Chapter 9
Simile, Metaphor and Learning to Perceive the World in Functional and Culturally Relevant Ways

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Abstract In this chapter, we use original data from early childhood education to illustrate, analyse and discuss an important distinction in learning, what something *looks like* and what it *is*. The difference and relation between these two claims, we argue are of great interest when studying learning and it emphasizes how our perceiving is mediated by cultural tools. Managing this distinction could be conceptualized in terms of the dialectics between everyday and scientific concepts. Several examples from research are used to show how metaphors and simile can be used for teaching science concepts to young children. It is shown how the analysis of the data has emphasized the important distinction and relationship between what something *looks like* and what it *is*. That is, children need to be able to discern the object or phenomenon represented (modeled, illustrated) from the mode of representing it. The communicative frame established by the teachers leaves space for children's playful similes. How children perceive the phenomenon being observed, and how they engage with this description is discussed in this chapter. Two or more people sharing attention on a third area is fundamental to education. To establish in speech how to mediate or represent what is observed is one way of coordinating perspectives with this end goal in mind.

Keywords Deictic references • Making crystals • Representations of objects and concepts • Microscopic images

9.1 Introduction

In this chapter, we use original data from early childhood education to illustrate, analyse and discuss an important distinction in learning, what something *looks like* and what it *is*. The difference and relation between these two claims, we argue, are of great interest when studying learning and it emphasizes how our perceiving is mediated by cultural tools. Managing this distinction could be conceptualized in terms of the dialectics between everyday and scientific concepts.

In their important study of preschool in three cultures, China, Japan and the United States, Tobin, Wu and Davidson (1989), among many other things, represent

M. Fleer, N. Pramling, *A Cultural-Historical Study of Children Learning Science*,
Cultural Studies of Science Education 11, DOI 10.1007/978-94-017-9370-4_9

a piece of conversational data that is particularly interesting to the topic and discussion of the present chapter. From a preschool in the US the following observation is made:

> Cheryl [the preschool teacher] then leads the class in an activity involving a felt board and cut-out flannel shapes. Each of the children is called on one at a time to come forward and select a white piece of flannel background. Cheryl explains, 'This blue board is the sky and the white shapes are clouds. Put a cloud on the sky and tell us what the cloud looks like.'
>
Lisa (in a whisper):	A bird.
Cheryl:	Speak louder, Lisa, so everyone can hear you.
Lisa:	A bird.
Cheryl:	The cloud looks like a bird? [To the class] What do you think? Do you think it looks like a bird? Yes, it does. Good. Thank you, Lisa.
Mike:	This is a cloud.
Cheryl:	Yes, it's a cloud. What does your cloud look like, Mike?
Mike:	Like a cloud. (Tobin et al., 1989, p. 129)

This practice of intentionally pedagogically promoting children's ability to perceive something in terms of something else, that is, through simile, may, Tobin et al. suggest, be culturally variant. In their ensuing conversation with the preschool teacher leading the aforementioned activity, she gives the following rationale of the activity:

> The idea of this activity is to teach children the concept of simile. I gave the children an example of the pattern: 'This cloud is like a da-da-da.' Then they each had their chance. I was less concerned here with what they thought the cloud looked like than with making sure they had the concept of something being like another thing without being the other thing. It's a trickier concept for some kids than others. (Tobin et al., 1989, p. 148; italics omitted)

In cultural-historical parlance, the referred activity illustrates the principle of semiotic mediation (Wertsch, 2007) and how we learn to perceive the world in terms deemed relevant and interesting from the prevailing culture's or institution's point of view. A child looking up at the sky at night (had she been allowed to be awake looking at the sky at night) would not have seen 'The Sign of the Southern Cross' and 'The Great Bear' etc. In order for the child to learn to perceive the night sky in these ways someone needs to support her in 'pointing out and linguistically informing her experience' (Pramling & Pramling Samuelsson, 2011). What something is perceived as like may come to be institutionalized in a culture into what something 'is'; 'That is the Southern Cross', for example. Such a process of institutionalization in a culture could be studied in a historical perspective. The transformation from the tentative 'is like' to the affirmative 'is' of scientific knowledge formation was clarified in the classic study by Ludwik Fleck (1935/1979). In the present chapter, in contrast, we will study how this distinction comes into play and is managed in teacher-child talk around natural phenomena. That is, in the present book and chapter, the relationship between what something 'is like' and what it in institutional terms from a certain perspective 'is' will be studied in terms of the everyday practice in a preschool when they talk about natural phenomena. In passing, we may note that the child in the above excerpt answering that it looks 'like a cloud' is also using a simile (as does the child answering that it looks like a bird); the object on the board is not literally a cloud. However, within the communicative premise as established by the

