for empirical refutation. It constitutes the very prerequisite for interpretation. With regard to the validity of interpretations,
we can at the most take them to be valid insofar as they can be regarded as the product of an inference of the best explanation (Harman, 1965).

In what follows, I will again raise epistemological and ontological issues and draw attention to the need to reformulate core questions that were raised in research on learning in the 90s. I will also draw attention to some possible implications this may have for the kind of interpretative stance that I suggest be the subject of further development. This means repeating much of what has been said above, particularly in the section on Epistemic holism, so it forms a sort of summary of the stance in question. However, here I will also briefly touch on what I conceptualise as a development, or maybe a radical change, in Intentional Analysis when examining how it has been outlined in earlier research (e.g. Halldén, 1999). As such, it is regarded as a subject for further discussions. I will suggest that the questions concerning the location of knowledge are in need of reformulation, as well as the ontological status of beliefs. Rather than thinking of beliefs as ontologically dubious, the question might be how we should organise a situation in such a way that the learner’s beliefs come into view.

In the light of Epistemic holism

A holistic approach to interpretation rests heavily on the assumption of a shared world, requiring interrelation between three varieties of knowledge (Davidson, 2001b; cf. Rönström, 2006; Roth, 2009; Wahlström, 2010, 2016). It can be compared with a core assumption within constructivism that learners may perceive a situation radically differently (cf. Driver & Easley, 1998; Smith, 1995). It raised the question of the ontological status of a situation and knowledge transfer. A sociocultural perspective may take the situation as intersubjectively accessible, discursive, and “…language is a social phenomenon where meaning and sense are determined by social conventions and rules…” (Säljö & Wyndham, 2002, p. 30-31, my translation). This view on meaning raises the question whether or not we are caught in language (cf. Rönström, 2006). In Intentional Analysis, “the situation” was originally accounted for in terms of how it is conceptualised by the learner (Halldén, 1999). However, there appear to be no objective, or external, grounds to refer to if IA rests on an intersubjective understanding of the observed behaviour. IA, as understood in this thesis, provides a possible solution to the question of
the status of the situation with reference to Davidson’s externalism and the principle of charity (2001b). According to the principle of charity, there is, in other words, also the situation as an objective event, constituted by a variety of salient objects. It is not because we endow the learners with our own logic, thus reducing the other to sharing our perspective. We can rather understand the learner because of the existence of an external world with salient objects and events that can work as a point of departure when building a theory of the particular idiolect of the learner. This thesis, with reference to Davidson (e.g. 2001c) may therefore constitute a move with ontological and epistemological relevance.

We can recall the discussion concerning the sociocultural aspects that influence learning in the middle of the 1990s. Researchers taking part in the debate referred to above were concerned with the “location” of knowledge (cf. Smith, 1995). Constructivist and sociocultural researchers naturally have quite different answers. We related to this question in Paper III, describing it briefly in terms of a core difference “…whether knowledge is to be looked upon as personal and residing within the individual or if it is embraced within discursive practices and cultural tools”. (Halldén et al., 2007, p. 38). However, none of the four papers in this thesis explicitly deals with the issue in question. Having Davidson’s (2001a; 2001b) theory of knowledge and interpretation in mind, I suggest that the very question of the location of knowledge is in need of reformulation. To ask about location leads us in the wrong direction. That knowledge should have a location at all can be regarded as spurious. For instance, it suggests that it is reasonable to formulate a critique that states that reference to “unobservable entities” is dubious. This critique can probably be understood in different ways, but interpreted (as) to mean that interpretation of learning should rely on what we can observe begs the question of what we mean by ‘observation’. Based on Davidson’s discussions about triangulation, I now believe it is possible to argue that beliefs can become public in communication (cf. Wahlström, 2016, p. 40). So when an interviewer, such as in our study with the preschool children (Paper II), poses questions to the child by pointing at an artefact, we actually observe what the child believes. This may serve as an argument against the sociocultural critique of “unobservable entities”

According to Interpretative holism, learners’ beliefs become public through actions and responses in triangular situations (cf. Wahlström, 2016). Thus, the very problem announced by sociocultural researchers, that interpretation of utterances relies on unobservable entities, disappears. We are able to coordinate our actions by way of joint attention and our ability to discriminate in a similar way. The very meaning of language lies in social practices, by way of triangulation. It relies on our beliefs being in contact with aspects in the shared world and that other people can discern our actions and relate to the
same salient features. It is only against a world shared by learners and teachers/interpreters that we can discern whether the learner speaks another language or has beliefs that deviate from teaching. Interpretation is, in other word, situated in the sense that it takes place at a certain time and in a certain space, but ascribing meaning by way of triangulation relates also to the world at large and as such transcends the particular situation, involving theoretical concepts (cf. Bereiter, 1997). Thus, the relevant question is maybe: How should we organise a situation in such a way that the learner’s beliefs come into view?

