Human thought can be characterised as being situated in the ‘space of reasons’. That is to say that human thought is guided by the norms of theoretical and practical rationality which, in turn, enable autonomous thinking. But how do children learn to navigate the space of reasons? Building on the work of Tugendhat and Bakhurst, among others, we argue, first, that this process involves the acquisition of propositional thought and that it is an essentially social one in which both children and adults take an active role. Second, and more specifically, by drawing on Brandom’s theory of meaning, we provide a philosophical analysis of empirical findings with respect to the efficacy of ‘Sustained Shared Thinking’ (SST) in early educational settings. We argue that the efficacy of SST is based on its emphasising, modelling and practising those elements of communication that are essential for gaining proficiency in ‘playing the game of giving and asking for reasons’, namely drawing inferences between propositions and concepts and providing justifications for one’s assertions. This is achieved by making explicit the inferential relationships between concepts and propositions and by the use of modal and doxastic markers that function as an invitation to a joint search for reasons.

INTRODUCTION: WHAT IS SPECIAL ABOUT HUMAN THOUGHT?

Human thought can be characterised as being situated in the ‘space of reasons’. That is to say that human thought is guided by the norms of theoretical and practical rationality which, in turn, enable autonomous thinking (Brandom, 1994; McDowell, 1994; Sellars, 1956). According to Sellars, for an utterance or thought to be situated in the space of reasons means for it to be answerable to the standards of rationality. This means that we can demand and must be able to provide justifications for each other’s assertions.

The specific character of human thought is also sometimes described in terms of its propositionality (e.g. Bermúdez 2003; Bogdan, 2009; Tomasello, 2014, ch. 4; Tugendhat, 1976, 2003). According to Tugendhat
propositional thoughts can be understood as functions of singular terms and predicates (i.e. concepts). These functions can be assigned truth values depending on whether the referent of a given singular term actually falls under a given predicate or not—which in turn depends on the actual state of affairs in the world and the rules of our language. That is, we can evaluate assertions with respect to their truth or falsehood; in other words, we can position ourselves with respect to the thoughts and assertions of others as well as to our own. In order to be able do so we need to know how the truth or falsehood of a particular assertion can be established. Thus, in learning to use a propositional language we are not just learning to associate objects with particular features; rather, we are learning the underlying rules of identification and justification that enable such associations within our linguistic community. Hence, we can ask questions and search for reasons that speak in favour or against a particular assertion, and we can express more or less epistemic security with respect to these reasons (i.e. we can distinguish different degrees of conviction). Importantly, our attitudes towards the propositions contained in particular assertions can be made explicit with the help of doxastic and modal makers (e.g. ‘I think/believe/wonder/ . . . ’ and ‘maybe/certainly/ . . . ’). This way, the thoughts themselves can become the object of our thinking. The ability to engage in meta-representations of this kind lies at the heart of autonomous, that is self-conscious, reasons-responsive human thought. Whereas non-human animals are arguably capable of instrumental reasoning as well, they lack the ability to think about their own thoughts in this way (cf. Bermúdez, 2003; Bogdan, 2009; Tomasello 2014).

In the following, our aim is to trace how children acquire the ability for propositional thought, which we regard as a crucial element within the space of reasons. We will begin in the next section by emphasising the significance of social interaction for the development of reason. Following this, we will distinguish different steps in the socially mediated process of acquiring the ability to engage in propositional thought through early childhood. Finally, we will examine a particular practice of social interaction—Sustained Shared Thinking (SST)—that has recently been shown to have long-lasting beneficial effects for the cognitive development of children. Our aim is to provide an analysis of this practice that is based on a philosophical theory of meaning and understanding in order to identify specific aspects of this practice that, in our view, contribute to its efficacy.

It should be pointed out that there is a large and diverse body of existing empirical literature on the development of reasoning skills in children, which has recently come to be labelled the study of ‘epistemic cognition’ (see, e.g. Greene et al., 2016). This literature is far from unified, spanning multiple literatures across the fields of cognitive science, developmental psychology, philosophy and educational science. Generally speaking, the term ‘epistemic cognition’ refers to thinking about knowledge, including thinking about its normative nature. Notice that while some aspects of what is studied under this label are obviously relevant to our discussion, the term ‘epistemic cognition’ is much broader than what we are concerned with here, for it encompasses both general reasoning skills as well as explicit
knowledge about the nature of justification and truth in general and about justification and truth within different epistemic domains. For instance, it includes the study of epistemologies of science and logic, moral epistemology, or the epistemology of history, often with a focus on the development of these epistemologies in college and university (or, more recently, elementary and high school) students. Thus, most of this literature goes well beyond the more general and basic capacities for reasoning—in particular the development of propositional thought in early childhood—that are the focus of this paper. However, insofar as the study of epistemic cognition also encompasses the development of these more fundamental reasoning skills in young children, our paper can be seen as a contribution to this literature.