teacher, that the object represents a cloud should be taken as given, and then the task is to clarify what this cloud looks like. What are and are not relevant terms to perceive something in is, in an educational practice, contingent upon the communicative framing (Goffman, 1974) of the activity. Whether it is open for the children to play with how to perceive something or if some kinds of similes are expected and valued in a certain situation is in itself something for children to identify as they partake in a practice.

9.2 What It Looks Like or What It Is: Different Pedagogical Principles and Their Possible Institutional Embeddedness

Asking a child what something looks like (sounds like in music etc.) or what it is, has been suggested by Shirley Brice Heath (1996/1983; cf. Winner, 1988) to be an important difference between the institutions of preschool and school (in the US). Whether this is also the case in, for example, Sweden and Australia some 30 years later, is in itself a question worth investigating empirically. To our understanding these two questions – what something *looks like* or what *it is* – are very different. From a pedagogical point of view the former appears to be far more productive in promoting the child's learning. Asking a child what something looks like allows him or her to use her previous experience and language as resources in making sense of novel phenomena. This also allows the teacher to confirm and thus acknowledge the child's knowledge and, in addition, introduce the child to a new tool for conceptualizing the observation (for an empirical example of this, see Pramling & Pramling Samuelsson, 2010). In contrast, asking a child what something is, while being more distinct, disconnects the novel from the child's previous experience. This question also works summative rather than formatively, that is, it works in checking whether the child has a certain knowledge or not, but does not support the child in furthering his or her understanding. Consequently, scrutinizing our data sets in terms of this distinction between 'what something looks like' and 'what it is' appears to be a worthwhile analytical endeavor. From a pedagogical perspective, particularly interesting is how the tension between what something is like and what it in a conventional sense from a particular perspective is, is managed in teacher-child interaction around, for example, natural phenomena.

9.3 Telling and Explaining

In this chapter we will analyse empirical data from one lesson in a Swedish preschool class. What is referred to as the preschool class is an intermediate form of schooling for the 6-year-olds, intended to bridge between the traditions of preschool and school and thus between play-based and teaching-based ways of organizing learning (for a presentation of this form of schooling, see Pramling Samuelsson, 2006).

The lesson begins with the group of children and their two teachers sitting in a circle. In the following transcripts, the teachers' (fictious) names are written in UPPER-CASE LETTERS. One of the teachers shows an object (a glass jar with something in) and asks, `Does anybody wants to tell about this?` One of the children, Philip, raises his hand and is given the communicative floor. However, he mumbles and it is not possible to make out from the recording what he initially says:

```
Philip:   [mumbles]
TINA:     There has been water in this, has there been anything
          else?
Philip:   Salt and the salt has like…
TINA:     What has the salt done?
Philip:   Climbed up the walls and…started to become like
          warm.
TINA:     It has become warm. What has happened to the water
          then?
Philip:   It turns into steam.
TINA:     Yes. It has evaporated, yes.
Philip:   Then it's turned into like ice crystals.
TINA:     Yes.
```

