

Socioculturally-informed Interaction Analysis (SIA): Methodology and theoretical and empirical contributions of an emerging research program in early childhood education

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Abstract

Over the last decade, a Swedish research group has conducted several empirical studies in the field of Early Childhood Education (ECE). These studies are examples of what is sometimes referred to as practice-based studies, and they are often conducted in collaboration with ECE personnel. In this meta-study, we review 37 publications from the research group to highlight key contributions in terms of methodological issues or challenges identified, as well as empirical findings and theoretical developments. We argue that these studies constitute an emerging research program, termed *Socioculturally-informed Interaction Analysis* (SIA). Key aspects of SIA are: examining learning as a process, using recordings to avoid bias, considering pragmatic validity when working with transcriptions, making claims closely aligned with what is studied (ecological validity), and viewing context as an analytical rather than as a descriptive concept, and generalising at a conceptual level, which affords empirical generalisation.

Keywords

meta-analysis, methodology, early childhood education, research program, empirical study

Introduction

Over the last decade, our research group, Preschool, Play, Learning and Teaching (PrePLanT) has been conducting empirical research in Sweden in the field of early childhood education (ECE), which encompasses preschool, preschool class and the first years of school. Our research has focussed on areas such as teaching, learning, the use of digital technologies, the use of (different) languages, and subject-specific learning (e.g. music and story-telling). Although these areas vary, our empirical studies share a common interest: the interaction between children and adults (primarily preschool teachers). Our studies of learning and/or teaching also share the unit of analysis: tool-mediated activities (Säljö, 2009; Säljö, 2021). These refer to how participants in ECE practices establish mutual activities using the cultural tools available. To identify such activities, we have employed observation methods that make use of audio and video recordings.

The need for practice-based research in the field of ECE has been emphasised both internationally (Sharmahd et al., 2017) and nationally (SOU, 2018:19). A number of research approaches can be used to conduct research closely with or in collaboration with early-years teachers, such as action research (Edwards-Groves & Kemmis, 2016), lesson study (Pang & Marton, 2017), development research (Menaldo & Prakash, 2014) and design research (Reimann, 2016). While these approaches are characterised by their iterative design, our studies are typically not. Nonetheless, we see commonalities between these approaches and ours and suggest that the research we have performed can be a fruitful contribution to the tradition of practice-based research. In this article, we present a meta-study of 37 publications, published by our group between 2012 and 2019. By reviewing these publications, we aim to outline what these studies have collectively contributed, both empirically and theoretically. We also discuss the methodological issues these studies actualise and how these issues and challenges have been addressed. Taken together, the empirical studies in these 37 publications constitute a research program in terms of empirical findings and theoretical and methodological developments. Based on this review, we present a specific analytical approach for practice-based research, which we will refer to as Socioculturally-informed Interaction Analysis (SIA).

This paper is structured as follows: we first introduce the theoretical and methodological premises before introducing the meta-study and subsequently present the findings, which are grouped into three themes: (i) questions posed in the studies, (ii) main empirical results concerning (a) the role of teachers and cultural tools in children's learning, and (b) what it means to develop children's agency in ECE, and (iii) theoretical development. In the subsequent section, we discuss the methodological issues that our studies actualise. Finally, we conclude with a summary of the idea of SIA.

Theoretical and methodological premises

In this section, we first clarify our theoretical premises, which stem from a sociocultural perspective. From this perspective, learning is considered the appropriation of cultural tools and changed participation in practices. We then discuss methodological points of departure that concern the need for studying activities in situ, ecological validity and doing research with teachers/the profession.

Learning as the appropriation of cultural tools

In research on learning and development, an important and longstanding distinction is between product and process studies (Scribner & Cole, 1973; Werner, 1937; Valsiner, 2005; Wallerstedt et al., 2014, 2015). Studies with a product-oriented design mainly measure the effects of learning by assessing what children know before and after some time or activity (e.g. partaking in a lesson). On the strength of a difference between these two measuring points, these studies infer that learning or development has occurred. However, we deviate from this strategy and instead approach learning as a process (Fleer et al. 2020); that is, we analyse how children actualise what they know in making sense of something novel and how they change their participation through gradual appropriation of cultural tools and practices. The process of appropriation implies the co-construction of knowledge that happens through jointly conducted activities (Wells, 2007). In order to study this process and how teachers and children respond to each other in an educational setting, there is a need for a research design that enables the analysis of how activities evolve (Säljö, 2009; Pramling et al., 2019). This is the fundamental argument supporting observation studies that use audio and video recordings as methods for generating data.