THE IMPORTANCE OF SOCIAL INTERACTION FOR THE DEVELOPMENT OF REASON

As we have explained in the first section, the ability for propositional thinking is a crucial element within the space of reasons. How do children acquire this ability? Historically, in the literature on education there are views (sometimes associated with Wittgenstein) that see the formation of children’s rational powers as the outcome of a process of drill, conditioning or training. In contrast to this, there is a tradition (going back to such thinkers as Rousseau and Herbart) that sees the development of reason as a matter of the maturation of innate capacities. More recently, philosophers of education have been reminding us of the importance of taking into account the role of Bildung (education), while at the same time emphasising that children cannot simply be ‘trained’ to become rational creatures (e.g. Bakhurst, 2011, 2015; Derry, 2008, 2013; Rödl, 2016), thus forging a middle way between these opposing views.

For instance, Bakhurst (2011, 2015), following McDowell and Brandom as well as Vygotsky, characterises Bildung as a process of enculturation during which the child, by means of acquiring conceptual abilities, is transformed from being in the world to being a subject capable of thinking and acting in light of reasons, thereby taking a view on the world and herself. As Bakhurst points out, this ‘gradual mastery of techniques of language that enable the giving and taking of reasons’ (2015, p. 310) is an essentially social process, because in acquiring concepts the child essentially learns to participate in a social praxis. Similarly, by adopting an approach to pedagogy that draws on both Vygotsky and Brandom, Derry (2008, 2013) emphasises the importance of a normatively structured learning environment in which adults provide opportunities for children to engage in the social practice of giving and asking for reasons in order to gain understanding of the inferential relations that govern our use of concepts.

The importance of social interaction for the development of reasoning skills is also stressed by Kuhn (2008) and Moshman (2015) in the context of their investigation of the development of epistemic cognition. As Moshman (2015) points out, ‘social interaction is presumably crucial to epistemic development’ for ‘it is among other people that we encounter diverse claims
and justifications and feel compelled to express and defend ideas of our own and coordinate multiple points of view’ (Moshman 2015, p. 53). Accordingly, he argues that epistemic cognition is ‘not simply a maturational process’ (*ibid.*), but based on a developmental process in which both the child and its social environment *actively* participate. In line with this, Kuhn (2008) stresses, based on her extensive empirical research in this area, that rational reasoning is something that has to be learned and that does not develop without adults ‘doing’ anything. In particular, Kuhn argues that the reasoning skills required for rational inquiry and argumentation need to be explicitly taught and thus integrated into the curriculum of school children.

However, notice that both Moshman and Kuhn focus their investigation on developmental processes that occur in children aged four years and older. This is because they assume that children younger than four do not yet possess an explicit theory of mind, and in particular an understanding of false beliefs. Hence, ‘epistemological questions of truth and justification’ (Moshman, 2015, p. 45) cannot yet arise for them. In contrast, our focus here is primarily on the acquisition of propositional thought in early childhood. While we agree with Moshman and Kuhn that the development of epistemic cognition extends well beyond the age of four years into adolescence and even adulthood, we also hold that its origins are to be located much earlier, even if children initially lack the ability to reason explicitly about true and false beliefs. Specifically, we hypothesise that the kinds of speech act we discuss in the section on SST provide children with an understanding of the epistemic status of particular assertions even before they begin to think explicitly about epistemological questions. Indeed, research suggests that children as young as three years old prefer an argument from perception over a circular argument, suggesting that they are able to assess arguments at a basic level (Mercier *et al.*, 2014).

Generally speaking, there is an impressive amount of empirical research that shows that, while children are equipped with a variety of social-cognitive capacities right from birth onwards, and while we certainly shouldn’t assume the role of the child in education to be passive, it requires much active support and guidance on the part of their caregivers and teachers for children to become proficient in the practices involved in conceptual understanding (e.g. Rogoff, 1990). More specifically, right from birth onwards, interactions between infants and their caregivers are characterised by a number of scaffolding processes on the part of the adults that, in our view, lay the foundations for the acquisition of reasoning skills (e.g. Siraj-Blatchford *et al.*, 2002). For instance, adults engage in a kind of implicit pedagogy (Bruner, 1983) and use a variety of age-appropriate strategies for communication that aid the acquisition of language, such as using motherese (Szagun, 2007; Weinert and Grimm, 2012). The way in which interactions are structured by the adults plays an important role with respect to several dimensions of development. For example, the way in which dialogues are structured (i.e. the quantity and quality of opportunities offered for speaking and interaction) positively influences the acquisition of vocabulary (Bornstein and Ruddy, 1984; Grimm, 2003; Snow, 1995), children’s narrative abilities, as well as the development of theory of mind.
(Astington and Baird, 2005; San Juan and Astington, 2017; Schick et al., 2007). On the other hand, it can also hinder development: for instance, direct instruction in educational contexts limits exploratory behavior and the generation of hypotheses on the part of children (Bonawitz et al., 2011). Hence, Bonawitz et al. (2011) speak of the ‘double-edged sword of pedagogy’.