Philip's explanation is interesting for several reasons. He says that, `salt and the salt has like…` This marker (`like`) signals that he has a vague idea about this, but cannot really clarify what it is yet. Asked by the teacher, `what has the salt done?`, which is a kind of question that implies a narrative elaboration (the salt as an agent doing something, an action; cf. Bruner, 2006; Pramling & Ødegaard, 2011), Philip responds that it has `climbed up the walls and… started to become like warm`. He uses this active metaphor of `climbed` to give an explanation, an explanation that he however meta-communicates through his markers (`to become like warm`) he knows is not in a strict sense how it is. Hence, he signals that he speaks in an *as-if*, rather than in an *as-is* manner (see Pramling, 2006, for an elaboration). In her follow up, the teacher connects to the temperature and the water rather than the salt, first stating, `It has become warm`, and then asking, `mm, what has happened to the water then?` Philip responds that `it turns into steam`, which the teacher confirms and reformulates into, `yes. It has evaporated, yes`. Finally Philip adds, `then it's turned into like ice crystals`, and in this way, similar to his previous statements, implies that he has some notion of this process but cannot yet quite explain it, comparing what he sees to `ice crystals`.

Asked if anyone else `wants to tell something else about this`, Magnus raises his hand:

```
Magnus:     [Walks up to the jar] Yeah, because the water has
            all turned into st…steam, the salt has also gone
            up with the steam and it has become a salt stone.
            [Goes back]
TINA:       Would anyone else like to say anything about this?
            Have I forgotten anything?
LISA:       I don't underst…
TINA:       Wait Valdemar.
Valdemar:   The salt turned into a salt crystal.
```

TINA: Yes, they have become salt crystals.
Valdemar: Mm.
TINA: It's a beautiful name, isn't it. Mm. Salt crystals. Yes, mm. And I noticed that Lisa put up her hand.
LISA: Yes, do you know what. We're going to have a look at them, and they're really beautiful in the jar and on the string, aren't they?
Children: Mm mm.
LISA: Yes they are. But we'll see if we can look in this to make it a little bigger. Then we can see it on a board on the wall.
Children: Mm!

Magnus's explanation is brief and to the point, yeah, because the water has all turned into st…steam, the salt has also gone up with the steam and it has become a salt stone, after which he returns to his seat. Another child adds that the salt turned into a salt crystal (cf. above, like ice crystals), which the teacher confirms with a somewhat ambiguous statement, yes, they have become salt crystals; they perhaps referring to grains of salt. The teacher also adds that It's a beautiful name, isn't it. Mm. Salt crystals. This introduces something that will recur throughout the lesson, aesthetic value judgments. We will return to this issue. Finally, she mentions the next activity to be undertaken; they are to look at the salt crystals under a magnifying glass projected on a whiteboard. For this they have to walk through school to another classroom.

LISA: Because Marie [a third teacher] has a microscope there.
Boy: Oh cool!
LISA: And she has a big board on the wall called a smartboard.
Child: Oh, and my….
LISA: And you can see it.
TINA: Mm.
LISA: What they look like magnified.

This prompts one of the children to declare, Oh cool! The children are much enthused throughout the lesson (as will be seen below).

9.4 Under the Microscope, Up the Wall: What It Is They Look at, How It Looks, and the Aesthetics of Perception

Having walked to the new classroom and taken a seat, the light in the room is shut and the image from the microscope is projected onto the whiteboard for all to see.

Child: What's that, is it dust?
TINA: It looks a little like it.
JOHN: We can't see anything there now.
TINA: Jonas. There's nothing there now, but what John is pottering about with now are the salt crystals that have grown in our jar. The white stuff, mm.

JOHN: Do you know what. I've taken a bit of this now, you know better than me what it is because I've got no idea.
Child: Salt crystal.
JOHN: Salt, oh right.
TINA: Not…Lukas.
JOHN: Shall we see what it looks like. [It starts to move on the screen] If we just magnify this a little.
Child: There's the salt crystal. [The crystal can be seen on the screen]
TINA: Oh, get a beautiful picture now, please.
JOHN: Yes, I'll just try to get it to stay still.
TINA: It should glitter.
TINA: Wow! It is glittering! What…what are they doing?