Ascribing meaning to observed behaviour, as it has been described in this thesis implies that an action, is always an action under a specific description. Different descriptions may not be contradictory, as when one person is describing the temperature in Celsius and the other in Fahrenheit, as long as they are aware of the fact. Correspondingly, if we do not know the language of the learner we cannot claim to have knowledge about the learner’s knowledge. Reference to saliency and the assumption of a general coherence and rationality may help us to decide whether there is difference in language, or in beliefs. However, saliency do not only appear as a phenomenon in relation to physical objects and events, but also in the symbolic world. A holistic approach thus require that the analysis extend beyond the mere transcription of an interview or description of an observation. A conclusion to be drawn from this thesis is hence not only that the question of the location of knowledge needs to be reformulated, but also that the very question of what counts as data in interpretation of complex learning processes are up for discussion.
Sammanfattning

Epistemisk holism och tolkningsholism
En kritik av metodologiska ansatser i forskning om lärande


Avhandlingen exemplifierar också hur en sådan utgångspunkt kan informera empirisk forskning. Således ges en första formulering av en så kallad tolkningsholism, i term av några centrala begrepp som kan utgöra en forskningsstrategi i syfte att hantera ovan nämnda villkor. Slutligen diskuteras vad en sådan hållning kan innebära gällande de kunskapsteoretiska och ontologiska frågor som diskuterats inom ramen för de ovan nämnda perspektiven.
Bakgrund

Epistemologiska och ontologiska antaganden i teorier om lärande

Behaviorism delas in i tre huvudtyper, metodisk, psykologisk och analytisk behaviorism (Graham, 2015). Gemensamt är behaviorismens empiristiska utgångspunkt, vilken betonar bevis, där våra perceptuella förmågor spelar en avgörande roll. Detta liksom idén om kausalitetens relevans för att förstå vår interaktion med världen kan ses som attraktiva idéer. Tanken att det finns en verklighet, som är oberoende av vår uppfattning tjänar våra intuitioner. Likaså idén att vår förståelse av yttranden innebär att korrekt kunna avkoda meddelanden. Logiska empiristers försök att konstruera ett extensionellt språk, det vill säga, idén att språkliga uttryck får sin mening genom vad det refererar till (Martin, 1994, s.143) misslyckades dock.

Även om empirismens mål var objektivitet, så verkar den empiristiska utgångspunkten paradoxalt nog hamna i en form av skepticism, att vi endast kan ha kunskap om våra egna subjektiva erfarenheter (jfr Scruton, 1995). Argument baserade på holism och teoriers underbestämning av data utgör en särskild utmaning på det metodologiska planet. Vid genomförandet av ett experiment är flera teorier och hjälpeterier i spel samtidigt. En konsekvens är att det observerade beteendet kan stämma med olika teorier om relationen mellan input och output, och det finns inget enkelt sätt att avgöra vilken som är den rätta teorin.

Kognitiv konstruktivism (Piaget 1936/1970) betonar den lärandes aktiva konstruktion av kunskap. Vikten av att ta hänsyn till den lärandes tidigare kunskaper hävdas vidare som central i kunskapsutveckling och vår förståelse för dessa processer väsentlig för att förstå lärande i termer av


**En metodologisk ansats**

den specifika situationen. Determinanterna utgör därmed olika kontexter för tolkning. Den senare handlar med andra ord om föreställningar relaterade till sociokulturella aspekter, och som därmed kan påverka den lärandes tolkning av uppgiften, så kallade ”diskursorienterade determinanter”. Detta innebär att vi i en analys således kan komma fram till att vi inte vet vad den lärande vet om ämnet i fråga, utan snarare om hur uppgiften har tolkats.


Mot ett nytt förhållningssätt till tolkning av lärandeprocesser

Givet den ovannämnda kritik som kan riktas mot de olika perspektiven samt IA, hävdas det i avhandlingen att de var för sig bidrar med viktiga aspekter vid tolkning av lärandeprocesser. Objektivistiska ideal som förfäktats av empirismen betraktas som en central utgångspunkt i tolkning av lärandeprocesser; möjligheten att vi kan ha fel med avseende på hur världen är beskaffad. Idén om språket som extensionellt är därför central, och antas värld av att försöka behålla. Konstruktivismen har lärt oss sikten av att ta hänsyn till den enskildas individens egen konstruktion av uppgifter, där förkunskaper och rationalitet utgör viktiga inslag, liksom att vi i allmänhet och i enlighet med rationalismens antagande vanligtvis vet vad vi själva tror. Utifrån situerade perspektiv har intersubjektivitet betonats, och sociokulturella aspekter visats viktiga i förståelsen av lärandeprocesser. Intentionell Analyser utgår ifrån en för studiet av lärandeprocesser grundläggande distinktion mellan uppgift, och hur uppgiften tolkas (Halldén, 1988). Vidare bidrar Intentionell Analyser med den centrala distinktionen mellan de olika determinanterna för handling (Halldén,