At the same time, even very young children are also sensitive towards signaling from adults. They understand ostensive communications as being directed at themselves in an informative way and are able to generalise their content (natural pedagogy) (Csibra and Gergely, 2009). They are sensitive towards the epistemic status of adult partners in communicative contexts (Cole et al., 2012; Muentener and Schulz, 2012), engage more in dialogical interactions when adults provide explanatory answers (Frazier et al., 2009), and prefer to communicate with adults who show a more reliable epistemic status (Koenig and Harris, 2005; Kushnir et al., 2008).

This is also important for contexts of early childhood education, which has been shown to have a lasting influence on the development and later educational success of children (Hamre and Pianta, 2001; Hamre et al., 2013; Sammons et al., 2004; Sylva et al., 2010). For instance, children display better cognitive and linguistic developmental progress, the more often kindergarten teachers interact with them (Anders, 2013; Ahnert and Lamb, 2011; Belsky et al., 2007; Burchinal et al., 2011, Huttenlocher et al., 2002; Mashburn et al., 2008). Further, the quality of interactions plays an important role. Recent studies show that integrated, cognitively stimulating interaction formats in particular have a positive effect on cognitive and linguistic development (Ahnert and Lamb, 2011; Anders, 2013; Belsky et al., 2007; Burchinal et al., 2011; Hamre and Pianta, 2001; Hamre et al., 2013; Mashburn et al., 2008; Sylva et al., 2004; Sylva et al., 2010; Roseberry et al., 2014).9

STAGES OF DEVELOPMENT INTO THE SPACE OF REASONS

As we have just seen, there are good theoretical arguments as well as a host of empirical findings that support the view that the development of reasoning skills relies on normatively structured interactions between adults and children. Yet there is still a relative lack of knowledge as to how exactly interactions between children and caregivers should be structured in order to enable children to successfully enter and navigate the space of reasons, that is to become proficient players in the game of giving and asking for reasons. In order to address this question, we will begin by sketching in more detail the developmental steps that lead towards propositional thinking. In the next section, we will analyze a particular type of interaction format, namely the practice of ‘Sustained Shared Thinking’ (SST), and try to show how this format exemplifies and enables children to learn to communicate in a way that is essential for reasons-responsive, propositional thought.

As we saw in the first section, according to Tugendhat (1976, 2003), the development of propositional thought is essentially tied to the ability to use singular terms. While animals react to ‘situations’ and, in a sense, ‘classify’ them by means of particular expressions that are used according
to *situation-specific rules* (such as the issuing of particular alarm calls in the presence of a predator), humans possess the ability to employ singular terms (i.e. demonstratives and proper names) and predicates that can be systematically substituted (e.g. ‘a is F’, ‘b is F’, ‘a is G’), that is, classification expressions that refer to specific individuals according to *situation-independent* rules. On this view, the ability to use singular terms constitutes a fundamental step in the development of reason. For the use of singular terms allows the perceiver to break down the perceptual situation into individual objects and their predicates. Thus, singular terms effect situational independence by enabling reference to individual objects that can be localised objectively in space and time (Tugendhat, 2003, p. 19). This means that the speaker understands that the object she is referring to is one specific object among others that could be re-identified by herself at a later time, or that could be identified by others from potentially different perspectives in time and space. The possibility of representing different perspectives on the same object, in turn, enables objective thought. Tugendhat also expresses this by speaking of the transition from the use of quasi-predicates to the use of predicates (i.e. concepts). In short: At the first level, we find causal signaling, which is characteristic of the communication found in non-human animals. At the second level, young children learn to use a conventional quasi-predicate language, enabling them to distinguish right from wrong, albeit in a situation-relative way. That is, they learn under which circumstances a quasi-predicate is to be used. Third, children learn to use singular terms, that is they learn to use situation-independent expressions for individuals. This enables them to distinguish true from false representations. Finally, propositions themselves can become objects of reflection, leading to the ability to evaluate one’s own thinking, and thus to autonomy and reasons-responsiveness in the sense introduced at the start of this paper.

In line with this, albeit with a stronger focus on the development of concepts and without going into the specific role of singular terms, Bakhurst describes the development of conceptual thought within a four-stage model, which he illustrates by considering how a child might acquire substance concepts, such as the concept HORSE (Bakhurst, 2011, p. 12f.). One way of interpreting this model is that it describes how the child moves from being able to pick out and keep track of individual objects to referring to individual objects, first in a situation-bound way, later by using singular expressions and predicates according to the linguistic rules of her community, which consequently allows for situation-independent reference and, ultimately, for self-reflection. However, more explicitly than Tugendhat, Bakhurst emphasises the social nature of this process (also cf. Bogdan, 2009). Thus, according to Bakhurst, already at the first stage, that is the stage of learning to pick out and keep track of horses, the activities of others, such as their pointing to horses and uttering the word ‘horse’ play a role in structuring this ability. In the second stage, the child begins to use words herself, and her utterances are begun to be held accountable to the standards of her linguistic community, whose members encourage and correct her. Stage three marks the child’s association of the term ‘horse’ with the criteria for its application, and she begins to justify her use of terms and her judgements.
by appealing to these criteria. She begins to appreciate the inferential relations holding between different concepts and her knowledge becomes increasingly reflective. Finally, at stage four, the child begins to understand that horses have a nature that is independent of the way we interact with them and that is open to scientific discovery, putting her on the road towards an open-ended conceptual development. Again, this development is social in that it is situated within a social and historical context.