In our studies, we also adopted principles of Interaction Analysis (Heath et al., 2010; Jordan & Henderson, 1995; Keyton, 2018) to examine empirical data. We analyse interactions as unfolding, responsive events, and both verbal and embodied actions, such as pointing and gesturing, are seen as part of such interaction. Critical to educational activities is whether participants manage to establish temporarily sufficient intersubjectivity (Rommetveit, 1974), that is, whether they are able to co-ordinate their actions in order to engage in a joint activity rather than in separate ones. Intersubjectivity is thus understood as temporary, sufficient and partial; participants do not necessarily share concepts in a more fundamental sense, since all have different experiences and participate in activities in different ways (Linell, 2014).

According to the sociocultural perspective, which underpins our studies, teaching and learning in ECE settings concerns how children are introduced to and gradually appropriate cultural tools. Tools can be concepts, or digital as well as analogue artefacts (e.g., toys or instruments). Such appropriation of cultural tools (Wertsch, 2007) is a salient interest of our research group. In fact, researchers have long been interested in how children use, interact and appropriate different kinds of cultural tools in institutionalised settings, and accordingly change their participation in these (for a socioculturally-informed historical perspective on technology in human development, see Pea & Cole, 2019). Under this perspective, children are not considered blank canvases but active agents. The concept of agency denotes a child's possibility to change the course of their participation in an activity (Clarke et al., 2016).

Studying activities in situ and ecological validity

We argue that it is important to both study activities in situ and, consequently, make claims on the basis of what is actually studied. Studying activities in situ affords, for example, a nuanced interpretation of a phenomenon that is otherwise primarily discussed in the exceptionally polarised academic debate on the appropriateness of young children using digital tools in ECE settings. Instead of focusing on what could or should happen when children use technologies, studies can focus on what Selwyn calls 'state-of-the actual' questions, such as, 'What is the use of technology in educational settings actually like?'

(Selwyn, 2010, p. 70). A close relationship between what is studied and what is claimed is referred to as ecological validity and is an important quality criterion of practice-based research. While it may seem obvious that the two need to align, historically, and even today, this is not always the case. A clear example of a discrepancy between what is studied and what is claimed is classic behaviouristic research, where one thing is studied (animals – primarily pigeons and rats – in a laboratory) to make claims about other things (how people in general learn, including in classrooms). Another example is neuropsychological research on (children’s) learning in educational settings, in which studies conducted at one level of description – neural – are used to make claims about a very different level – human action or activity (learning or teaching), without any clear or causal relationship between these levels (see Säljö, 2009, 2011, for critical discussions).

Video recording of learning activities allows the researcher to step back and be distant from the studied activities. The contextual knowledge needed challenges researchers to be explicit in clarifying the empirical data for analysis and how conclusions are grounded in the material to be analysed. Therefore, we argue that a collaborative view of video data becomes an important practice for ensuring ecological validity. Specifically, this implies that it is important to arrange collaborative data-analysis sessions (Derry et al., 2010; Jordan & Henderson, 1995; Keyton, 2018), where the video recordings are critically scrutinised and discussed. This kind of collaborative viewing also allows the researchers to be distant from the activities analysed. By means of such sessions, reflexivity can be maintained, with regard to researchers’ cultural knowledge of, for example, participation in the actual setting, the experience of similar settings, or professional experience of teaching in preschool (several members of the research group have a background as preschool teachers). Observation studies using audio and video recordings enable this kind of analytical work, where it is possible for a critical mass of researchers to analyse data collaboratively.