Syfte och frågeställningar

Syftet med avhandlingen är att diskutera tolkningen av lärande inom pedagogisk forskning. I avhandlingen diskuteras också tolkning i ljuset av filosofen Donald Davidson teorier om kunskap och tolkning. Detta för att öppna upp för fortsatta diskussioner om hur ontologiska och epistemologiska aspekter kan utgöras delar av ett nytt förhållningsätt till forskning om lärande. En sådan hållning ska kunna utgöra bas för tolkningar av komplexa lärandeprocesser samt innefatta förmåga att hantera holism, intentionalitetens komplexitet och underbestämning. Utgångspunkt tas i Intentionell Analys då den har utvecklats i syfte att hantera såväl sociokulturella aspekter som påverkar lärandesituationen som individuell kognition. Begrepp hämtade från Davidsons teorier prövas därmed inom ramen för Intentionell Analys. Frågeställningarna är:

1.) Hur kan Davidson teorier om kunskap och tolkning utgöra aspekter av en ontologisk och epistemologisk hållning, i syfte att bilda grund för tolkning av lärandeprocesser i pedagogisk forskning?

2.) Hur kan en sådan hållning bidra till empirisk forskning gällande hanteringen av holism, underbestämning, samt intentionalitetens komplexitet i tolkning av lärandeprocesser?

3.) På vilket sätt kan en sådan hållning utgöra ett alternativ till tidigare perspektiv när det gäller epistemiska och ontologiska antaganden samt specifika forskningsstrategier?
Davidsons holistiska syn på kunskap och epistemisk holism

Som sådan utgör epistemisk holism en första skiss i syfte att hantera holism, underbestämning och intentionalitetens komplexitet. Välvillighetsprincipen, triangulering och framträdande drag utgör därmed en första skiss till en forskningsstrategi, här benämnd tolkningsholism. En sådan hållning ger också ett möjligt svar på hur objektivitet kan förstås i relation till handlingsförklaringar och i appliceringen av distinktionen mellan determinanter för handling, vilken är grundläggande i Intentionell Analys. Davidssons teorier kan tjäna som bas i valet mellan olika tolkningar med referens till alternativa framträdande drag.

**Tolkningsholism**

Välvillighetsprincipen tillsammans med antagandet om framträdande drag utgör a priori-antagande i tolkning, antaganden vi måste utgå ifrån i tolkningen av lärandeprocesser. Dessa antaganden föreslås också kunna fungera som specifika tolkningsstrategier i syfte att hantera holism, underbestämning och internationalitetens komplexitet. Det bör noteras att frågan om giltigheten i tolkningar i artiklarna inte explicit relateras till ovan nämnda villkor. Å andra sidan diskuteras just tolkning i artiklarna i syfte visa hur man gör valida tolkningar.


De studier som presenteras i artikel II, III och IV visar behovet av att ta hänsyn till den lärandes idiosynkratiska språkbruk och kontextualisering, och nödvändigheten att inte anta att den är den samma som intervjurens eller forskarens. Om vår tolkning inte lyckas rimligöra den lärandes yttranden, bör vi fundera över om vi överhuvudtaget har förstått den lärandes språk, och vi saknar därmed också grund för att hävda något ifråga om den lärandes kunskaper. Då startpunkten utgår ifrån idén om radikal tolkning som tidigare nämnts, reses också behovet av välvillighetsprincipen och triangulering.

En grundläggande form av triangulering exemplifierades i artikel II i förhållande till argumentet att tolkningen börjar redan i intervjun. Intervjuerna videofilmades och var därmed en värdefull informationskälla, i vilken ostension spelar en avgörande roll. Det hävdas också, med hänsynsvisning till Davidson (2001a), att användningen av artefakter var avgörande i tolkningen av barnens utsagor. Intervjuaren pekade på särskilda ställen på


Välvillighetsprincipens status och begränsning

I avhandlingen diskuteras också en kritik och motkritik (Andrews, 2002; Andrews & Radenovic, 2006; Bouma, 2006a, 2006b) som riktats mot välvillighetsprincipen. En slutsats som dras är att man bör reflektera över hur mycket rationalitet det är rimligt att tillskriva så små barn som fyraåringar, som till exempel tolkades inom ramen för den studie som presenterades i artikel II. Välvillighetsprincipen förstådd som utgångspunkt, dvs. a priori-princip drabbar dock inte av de invändningar som framförts.

I ljuset av Epistemisk holism

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