As mentioned, Bakhurst’s focus on the social nature of human thought is inspired in part by McDowell’s and Vygotsky’s views. It is also very close to Brandom’s view, which interprets intentionality as a fundamentally social phenomenon, namely as the ability for deontic score-keeping, that is the ability to ascribe and acknowledge justifications to others and oneself. Thus, on this view, human thinking, understood in terms of the possession and use of concepts, consists essentially in the ability to participate in the—necessarily social—game of giving and asking for reasons.10

The essentially social nature of the development of human rationality is also stressed in recent empirical research, in particular in Tomasello’s (2014) influential evolutionary and developmental account.11 On Tomasello’s view, human rationality is essentially characterised by what he calls ‘we-intentionality’. He claims that our ability for objective-reflexive-normative thinking is the result of a ‘social turn’ in cognitive evolution, which was necessitated by the need for increasing social cooperation. This ability is thought to have developed in two steps over the course of human evolutionary history, which are thought to be mirrored to some extent by human ontogeny. The first step consists in the development of shared intentionality, which children acquire around the age of 9–12 months. Shared intentionality is characterised by the ability to take into account another’s perspective (without necessarily explicitly distinguishing one’s own perspective from that of the other), for instance when jointly attending to an object with a caregiver. Ultimately, this enables children to engage in cooperative communication and two-level collaboration with another person. The second step consists in the development of collective intentionality. Thus, from the age of about 3 years onwards, children begin to be oriented not just towards a specific other, but towards the group and they begin to communicate conventionally. That is, they learn to evaluate and justify their reasoning according to the standards of the group. Taken together, the development of ‘we-intentionality’ is thought to have provided early humans with crucial survival advantages over groups who were not able to engage in reasoning of this kind (Tomasello, 2014).12

THE SIGNIFICANCE OF SUSTAINED SHARED THINKING FOR LEARNING TO NAVIGATE THE SPACE OF REASONS

While the accounts mentioned above provide us with important insights into the—socially mediated—gradual process of acquiring propositional thought, they say little with respect to the question of whether and how the development they describe depends on or can be aided by specific interactions between children and adults. Indeed, the general assumption
at work in at least many of the philosophical accounts seems to be that although conceptual development takes place within a social-normative framework, there is nothing in particular (beyond providing examples and general encouragement) that adults can or should do to teach children how to think rationally (cf. Rödl, 2016). In contrast, we take it that the development of propositional thinking and reasoning skills is a process that is guided by and benefits from specific interactions between adults and children (and, later, between peers).

This is in line with insights from empirical research on the development of epistemic cognition in school children. For instance, as Kuhn (2008) demonstrates for school contexts, dialogical interactions in everyday forms of argumentative discussions as social activities, which follow the actual interests and questions of children, are particularly effective for teaching reasoning skills.13

Further in line with these insights, and beyond demonstrating that the cognitive development of children is socially scaffolded in a variety of ways (as briefly outlined in the second section), empirical research in early educational science has recently shown that there exists a specific type of interaction that is particularly effective with respect to the later cognitive development of children: so-called Sustained Shared Thinking (SST) (Siraj-Blatchford, 2002; Sylva et al., 2010). SST marks episodes of thinking in which both adult and child are actively and jointly engaged in answering a question or solving a problem (often raised by the child). More precisely, SST initiates dialogues that have a specifically explicative dimension, that is they aim at the making explicit of hypotheses and at improving understanding of causal connections (as well as of reasons, motifs, etc.) (Hildebrandt and Dreier, 2014). SST speech acts can be defined as encompassing the following three elements (Hildebrandt et al., 2016):

(A) Offering an explanatory hypothesis, based on inferences;
(B) Signaling the epistemic status (B1) and making explicit the sources (B2) or reasons (B3) for one’s hypothesis;
(C) Encouraging the child to engage in shared thinking.

For example, some typical SST dialogues with preschoolers might look like this:

Example 1:
Child and adult are in the garden.
Child: Look here, this beetle isn’t flying away.
Adult: Oh, yes. I think (B1) it feels warm in your hand (A). Beetles love it when it is warm (B3). Or maybe (B1) it is a bug (A). I believe (B1) bugs cannot fly (B3). I once read that (B2). What do you think (C)?
Child: Or maybe its wing is broken.