Doing research with the profession

In our practice-based studies, we have collaborated with teachers in ECE settings, which implies that ECE is the empirical context we need to be familiar with and, in order to conduct analyses, distance ourselves from. While recognising that it is important to analytically situate studies, we argue that the notion of context needs to be differentiated to elaborate on this idea. In a general sense, describing the nature of the institution where the study takes place is of importance. For example, it is important to understand that Swedish preschool is governed by a curriculum with goals to strive for, not goals to reach, and that it has university-educated preschool teachers as well as personnel without such education. This is a contextual description where context is used as a narrative concept – to clarify the conditions that need to be considered to understand what is studied. However, we argue that it is more critical that context is employed in our research as an analytical concept. This is in line with what van Oers (1998) refers to as contextualising (rather than context; see also, Guile, 2019; Vågan & Heggen, 2014), which highlights the need to analyse how participants, metaphorically speaking, weave together what they encounter in an activity with what they know or associate it with. Interestingly, context etymologically stems from the Latin word ‘contexere, which means “to weave together”’ (Cole, 1996, p. 135). Hence, context, in a sense, is generally used in research both as a narrative and as an analytical concept. The latter is critical to studies that aim to understand the participants’ perspectives. Such studies recognise that contexts do not exist beforehand to ‘influence’ participants; instead, contexts and participants are engaged in a reciprocal process. The former view – seeing context as a factor influencing people – arguably

constructs context as a static structure to which participants respond in the same way (are ‘influenced’, as it were), in effect black-boxing what needs to be analysed (Pramling et al., 2019): the relationship between participants’ actions and the setting to, and in, which they orient themselves (Wertsch et al., 1995; cf. Kullenberg, 2014, on double dialogicality).

The meta-study – findings

To conduct this meta-study, we identified all the publications by our research group between 2012 and 2019 that were relevant to the interests and points of departure described above. This resulted in 37 publications. The selected studies are marked with an asterisk (*) in the reference list. The meta-study was carried out by examining all publications in terms of (i) aims and questions, (ii) methods, (iii) findings on the role of the teacher in general and more specifically on scaffolding, (iv) findings on the role of technologies and other artefacts, and (v) notions on children’s agency. We tabulated the above information, analysed the salient factors in each theme, and identified commonalities and recurrent results. The theoretical points of departure and some basic methodological features have already been presented. In this section, we elaborate on the main findings of the included studies, focussing on the research questions, empirical findings on the role of teachers, artefacts, children’s agency, and theoretical development (i.e., conceptual differentiation and specification).

Research questions

The selected studies have raised a number of similar questions, which can be summarised as follows:

1. What activities emerge and develop in tool-mediated ECE settings?
2. What is the nature of the communication in these activities; for example, how do children and teacher(s) participate?
3. What is the content that emerges – how do the children and teacher(s) orient themselves to these artefacts, and how are artefacts, such as technologies, used?
4. What roles do teachers play in these educational activities?
5. How can teaching and learning be conceptualised, based on these empirical studies?

These questions reflect our theoretical point of departure that the activity is the unit of analysis. The epistemological statement that knowledge is co-constructed is also evident and supports the methodological focus on the interaction between participants engaged in activities. It is important to add that educational activities, in our view, do not exclude caring activities; rather, given the holistic approach of Swedish and many other ECE systems, care and education are understood as inherently related. This is captured by the term *educare*, conceptualised as provided in activities framed by “caring, responsive social contexts where adult-child and child-child interactions and opportunities for play and exploration promote children’s social and intellectual development” (Smith, 1993, p. 49).

Findings on the role of teachers and artefacts in children's learning in ECE settings

Within the field of ECE, preschool teachers play a significant role in how a practice is organised and which opportunities for learning are scaffolded in the studied activities (Aarsand et al., 2019; Erstad et al., 2019; Merjovaara et al., 2020; Oakely et al., 2018; Pöntinen & Rätty-Záborszky, 2020; Undheim & Jerne, 2020). The overall findings of our empirical studies confirm not only *that* teachers are important but also *in what ways* they make a difference to educational activities.