Simply watching the emerging pattern on the whiteboard prompts a child to pose a question; what's that, is it dust? In all representational practices (modeling, illustrating, exemplifying etc.), the issue of discerning what is a feature of the phenomenon observed (referred to) from what is a feature of the representational media as such is pivotal. In this case, the child ponders over whether what is observed is the phenomenon (salt crystal) or an 'artefact' in the sense of dust. What is in fact observed at this initial time is apparently not clear to the teacher either, as seen in her response; it looks a little like it. The teacher clarifies that what they will see is the salt crystals that have grown in our jar. The white stuff. A fourth teacher, John, who is also present and assists with the microscope takes the uninitiated role, I've taken a bit of this now, you know better than me what it is because I've got no idea, triggering the children to take the role of more knowledgeable and giving contributions such as salt crystal in clarifying what John's deictic expressions this and it refer to. Responding to deictic referencing in terms of verbalization of conventional names is otherwise often done by teachers in learning situations (as we have many examples of in other chapters of this book). Magnifying what is observed, a child immediately points out there's the salt crystal as it appears on the whiteboard. Apparently this looks discernibly different to what was previously seen on the screen, which was perhaps dust. The teachers in contrast respond by aesthetic judgments (Jakobson & Wickman, 2007), Oh, get a beautiful picture now, please, it should glitter and Wow!

John says that he can take photos of what they see and print these. Looking at the image on the whiteboard the children start describing what they see:

Child: Oh! It looks like a rock, with a little bridge going over it. [laughs] it looks like stairs!
JOHN: I'll zoom in even more and we'll see what the rest look like…Now it's gone dark…this is now twenty times magnification.

[The children talk at the same time, indistinguishable]

TINA: Shh!
Child: A rock…
TINA: Listen to John now.
JOHN: This is now forty times magnification.
Child: Wow. What is it?
TINA: What can it be? It looks a little like moisture.
LISA: Yes, just like, yes…water.
TINA: Yes, it does, doesn't it.
JOHN: That is a tape…a piece of tape, something catching on a piece of tape, I think.
Child: Oh!
TINA: What do you mean, a piece of tape?
LISA: You had a piece of tape and put the salt on it.
JOHN: Yes, to get it to stay still.
TINA: Oh yes.

Watching the visual patterns on the screen, the children describe what it looks like, `Oh! It looks like a rock, with a little bridge going over it. [laughs] it looks like stairs!` These similes and the child's engagement seem to be triggered by the aesthetic response (`Oh!`). John continues to zoom in on the salt crystals. One child proposes `A rock`…, while another when 40 times magnitude comes into focus exclaims, `Wow. What is it?` Responding, `what can it be? It looks a little like moisture`, one of the teachers, rather than simply stating that they look at the salt crystals, repeats the question giving the children the opportunity to give suggestions. More productive than saying *what it is*, however, at this instance seem to be to encourage the children to describe what they see on the whiteboard *as*, the teacher herself suggesting, `it looks a little like moisture`. The other teacher connects with `yes, just like, yes…water`. However, as suggested by John's comment, it may not be entirely clear what they are in fact looking at, `that is a tape…a piece of tape, something catching on a piece of tape, I think`. This suggestion poses some surprise to the teachers but they soon coordinate their talk. Hence, again the issue of the critical importance of distinguishing between the representational media and the phenomenon comes up for negotiation between the children and teachers (cf. above).

TINA: Shall we see if it is possible without tape.
LISA: Yes…because it might be a bit confusing.
TINA: Yes. It is. Really.
JOHN: Shall we see what this looks like.
TINA: Ah, but it looks like…
LISA: Oh, look!

[it comes into focus and the crystal can clearly be seen]

Children: Ooh!

[Somebody claps their hands]

TINA: Here it comes!

LISA: Oh.
JOHN: But now it is very…uh…one part is very high up and one part is a long way down, so we have to focus on it at the same time.
TINA: But it looks like a crystal.
JOHN: Shall we see if we can find a good place.
Child: Yes. Did you see, Lisa.
LISA: How cool.

Concluding that the tape fixating the crystals on the microscope plate confuses their perception, the teachers decide to take it away. When the crystal finally come into sharp view it is met by enthusiastic aesthetic responses such as `Oh, look!`, `Ooh!`, and even clapping (applauds). Children's attentive engagement is further indicated when one child saying to one of the teachers, `Yes. Did you see, Lisa?`, making sure the teacher has notices what the child has and considers worth attending others to (cf. Tomasello, 1999).