Example 2:
Child: Why do only adults go to work?
Adult: Mhm (B1), yes, why would that be? Is it actually the case? I think (B1) if we didn’t feed our dogs, they would also have to work (A) because they would have to go hunting then (B3). What do you think (C)?
Child: No, dogs don’t work. Maybe ants. But they also don’t earn money, only humans earn money. And money is what you get when you work.
Adult: Ok, if you think money is the important thing about work (A). But some people work, even if they don’t get money for it (A), I would say (B1). And about the ants: I once read (B2) that they really work a lot (A). They have to do different things all day long: feeding, getting food, cleaning—they are busy from morning till evening (B3). I believe (B1) they don’t have any free time at all.
Child: No. At most they get to sleep a bit. Like chicken—I mean they also sleep when they’re not pecking.

Example 3:

Adult and child while putting on a coat:
Adult: Hey, your coat has a really long zipper. It doesn’t seem to stop . . .
Child: I got that from Frieder. Frieder is my cousin.
Adult: Oh yes, he once came to pick you up. I like the grey pattern . . . What do you think would happen if the zipper really never stopped (C)?
Child (laughing): Then it would reach all the way to the floor.
Adult: Yes. And what if it was even longer (C)?
Child: Well, then it would go all the way down to the lava inside the earth.
Adult: Help! Into the earth! Maybe (B1) even all the way through to the other side (A). I believe (B1) if it went up, then . . .
Child: Then it would go up into space. Up until when the dinosaurs still existed, as well as lava.

Importantly, in our view SST speech acts are ideally construed as rather short sequences that are seamlessly integrated into routine activities, rather than as special episodes of extended, deep dialogue. They are usually initiated (often by the child) by drawing attention to an interesting detail or observation, thereby establishing shared intentionality in Tomasello’s sense. Such shared intentionality might also be established through the experience of a conflict—either with experience or with the views of others—which can likewise serve as an initiator for dialogical interactions in order to resolve the conflict. Both exemplify situations that can, in the words of Moshman, make us ‘feel compelled to express and defend ideas of our own and coordinate multiple points of view’ (Moshman, 2015, p. 53).

Interestingly, SST has been shown to have a positive effect on the quantitative and qualitative linguistic behaviour of children (e.g. on verbal hypothesis construction) independently of children’s socio-economic status and cognitive ability (Hildebrandt et al., 2016). However, it is as yet unclear why SST elicits these effects.

Based on our description of the developmental steps leading to propositional thought in the previous section, we think that it is primarily processes at the third and fourth levels described by Tugendhat and Bakhurst that are supported by SST. As we have just seen, the acquisition of propositional
thinking and reasoning skills should not be conceived of in terms of a single step, but rather in terms of a gradual process. Obviously, in order to participate in SST type interactions, children already need to possess a certain level of linguistic/conceptual competence. Accordingly, SST is one element among many that contribute to a successful transition from non-propositional to propositional thought (or, to put it differently, that contribute to the development of epistemic cognition). However, we take it that SST supports certain aspects of the social practice of giving and asking for reasons that are particularly important, such that it can play a crucial role in the transition to fully propositional thought in early childhood.

Generally speaking, there are different possibilities to explain the efficacy of SST. For instance, SST involves particular socio-emotional factors, such as encouraging the child to engage with an adult at ‘eye level’. This is achieved by signaling a reduced epistemic status on the part of the adult, thereby creating a more symmetrical relationship between adult and child. Relatedly, SST encourages an experience of self-efficacy on the part of child. Further, it involves a reciprocal exchange (turn-taking), which allows for specific learning experiences. For instance, Greenwood (2015) argues that turn-taking activities provide essential learning opportunities that ‘launch infants and children into the intentional and linguistically mediated adult world’ by providing opportunities for ‘motor mimicry and feedback regarding emotional signs, motor skills, and language’ (Greenwood, 2015, p. 133; also see Rogoff, 1990).

Notice that some of these characteristics can also be claimed for general conversations with children. Like SST, general conversation can be characterised as a joint endeavour in which neither party assumes the role of playing an epistemic authority. However, we take it that what lends SST interactions a special significance is that they possess specific semantic features. In particular, SST involves assertoric statements on the part of the adult that do not involve claims to their truth, as indicated by doxastic (e.g. I think, I believe, I assume, . . . ) or modal (e.g. certainly, maybe, . . . ) markers. This is significant because when a person uses a doxastic or modal marker, she thereby performs different speech acts:

1. She communicates two types of information: She (a) renders explicit a certain state of affairs, and (b) communicates a doxastic/modal piece of information (epistemic status).
2. With the help of doxastic markers, the speaker makes explicit her subjective perspective on the state of affairs in question. She marks herself ‘as a person’.
3. The speaker makes explicit a mental state/process (= thinking, believing) and refers to herself as an intentional subject with propositional attitudes (intentionality).
4. Both in the case of the use of doxastic as well as modal markers we are confronted with higher-level assertions (i.e. second order thinking). Thinking, believing, doubting, etc. are not just performed but made explicit.
(5) Speakers who utter doxastically marked assertions in the first person present themselves as subjects who are aware of their own fallibility and can thereby—in particular when doxastic markers are used in combination with a search for reasons—function as heuristic role models.