In teacher-initiated ECE activities, we have found that a play framing (i.e. constituting the activity as if it were make-believe) tends to appeal to children as it contributes to making the ECE activities meaningful to participate and engage in (Botö et al., 2017; Lagerlöf et al., 2019; Nilsen, 2018). Once engaged in an activity, the children's actions are made legitimate by the teacher's sensitive response to their expressed understanding; the teacher uses the response to draw attention to their interests and previous experience. By framing an activity as play, the tools presented by the teacher hold significance for what actions may unfold. From our analysis, we can discern that children's ability to distinguish between, for example, musical aspects, such as dark and bright tones (Lagerlöf et al., 2013) or concepts related to narration, such as fairy tales [*saga* in Swedish] and writing (Skantz Åberg, 2017), make the activities more subject-specific. By assuming the role of someone more experienced, the teachers employ concepts to direct the children's attention to particular aspects and thus create the potential for making and developing the musical and narrative experience, to recall our previous empirical examples.

Tools – both intellectual (psychological/discursive) and physical – can serve as reference points for children and teacher(s) to establish intersubjectivity. However, in our analyses of the activities, we could also see that teachers' introduction of physical tools, such as various digital technologies (keyboards, computers, tablets, and interactive whiteboards), occasionally distracted the children from the purpose of the activity, leading to them instead exploring the tool. This resulted in insufficient intersubjectivity, primarily between the children and the teacher. For example, for an art activity, a teacher used a tablet and a biology app with images of insects (Nilsen et al., 2015). A 4-year-old girl tried to copy the image of a butterfly on the app and constructed a butterfly using physical material. During the activity, the teacher mainly focussed on the physical material, while the girl was drawn towards the digital image of the butterfly. The different orientations led to problems in establishing intersubjectivity between the teacher and the girl. This was evident throughout the activity. For example, the teacher asked the girl what she would need to make a butterfly, and the girl answered, 'Ings' ('wings') and looked at the image in the app. In response, the teacher looked at the material at the table and asked, 'Rings?' Typically, when participants do not manage to establish temporarily sufficient intersubjectivity (Tomasello et al. 2005; Trevarthen & Aitken, 2001; Wertsch & Kazack, 2005), meta-communication is used to clarify what one means and does.

Another example of a discrepancy in orientation was seen in an activity where a story-making program with in-built images was used (Skantz Åberg et al., 2015). The images triggered extended storytelling by the children. However, instead of supporting the evolving narratives, the teacher reduced the children's verbal stories to transform them into written narratives. These acts called for negotiations and co-ordination of perspectives to complete the task.

In our analyses, we found that teachers use many strategies for scaffolding children's use of technologies in the context of educational activities. More productive activities demand teachers who take children's interest, agency and motivation into account in pursuing tool-mediated activities. However, problems arise when teachers do not pay attention to such considerations or if the teachers are more or less absent from the activities.

Teachers are also shown to play a crucial role in co-ordinating communication in tool-mediated activities. In a study by Lagerlöf et al. (2014), activities in an after-school centre were observed when children played on a keyboard connected to a computer. The study showed two contrasting examples: one when two children interacted in a dyad, and one when an adult also participated (triad). The teacher contributed by introducing structuring resources in the communication. For example, she established an intertextual tie with one of the children's previous experiences by picking up a non-musical concept that the child had used in describing the music in order to challenge her to develop her listening.

Several such examples of the teacher as a more knowledgeable peer in interaction, co-ordinating contributions, are evident in our studies. These can be summarised as follows: the teacher co-ordinates (i) children's previous experiences with the content in the activity (Kultti, 2014; Lagerlöf et al., 2014; Nilsen, 2018; Skantz Åberg, 2018; Wallerstedt, 2013; Wallerstedt & Pramling, 2012b), (ii) children's perspectives with each other (Kultti & Pramling, 2015a; 2015b), and (iii) children's initiatives with the ongoing activity (Kultti & Pramling, 2015a; 2015b; Lagerlöf et al., 2019).