Child: Lisa, it's so cool, this rock.
LISA: Yes. It looked like…
Child: It looks like a person.
Child: It looks like a person with just one long arm.
LISA: Oh yes.
Child: Oh shit.
TINA: Now we have a sensation here.
Child: You can make a bigger picture too.

The visual pattern they see on the whiteboard triggers the children to express aesthetic judgments that they direct to and thus involve others in perceiving; one child makes one of the teachers attend to the pattern; `Lisa, it's so cool, this rock`. The teacher confirms the child's statement and proposes `yes, it looked like`…, which the children readily continue, saying that `it looks like a person. It looks like a person with just one long arm`. One child continues the other child's simile. A collaborative sense-making practice evolves. `O shit`, as exclaimed by one of the children, is actually said in English; this is a common expression in the Swedish young with a positive sense, used in a similar way as 'cool' (cf. Jakobson & Wickman, 2007).

LISA: We can actually do it like this, you know, and I'm going to change that a little. Yes, I'm going to take that slightly bigger one there.
JOHN: It should actually be kept flat… [inaudible].
TINA: If we get more light on it, does that work? So that we can get that glittery appearance.
JOHN: We can zoom in even more.
TINA: I think I'll zoom in one more click.
JOHN: [inaudible]
TINA: What does it look like?
Child: Chickens.
Child: A cliff.
TINA: A cliff, yes.
Child: I think it looks like a…
Child: Or grass.

TINA: Ah, but look here!
Child: Dragon-mushroom.
TINA: There's the glitter. Look here.
Child: It looks like silver!
Child: It looks like a dog. With a tail.
Child: No.
Child: But up there.
Child: Look.
Child: Ah, but can't you see it looks like a…it looks like when you make…

After some initial deictic talk (that, that, there), one of the teachers mentions that the attempt is to get that glittery appearance. Again zooming in, a teacher asks the children, what does it look like? One child suggests chickens, while another says a cliff. The latter simile, in contrast to the first one, as it appears in terms of her response, makes sense to the teacher (a cliff, yes). Other suggestions are made by children, for example, saying that it looks like grass. However, this suggestion is not responded to by the teacher. Instead, she exclaims, ah, but look here! Before verbalizing what she wants the children to see, a child cuts in with a neologism, dragon-mushroom. The teacher clarifies that there's the glitter. Look here. She directs the children's attention to what is on the whiteboard in certain terms. One child confirms this perception by using a related expression, it looks like silver! while other children negotiate but do not at this point reach an agreement on how to see the visual pattern. While talking about what something *looks like*, rather than what *it is* (the latter they have already decided beforehand), it is not arbitrary in terms of what to see the phenomenon. Certain similes make sense to others (the teachers and other children) and some do not. Even if the similes used in these conversations may be unconventional, learning to perceive phenomena in terms of something familiar that makes sense also to others, making possible the coordination of perspectives and sense is important. Such coordination work of how to perceive something in certain metaphorical terms is also done by scientists in laboratories trying to make sense of experimental observations, as studied by Ochs and colleagues (1996).

Child: Glitter.

[The children talk a little while somebody tries to adjust the focus]

TINA: This is as big as we can make it. Now we're as close as we can get.
LISA: Yes.
Child: How far away can we get.
TINA: We have looked at the very top, now we are going to look right down at the bottom. Now we do this.
TINA: Now it's starting to gleam, there. Look.
Child: It looks like silver.
TINA: Yes, it's glittering now. Yes.

[The children point and look]

Child: What is it actually?
All the adults answer: It's the salt.
TINA: That we had in jar. This is the salt. Magnified.