Moreover, by generating hypotheses and providing reasons and sources of evidence for these, sometimes with the help of conditionals and other explicitly inferential vocabulary, SST draws attention to the inferential relationships between concepts and propositions. Thus, we take it that SST’s efficacy is at least partly due to the fact that it emphasises certain elements of verbal communication that are crucial for an effective navigation of the space of reasons. Importantly, this aspect has so far been neglected in discussions of SST. In particular, we claim that SST (a) contains signaling of one’s epistemic status (corresponding to 1, 2, 3 and 4 above), and (b) makes explicit the need for justification (5). Both of these are essential elements of human propositional thought, as we aim to show in the following with reference to Brandom’s analysis of propositionality.

As mentioned above, and in line with the other accounts discussed above, Brandom interprets intentionality as a fundamentally social phenomenon, namely as the ability for deontic score-keeping, that is the ability to ascribe and acknowledge justifications to others and oneself. Interestingly for our purposes, he has put forward a pragmatic analysis of propositionality that focusses on inferences and their expression and that seems particularly well suited to interpret the effectiveness of SST. In particular, Brandom develops a theory of meaning and intentionality by taking social practices to be generative of meaning and by putting the ability to articulate and exchange reasons centre stage. Two aspects of Brandom’s rich analysis seem particularly well suited for a better understanding of the efficacy of SST.16

SST—Practicing and Understanding the Practice of Understanding

First, according to Brandom, expression enables a form of transformation. Expressing something is conceptualising it, thereby rendering it explicit and ‘addressing it in a form that can serve as and stand in need of reasons, making it inferentially significant’ (2000, p. 16). With each expression of an assertion a proposition is made explicit. Yet the inferences licensed by the assertion remain implicit. Nonetheless, an assertion always implies an implicit agreement to other propositions. For instance, if you claim that this is a red piece of cloth, you are also claiming that it is coloured. ‘Mastery of these inferential connections is the implicit background against which alone explicit claiming is intelligible’ (Brandom, 2000, p. 18).

The mastery of inferential relationships constitutes understanding in Brandom’s view: ‘Actually drawing inferences from an explicit claimable (something that can be said, thought, and so on) is exploring the inferential relations that articulate its content’ (ibid.). Importantly, this understanding is a kind of practical mastery or knowledge-how. It can itself be made
explicit, when we talk about how different states of affairs hang together. The basic vocabulary of logic provides a ‘central expressive resource for doing this’ (2000, p.19). It makes explicit the implicit assertions that structure the content of our concepts. Conditionals play a central role in this (e.g. logical if-then-relations, causal vocabulary), as they show the logical connections between propositions (2000, p. 21).

Accordingly, effective pedagogy can be understood as involving on the one hand the provision of opportunities to ‘operate with a concept in the space of reasons within which it falls and by which its meaning is constituted’ (Derry, 2008, p. 14), thereby acquiring an understanding of the inferences implicit in its use. On the other hand, ‘in order to understand, it is necessary to “make explicit” the connections and determinations which constitute a concept’ (Derry, 2008, p. 16). Thus, effective pedagogy should also involve the teaching of inferential vocabulary, for learning to use inferential vocabulary means learning to develop the competence to express—and thereby render explicit—implicit features of assertions, in particular their relations to other propositions. This, in turn, enables one to see how they relate to other propositions, that they can be controversial, that they may be in need of justification, or that they can be evaluated against alternative claims.

Now, SST is an interactional technique that strongly relies on using inferential vocabulary. Consider again one of our examples from above:

**Example 1:**

Child: Look here, this beetle isn’t flying away.
Adult: Oh, yes. I think (B1) it feels warm in your hand (A). Beetles love it when it is warm (B3). Or maybe (B1) it is a bug (A). I believe (B1) bugs cannot fly (B3). I once read that (B2). What do you think (C)?
Child: Or maybe its wing is broken.

As can be seen by taking a closer look at this example, SST consists in producing one’s own hypotheses (A) based on inferences, making these inferences (B3) and different sources of knowledge (B2) explicit and encouraging children to produce hypotheses (C). The same elements can be identified in the other examples as well.

We can now analyse these elements by drawing on Brandom’s theory: Producing a hypothesis (A) and giving a reason for it (B3) means making explicit the inferential connections between propositions or concepts, in other words explaining. Naming the sources of one’s knowledge (B2) serves to justify the epistemic validity of an assertion. Accordingly, encouraging children to produce their own hypotheses (C) can be seen as training them in understanding and producing inferential connections between propositions or concepts and in assessing and justifying the epistemic validity of an assertion.

Put differently, SST not only instantiates in exemplary form the game of ‘giving and asking for reasons’ by making this the main aim of the interaction between adult and child. By naming one’s own hypotheses and reasons, implicit inferential relations are made visible, thus advancing
understanding. Finally, the practice of understanding itself is turned into the object of understanding by being conceptualised. Thus, in SST the practice of reasoning is not only realised but is at the same time made explicit at a meta-level, thereby allowing reflection on the practice itself.