To date, we have studied activities with analogue technologies (musical instruments and board games) and digital technologies in the form of hardware (computers, tablet computers and interactive whiteboards) and software (computer software, apps, and educational television shows). We have examined how these technologies are used in activities in ECE settings and for what purposes, in order to critically discuss their educational implications. Our studies show that the design of technology is closely connected to the kind of activities that develop, which can be understood as the affordances and constraints of technologies (Botö et al., 2017; Lagerlöf et al., 2013; Nilsen et al., 2021; Skantz Åberg, 2017; Wallerstedt & Pramling, 2012a). For example, digital software can support children in creative activities (Nilsen et al., 2015) and mediate their motivation, reasoning, and negotiations (Skantz Åberg et al., 2015). However, misdirected or poorly developed software may restrict or even hinder children's interactions and learning (Nilsen et al., 2021; Skantz Åberg et al., 2013). These findings are also supported by findings in other empirical studies from the field (Bullock et al., 2017; Kucirkova et al., 2014; Palmér, 2015; Sandvik et al., 2012). Further, it should be recognised that children do not always use technology for the purposes it is designed (Vangsnæs et al., 2012; Wallerstedt et al., 2015). It is therefore critical to study technology in use in ECE rather than making claims about its benefits or pitfalls on the basis of an analysis of technology per se. Our findings thus highlight the problems that arise when technologies are expected to be self-instructive and occasionally even expected to replace teachers in ECE settings (Lagerlöf et al., 2013). They clearly indicate that the teacher's role is equally, if not more, important in digital-tool-mediated activities as in other educational activities. As digital technologies have become part of the daily lives of many young children, it is imperative for teachers to clearly understand their own importance in helping children see the relevance of, and building on, their previous experience, and in allowing them to make new experiences (Lagerlöf & Wallerstedt, 2019).

Findings on children's agency in ECE-settings

The focus in many of the reviewed studies is meaningful participation from the children's point of view. The studies contribute to the understanding of agency, contingent on the theoretical and methodological standpoints taken. A common finding pertains to the teachers' potential to increase, rather than decrease, children's participation and agency (Lagerlöf & Wallerstedt, 2019; Lagerlöf et al., 2019; Skantz Åberg et al., 2015). This is in line with Gillespie (2012) and Houen et al. (2016). For example, some of our studies show how children's experience of interaction and activities, whether teacher-initiated or not, become important means for structuring their communication and activities, especially when interacting and playing with other children or when playing by themselves (Kultti, 2013; 2014; Wallerstedt & Pramling, 2012a, 2012b; Wallerstedt et al., 2015).

Agency can "be understood both as a *means of education* – enrolling children as participants in their own development – *and as an intended outcome*: children having developed their own voice and the ability to state their claims on an informed basis" (Kultti & Pramling, 2021, p. 22, italics in original). In addition, agency is of critical importance when analysing children's opportunities to participate using several kinds of tools, including non-verbal communication, as well as studying how their participatory experiences are scaffolded and extended (Jidai et al., 2017; Kultti, 2013, 2014, 2015, 2016; Kultti & Pramling, 2015a, 2015b). A study by Kultti and Pramling (2021) shows how agency is redistributed, from the teacher initially directing (for children a new topic: negotiating the translation of song lyrics) to the children gradually taking over the activity, when the topic at hand is open to negotiation.

Even in activities involving digital technologies, the teachers' roles are emphasised and shown to be critical to developing children's agency. Skantz Åberg et al. (2015) studied children's narrative activities and showed how the teacher's role becomes crucial regardless of the resources used in the software. In the activities studied, 6-year-old children had greater leeway to negotiate, which could be related to the notion of agency. In another example, communicative framing by teachers allowed children to participate in shared, playful music-making in a technology-mediated activity. This then encouraged children to take the initiative in developing the activity, which can be seen as a case of increased agency (Lagerlöf et al., 2013). However, in a study by Nilsen (2018), examples of the opposite were seen. In her study, children-initiated activities tended to generate more evidence of agency and play-framing than activities initiated by teachers. The teacher's communicative framing and the design of the app on the tablet, in fact, limited the children's opportunities for agency. The teacher tended to take physical control over the tablet, which made it difficult for the children to use it in other ways. Moreover, the categories built into the app limited the choice of alternatives in the evolving activities.