One child uses the description, glitter, as previously introduced by the teacher. When the image once again comes into focus, the previously introduced (by child and teacher, respectively) descriptions recur, it looks like silver and yes, it's glittering now, and these perceptions are thus coordinated. At this point something very interesting occurs; the children point at the image on the whiteboard and one of them asks, what is it actually? This question, what something really *is*, is very different to the conversation thus far which has revolved around the issue of what something *is like* (how its appearance could be described). Interestingly, this question comes from the children, not from the teacher. The teachers respond, It's the salt. That we had in jar. This is the salt. Magnified. The conversation continues:

Child: [inaudible]
TINA: No, but it is magnified. How many times magnification is that now?
LISA: Uh…forty times.
TINA: Forty times.
MARIE: Next time will do sixty times. Because then you can't see what it is.
Child: No.
Child: If you go further away, you can see it much better.

[The children and adults chatter]

Child: Yeah, there it is.
MARIE: It's starting. Glittering a little.
Child: That looks like silver.

[Children and adults continue to chatter]

TINA: Shall we see if we have done it.
MARIE: I think we have to zoom out a little to make it visible. You can't see it as clearly with these…is that forty?
JOHN: Yes.

Unfortunately, the child's talk is not discernible, but judging from the teacher's response, no, but it is magnified, suggests that the child has expressed some doubt. After having zoomed in and out for some time and talked about what the image looks like, all children do no longer seem to be clear about what it is they look at (see the previous excerpt). The child saying that if you go further away, you can see it much better indicates an understanding of the principle that being able to see clearly through the microscope implies a 'trade-off' between magnifying and getting too close.

MARIE: Let's try twenty and have a look.
TINA: Yes, we'll try twenty too. I don't think we'll see anything. Because it becomes so blurred and so…

[The focus is improved]

Child: Wow!
MARIE: Wow!
TINA: Yes it was, it's like this! This is what it should look like.
Child: Cool.
Child: Take a picture!
Child: Take a picture!
TINA: We can take a picture there.
LISA: Do you know how to do it Marie?
MARIE: Oh yes.
LISA: Yes.
TINA: Can you imagine that those white things look like this. The salt crystals in our jar. That they look like this magnified. That's fantastic, isn't it. It's almost unbelievable.
MARIE: Yes, it's like they are cerise…
TINA: It's fun to see it like this.
Children: Yes.
TINA: I think so.

Several aesthetic exclamations are heard among the children and teachers, wow!, wow!, cool, and the children in their enthusiasm tell the teacher to take a photograph of what they see. At this point, when they children are greatly attentive to the image on the whiteboard, one of the teacher makes explicit the connection between what they see and what it is, Can you imagine that those white things look like this. The salt crystals in our jar. That they look like this magnified. That's fantastic, isn't it. It's almost unbelievable. Some more aesthetic appreciation is heard, it's fun to see it like this.

JOHN: It must be fairly flat.
MARIE: Oh, yes.
TINA: Yes, that's right, so that it fits in the picture. There!
MARIE: Wow.

[Picture of crystal appears on the screen again]

Child: There!
Child: Ooh!
Child: What's that long thing there?
TINA: It might be something…
JOHN: It might be a strand of hair or something lying there.
MARIE: Yes, something that ended up there.
Child: Or it might be, or it might be, it's this, what's it called…
JOHN: Or the threads, perhaps.
Child: Yes, the threads, the threads!
JOHN: Yes, the threads, I should think.
TINA: It might be the threads it is climbing on.
Child: That's brilliant!
TINA: Oh, look!

Child: Take it, take it, take it.
Child: Take it, it's cool.
Child: That.
Child: That was cool.

The by now familiar aesthetic expressions and deictic references recur. More interestingly, at this point, is the conversation triggered by one of the children asking, What's that long thing there? As evident from the teacher's response, it is not clear what it is they see, it might be something… Another teacher ponders whether it might be a strand of hair or something lying there. Some vague attempts are made to suggest what they see, and a child starting to say something but does not appear to find the word looked for is continued by one of the teachers suggesting, or the threads, perhaps, that is the thread that the salt crystals are attached to. The child responds with emphasis, exclaiming yes, the threads, the threads! This suggestion is confirmed, yes, the threads, I should think. It might be the threads it is climbing on. The expression (Swedish: ball), as used by the children here is a positive expression, similar to 'cool', which has been used as translation here. After some further looking under the microscope, the teachers and children return to their classroom and the activity is concluded.