**SST—Modal and Doxastic Markers in the First Person: Interpreting ‘Bare Assertions’**

Second, according to Brandom, modal and doxastic makers also serve to point towards the specific inferential role that the following proposition possesses in the respective context of justification. For example, Brandom claims that doxastically marked ‘believe that p’-utterances in the first-person (‘I believe that p’) differ from those in the third-person (‘He/She believes that p’) in that, in contrast to the latter, the former do not contain a distancing from the utterance. The ‘I believe’ form doesn’t mean that the subject is distancing herself from her assertions, that is such assertions don’t generally possess a social perspectival character in Brandom’s sense: ‘In such cases, the social-perspectival distinction between attributions of knowledge and attributions of belief cannot get a grip’ (1994, p. 228). Rather, a believe utterance in the first-person signals that the person assents to the proposition while leaving open the question of justification for assent: ‘Indeed, sometimes we make claims while fully aware that they may legitimately be challenged and that we are not in a position to vindicate them by demonstrating our entitlement to them’ (1994, p. 228). Thus, the qualification that is made by the ‘I believe’ in front of a proposition concerns the subject’s ability to justify it, but not the conviction regarding its truth (Brandom, 2000, p. 229). Perhaps the subject forgot the origin of the belief or the utterance possesses the quality of an ‘unjustified justifier’ within the person’s belief system. Brandom calls such utterances ‘bare assertions’ or mere assertions without an implicit claim to provable justification (Brandom, 1994, p. 229). Nonetheless, such assertions are meaningful: they can be used as premises in inferences and can be communicatively shared. They possess some of the authority of assertions with claims to truth while rejecting the corresponding epistemic responsibility (1994, p. 229). In particular, within a context of fully developed assertions it can be useful to treat some of them as ‘bare assertions’ precisely because in ‘bare assertions’ (e.g. ‘I believe that p’) that which is normally connected falls apart. For by making a ‘bare assertion’ a person both states that a) she believes that p is true, and b) signals that she knows she doesn’t have sufficient (inferential or epistemic) reasons to justify her belief. In other words: Bare assertions point towards the difference between conviction and justification. According to Brandom, such assertions are parasitic upon assertions that contain claims to knowledge, that is claims to truth and justifiableness. Against the background that in a full assertion the speaker signals both conviction and justification at once, bare assertions clarify that there is something missing, which needs to be supplemented. Thus, utterances containing modal and doxastic markers, as they are characteristic for SST (B1), show that the utterance in question lacks (sufficient) justification and hence point towards the need for (further)
justification. Through the signaling of a lack of justification doxastically marked utterances can thereby function as invitations to a joint search for reasons.17

CONCLUSION

Generally speaking, what we hope to have shown is that, on the one hand, philosophy needs to take a closer look at the role of interactions between adults and children if we are to understand how children learn to successfully navigate the ‘space of reasons’ and how we can best support them in doing so. While there has been much empirical research on the importance of social scaffolding and, more specifically, adult-child interactions, this has so far not been sufficiently integrated into philosophical theories of education. On the other hand, if it is true that human language and reasoning are social practices that can be learned, then philosophical analyses of these practices can help to better understand and subsequently teach individual elements of these practices. Thus, we believe that there is a need for genuinely interdisciplinary research. While philosophical theorising will benefit from paying closer attention to empirical findings, empirical studies can benefit from a philosophical analysis of their findings.

More specifically, SST seems to be a particularly promising starting point in this respect. Drawing on Brandom’s analysis of intentionality, we hope to have demonstrated that the efficacy of SST is based on its emphasising, modelling and practising those elements of speech acts that are essential for human (propositional) thought within the ‘space of reasons’, namely drawing inferences between propositions and concepts and providing justifications for one’s assertions. This is achieved by making explicit the inferential relations between propositions/concepts and by the use of modal and doxastic markers that function as an invitation to a search for reasons.

Many new research questions arise from the perspective we have taken. One the one hand, one might ask how other elements of the interaction format SST affect children’s navigation of the space of reasons at stages 3 and 4 (as identified by Tugendhat and Bakhurst)—such as the use of logical operators, explicit why-questions, the use of different forms of explanation/justification, expressions of cognitive emotions (e.g. via interjections such as ‘um’ or ‘huh?’), or the use of different types of markers of uncertainty by the adult interlocutor. On the other hand, one can ask which elements of social interaction can be identified as essential for the development of propositionality in the first two stages. In order to further explore these stages, it might be useful to consider Bogdan’s (2009) outline of the ‘ontogenetic staircase’ leading to the ability to form predicative judgements (which involves adult-infant physiological co-regulation, communication by shared meaning, imperative communication, and the child’s growing sense of other minds) and relate this to the current discourse on ‘natural pedagogy’ (Csibra and Gergely, 2009), which considers generic vs. episodic interpreting of ostensive pointing and speech acts. In addition, we need to further investigate the interactions that are involved in the successive development of the understanding of singular terms over the four stages described.
above—from situational dependency to complete situational independence. Thus, further theoretical and empirical research is needed to get a better understanding of the effects of adult-child interaction on the development of propositional, that is reasons-responsive, autonomous thought.\(^{18}\)