This review of 37 studies indicates that locating agency in child-initiated activities or in teacher-initiated/led activities may be a too simplistic distinction. In both kinds of activities, and with and without adults participating, different types of communication are possible. Groups can have participants with diverse communicative and cultural tools and capital, different power positions and statuses, different group constellations, etc. Essentially, it is important to recognise the situated nature of agency – agency is contingent on framing rather than something the child either has or has not in a general a-contextual sense. By enabling scholars to see this empirically, the studies reviewed offer an alternative

approach to studying agency. They help generate knowledge about how to teach/communicate/play for promoting agency in ECE (Houen et al., 2016).

Some studies in which agency is explicitly addressed show empirically how features of play-responsive teaching (Pramling et al., 2019) contribute to children's agency (see also Kultti & Pramling, 2017, 2018, 2021). For example, Lagerlöf et al. (2019) analysed a narrative play sequence in which a teacher and a group of children pretended that a phone was stolen and that they had called the police to solve the case. Theorised in terms of play-responsive teaching, they identified the following aspects as critical for promoting children's agency: (i) teacher and children act as co-creators, (ii) teachers respond to children's initiative (making them legitimate), (iii) teachers co-ordinate different contents and ideas for the play, (iv) teachers challenge/extend children's understanding through meta-communication and (v) shift between *as is* (culturally established knowledge) and *as if* (make-believe). In other words, play-responsive teaching can increase children's agency, and agency is something to appropriate rather than something naturally evolving. Promoting children's agency in ECE contributes to recognising and expanding children's competence and experiences. Responsive teaching, play, agency, and learning, are important for participating in and generating new knowledge.

Theoretical development

On the strength of empirical investigations of children and preschool teachers participating in a range of different activities, engaging with different kinds of content, we have made some contributions to the development of theory. One of them concerns the concept of scaffolding. Mainly discussed in the seminal work by Wood et al. (1976), the metaphor of scaffolding was introduced by Bruner in an earlier study on mother-child communication (Bruner, 1975). Wood et al. (1976) studied child-adult dyads where a child was supported – scaffolded – in solving a three-dimensional problem and then explicated a number of characteristics of this process, such as recruitment of the child, reduction of freedom to execute a task, direct maintenance and marking out of critical features. The concept of scaffolding was quickly adopted by other researchers and has since emerged as one of the key concepts in research on adult-child interaction (Elbers et al., , 2013; Malik, 2017; Smit et al., 2013). The concept has also been criticised for its limited applicability to educational processes in school. One argument has been that in school, children are educated primarily to master linguistic relationships (concepts, distinctions, and discourses) (Wells, 1999). Another argument is that the classroom is a different context from the one that was originally studied (Stone, 1998). Given these criticisms, it appears that scaffolding as an originally dyadic relationship between caregiver and child may not be useful for understanding educative support in institutional settings such as preschool and school (Mercer, 1995). Endorsing this view, Pramling et al. (2019) argue that for scaffolding to serve as an analytical tool for understanding educational processes, it needs to be differentiated and specified. That is, one cannot expect scaffolding to manifest in an identical manner in different kinds of activities, such as solving a wooden puzzle in a caregiver-child dyad versus collaboratively narrating and making sense of a story in a preschool group. Moreover, with activities on digital tools, scaffolding may not only be distributed among the participants; it may also depend on the design of the technology as tools may themselves provide certain support. For instance, a speech feedback software can reduce the difficulty of writing, and a story-making software showing illustrated images can restrict the degree of narrative freedom (for a discussion, see Skantz Åberg, 2018). Consequently, clarifying, through detailed empirical investigation, the process of

scaffolding in different educational activities can enrich our understanding of how more experienced participants (typically preschool teachers in ECE settings) support children's learning and development. Our research contributes to *theory development by differentiating and specifying* the concept of scaffolding. Theory development takes place not only through increased generalisation – identifying new instances of a familiar pattern – but also through specification (see further below).

Our conceptualisation of scaffolding is, for example, captured in a study on how teachers participate in and contribute to play (Pramling et al., 2019). The study makes an important distinction about what may and may not be adequately conceptualised as scaffolding. In the accounts of scaffolding, since its emergence in the study by Wood et al. (1976), the goal of the process has been to support the child towards developing the ability to solve some kind of problem (e.g. building a structure or tying a knot; Nilholm & Säljö, 1996). However, in the context of the play, a factor critical to teachers' participation is opening up new possibilities (increased openness) rather than reducing dimensions (one of the original criteria of scaffolding, proposed by Wood et al., 1976). In order to clarify this conceptual difference, the notion of triggering has been proposed (Pramling et al., 2019; Wallerstedt et al., 2021). Like scaffolding, triggering requires responsive adjustment; that is, these processes cannot be ascribed to the actions of any one participant alone (e.g. the teacher). Clarifying the conceptual distinction (and thus, introducing a novel concept) is, therefore, another contribution to theoretical development from our review of empirical research.