9.5 Discussion: What a Phenomenon Looks Like and What It Is

In this chapter we have followed an extensive sequence of teachers and children talking about and under a microscope, projected to a whiteboard, making sense of what they see and how this could be described. Particularly, the analysis of the data has emphasized the important distinction and relationship between what something *looks like* and what it *is*, as seen from a certain perspective, domain of knowing. Throughout the sequence followed, the issue of aesthetic judgments (Jakobson & Wickman, 2007) has also kept reappearing. In the final parts of this chapter we will discuss these matters and what they imply for children's science learning. A critical issue when learning science as well as other representational forms of knowing, are to be able to discern the object or phenomenon represented (modeled, illustrated) from the mode of representing it. This issue comes up for negotiation between the teachers and the children on several occasions throughout the followed lesson. What *is it* that they see through the microscope as magnified on the whiteboard, is it tape, dust, a thread or is it the salt crystals as such?

Another important observation was that the children themselves used markers, clarifying that they have some idea about the phenomenon discussed but that they cannot yet clarify more precisely *what it is*. These children are thus on the way in their knowledge development, they *know what it is like* and that this simile is somewhat correct but not quite what it is (cf. Pramling, 2006). As seen in several chapters of this book, a recurring speech pattern could be described as going from

deictics to verbalization of meaning. Deictic references are those communicative actions that point to something, either physically with one's fingers or verbally through words such as 'that', 'there', 'it', and 'then' (Ivarsson, 2003; Rommetveit, 1968). Verbalising deictic references clarifies what these refer to and how they should be represented in speech (categorized, labeled) in this particular activity. To do so is also important in order to coordinate perspectives between different communicative partners (e.g., a teacher and a child). This clarifying follow-up action is often done by teachers. However, as seen in the present chapter, there are also occasions when the children do so, that is, a child verbalizing a teacher's deictic reference. The teachers in this lesson communicatively frames (Goffman, 1974) the activity in ways that are subsequently picked up and aligned with by the children. One example of this is in the beginning of the lesson when one of the teachers uses an active metaphor when speaking about the formation of the salt crystals and a child reuses this way of speaking, in effect constructing a kind of proto-narrative (cf. Pramling & Ødegaard, 2011). Another example is how the teachers introduce aesthetic judgments into the activity, something the children also take on and use. As earlier pointed out by Jakobson and Wickman (2007) and Wickman (2006), aesthetic judgments such as 'beautiful' etc. are common in science learning.

While the participants in the followed activity frequently described what they perceived what they saw on the white board *as*, that is what is was *like*, they did less frequently engage in conversation about *what it is*. Letting children suggest what something looks like and to suggest such similes and metaphors as a teacher facilitates the children's engagement through allowing them to use what they already know and are familiar with as resources for making sense of and communicating to others something that is less well known and what they are only beginning to familiarize themselves with. However, in order to build upon these resources, a more knowledgeable interlocutor (e.g., a teacher) needs to relate these to a more established or conventional language (discourse) for speaking about the phenomenon. Without such relational work, and if only confirming the child's suggestions of what something looks like, the child will not be supported in appropriating new cultural tools useful for making sense of and communicating about nature. Alternatively, if only introducing what something is, as understood conventionally within a science discourse, the novel will not make sense to the child in being unrelated to what he or she already knows. If taking a Vygotskian (1987) perspective on conceptual development, there is an inherent dynamic and necessary tension between everyday and scientific concepts in the child's development (see Chap. 1). Seen in terms of the distinction made in this chapter, what something *is like* needs to be in speech negotiated in relation to what it in a certain discourse *is*.

The communicative frame established by the teachers leave much space for children's playful similes in suggesting what they perceive the phenomenon observed looks like, and they readily engage in this description with great joy (laughing, applauding). However, the teachers, in addition to encouraging the children to more freely say what they think it looks like, direct their attention to what is on the board in certain terms (e.g., `glittering`) which is subsequently taken up by the children in describing what they see. Two or more people sharing attention on

something third is fundamental not to learning, which is a much wider concept, but to what may be referred to as an education (Pramling & Pramling Samuelsson, 2010; see also Chap. 11). To establish in speech how to mediate or represent what is observed is one way of coordinating perspectives with this end. We now turn to graphical representations in science and what this means for scientific thinking of very young children.