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NOTES

1. This will be discussed in more detail in the section on Sustained Shared Thinking.
2. Empirical findings with respect to metacognitive abilities in animals might suggest that (some) animals are capable of meta-representations after all (e.g. Hampton, 2005; Smith, 2005; Son and Kornell, 2005). However, note that these findings can also be explained in terms of same-order reasoning (Carruthers, 2008).
3. For a helpful overview and integration of different approaches with a focus on the development of epistemic cognition, see Moshman, 2015.
4. See Hofer, 2016, for a summary of the history of the construct of epistemic cognition and the research paradigms employed in its study.
5. These different historical strands of thought might explain why empirical findings on child-caregiver-interactions in early education are ambiguous: somewhat paradoxically, early educational settings are generally characterised by periods of free and uninterrupted play without any form of communication between children and teachers on the one hand, and direct instruction on the other, while dialogical interactions tend to play a minimal role (Piasta, 1994). Another strand of thought that might have contributed to this development is constructivism, which emphasises the meaning-making of the individual learner (cf. Derry, 2008).
6. Note, however, that such a view obviously has deep historical roots in philosophy as well, e.g. in the work of Aristotle, Kant and Hegel, among others.
7. Recently, the long-held consensus that false-belief understanding only arises at the age of 4–5 years has been challenged by researchers employing novel, non-verbal paradigms who claim that children much younger than 4 are already capable of attributing false beliefs to others (for a review see Baillargeon et al., 2010). However, there are good reasons to stick to the more orthodox belief that a fully conceptual understanding of beliefs does not emerge before the age of 4 (e.g. Grosse Wiesmann et al., 2018; Rakocy, 2017). That said, young children may possess more primitive, non-conceptual forms of tracking ‘belief-like-states’ (Apperly and Butterfill, 2009; Butterfill and Apperly, 2013).
8. Though notice that Moshman, 2015, grants that epistemic development has roots in very early childhood. He does not consider these in detail, however.
9. The different studies that are cited in this section are based on different methodologies, including quantitative and qualitative observational studies regarding the interaction between children and adults across different experimental conditions (such as the use or avoidance of causal language, the provision of communicative cues, or the complexity of linguistic input), longitudinal studies of educational attainment in relation to different early-childhood educational settings, or meta-analyses of the primary literature.
10. This is in line with Derry’s views as well, who provides an insightful analysis of Vygotsky’s approach and its implications for effective pedagogy in light of Brandom’s theory (see Derry, 2008, 2013).
11. Also see Mercier and Sperber, 2017, for an essentially social—argumentative—theory of human reasoning.
12. The significance of joint attention and shared consciousness for the development of reason from a philosophical point of view is also discussed by Rödl, 2016. For an extended philosophical treatment...
of the significance of shared intentionality also see, for instance, Eilan’s, 2015, collection on the second person.

13. Also see Iordanou et al., 2016, for an overview of recent studies that emphasise the importance of dialogical argumentation for the development of argumentative reasoning skills and epistemic cognition and Bakhurst and Fairfield’s, 2016, collection exploring Oakeshott’s discussions of the educational role of conversation.

14. This was helpfully pointed out to us by a referee for this journal. For further discussion see Bakhurst and Fairfield (eds), 2016.

15. In the following, we will summarise these different elements and discuss them together. It would be an interesting task for future research to investigate in more detail the functional role of the individual elements that are described here.

16. Notice that by drawing on his analysis of communicative practice, we are not thereby committing ourselves to all aspects of Brandom’s theory of meaning.

17. Notice that, depending on context, another pragmatic role for ‘I believe…’ might be that the speaker has good, but not conclusive reasons (e.g. ‘I believe the train leaves at 1pm—that’s when it usually leaves’). On other occasions, it can be an expression of hope (‘I believe in you’), and on still others an expression of conviction (‘I believe this is the best option and that’s why I voted for it’). Only some of these usages invite interlocutors to engage in a joint search for reasons. We are grateful to an anonymous referee for this journal for pointing this out to us.

18. We thank the audiences at the European Society for Philosophy and Psychology conference in Hertfordshire, at a workshop on Reasons, Rationality, and Intentional Agency at the Department of Philosophy, Logic and Scientific Method at the London School of Economics, at the Philosophy Colloquium at the Humboldt University of Berlin, and our colleagues at the University of Applied Sciences Potsdam and Leipzig University for helpful comments and discussion. Moreover, we are very grateful to Hannah Ginsborg and to three anonymous referees for this journal for their generous comments. Both authors contributed equally to this paper. The authors declare that there exists no conflict of interest.

REFERENCES