References

Bruner, J. S. (2006). Narrative and paradigmatic modes of thought. In *In search of pedagogy, volume II: The selected works of Jerome S. Bruner* (pp. 116–128). New York: Routledge.

Fleck, L. (1979). *Genesis and development of a scientific fact* (F. Bradley & T. J. Trenn, Trans.). Chicago, IL: University of Chicago Press. (Original work published 1935)

Goffman, E. (1974). *Frame analysis: An essay on the organization of experience*. New York: Harper & Row.

Heath, S. B. (1996). *Ways with words: Language, life, and work in communities and classrooms* [with a new Epilogue]. New York: Cambridge University Press. (Original work published 1983)

Ivarsson, J. (2003). Kids in zen: Computer supported learning environments and illusory intersubjectivity. *Education, Communication & Information, 3*(3), 383–402.

Jakobson, B., & Wickman, P.-O. (2007). Transformation through language use: Children's spontaneous metaphors in elementary school science. *Science & Education, 16*, 267–289.

Ochs, E., Gonzales, P., & Jacoby, S. (1996). "When I come down I'm in the domain state": Grammar and graphic representation in the interpretive activity of physicists. In E. Ochs, E. A. Schegloff, & S. A. Thompson (Eds.), *Interaction and grammar* (pp. 328–369). Cambridge, UK: Cambridge University Press.

Pramling, N. (2006). 'The clouds are alive because they fly in the air as if they were birds': A re-analysis of what children say and mean in clinical interviews in the work of Jean Piaget. *European Journal of Psychology of Education, 21*(4), 453–466.

Pramling, N., & Ødegaard, E. E. (2011). Learning to narrate: Appropriating a cultural mould for sense-making and communication. In N. Pramling & I. Pramling Samuelsson (Eds.), *Educational encounters: Nordic studies in early childhood didactics* (pp. 15–35). Dordrecht, The Netherlands: Springer.

Pramling, N., & Pramling Samuelsson, I. (2010). Evolving activities and semiotic mediation in teacher-child interaction around simple objects. *Educational & Child Psychology, 27*(4), 22–30.

Pramling, N., & Pramling Samuelsson, I. (Eds.). (2011). *Educational encounters: Nordic studies in early childhood didactics*. Dordrecht, The Netherlands: Springer.

Pramling Samuelsson, I. (2006). Teaching and learning in preschool and the first years of elementary school in Sweden. In J. Einarsdottir & J. T. Wagner (Eds.), *Nordic childhoods and early education: Philosophy, research, policy, and practice in Denmark, Finland, Iceland, Norway, and Sweden* (pp. 101–131). Greenwich, CT: Information Age.

Rommetveit, R. (1968). *Words, meanings, and messages*. New York: Academic Press.

Tobin, J. J., Wu, D. Y. H., & Davidson, D. H. (1989). *Preschool in three cultures: Japan, China, and the United States*. New Haven, CT: Yale University Press.

Tomasello, M. (1999). *The cultural origins of human cognition*. Cambridge, MA: Harvard University Press.

Vygotsky, L. S. (1987). *The collected works of L. S. Vygotsky, Volume 1: Problems of general psychology, including the volume* Thinking and Speech (R. W. Rieber & A. S. Carton, Eds., N. Minick, Trans.). New York: Plenum.

Wertsch, J. V. (2007). Mediation. In H. Daniels, M. Cole, & J. V. Wertsch (Eds.), *The Cambridge companion to Vygotsky* (pp. 178–192). New York: Cambridge University Press.
Wickman, P.-O. (2006). *Aesthetic experience in science education: Learning and meaning-making as situated talk and action*. Mahwah, NJ: Lawrence Erlbaum.
Winner, E. (1988). *The point of words: Children's understanding of metaphor and irony*. Cambridge, MA: Harvard University Press.