A common notion in contemporary research – particularly within the tradition of Ethnomethodology (EM)/Conversation Analysis (CA) (Bateman & Church, 2017; Bolden, 2013) – is the need to 'unpack' theoretical concepts. This stems from the idea that concepts such as remembering or learning are too general to have the explanatory value given the level of detail explored in these studies. It is easy to agree with this claim – and our discussion on scaffolding and triggering above indicates that we share this concern – but we also argue that it is equally important that empirical findings are 're-packed' to align with the previous metaphor. That is, when untying theoretical concepts for empirical investigation, we need to reconceptualise (or metaphorically speaking 're-pack') our findings. Our specification of the meaning of scaffolding in activities and settings is very different from the concept's origin, and the distinction between scaffolding and triggering constitutes examples of such re-packaging.

Methodological issues

In this section, we will discuss some methodological issues that emerged during our research and how they have been addressed. The issues concern the use of video, and more specifically, how to transcribe video data to achieve pragmatic validity, how to overcome ethical challenges and how to deal with questions about the generalisability of small-scale studies, like the ones often carried out by us. We will argue and show that generalisation is constituted in a dynamic relationship between specification, contextualisation and reconceptualisation.

Transcription of video data

On the one hand, using a video camera to document bustling and vibrant activities in preschool practices generates extensive data. On the other hand, rich recordings may also

pose challenges related to transcription. A key challenge with video research is deciding on the level of detail for the transcription process. We have specified and discussed the factors that we found challenging when deciding the level of detail for the transcription process in SIA. Using the same premise that underpins the choice of method – research questions as well as theoretical and analytical standpoints – transcription can be understood as a cultural activity (Duranti, 2006) and selective process (Derry et al., 2010; Linell, 1994; Ochs, 1979) part of the analytical work, rather than merely a method for representing data in another semiotic form (Heath, 2011). Furthermore, transcription can be understood as an iterative process, involving a back-and-forth movement between the original video material and the writing (Derry et al., 2010; Duranti, 2006). In this sense, a transcript is not viewed as static; instead, it needs to be constantly adjusted during analytical work as new findings may be detected when researchers return to the recordings (Linell, 1994). Thus, transcriptions are regarded as interpretations of the video-documented interaction and should be understood as valuable complements to the recordings and part of the initial analytical work (Heath et al., 2010; Jordan & Henderson, 1995).

Theoretically informed by a sociocultural perspective, our point of departure is that social interaction is multimodal by nature, mediated by cultural tools and conditioned by the environment (Ivarsson et al., 2009). Hence, transcriptions should be produced in ways that facilitate sociocultural analyses of interaction (Plowman & Stephen, 2008). However, it is impossible to capture everything recorded during an activity in a complete transcript. In fact, there is no such thing as a complete transcription. A transcription, like any representation, is by necessity a transformation and a reduction. Therefore, the criteria for what should be included and what should be omitted need to be considered carefully. This implies that the precision of transcriptions may vary, and not only in terms of detail. In fact, a variety of transcription systems may be used depending on the different dimensions of representation, provided all the systems are aligned with the research questions (Cowan, 2014).

We find that two general considerations should be taken into account when transcribing. The first deals with authenticity; that is, the transcript should mirror the verbal actions by closely presenting what is said and as far as possible how it is said. With children, this requirement poses a challenge as their speech patterns differ from those of adults. They occasionally have indistinct articulation and a tendency to talk at the same time as their peers (Nilsen, 2018); thus, they do not adhere to explicit turn-taking. Another common feature is the ‘tuning out’ of peer’s utterances, caused by lost interest or tiredness (Ochs, 1979). Transcribing this inevitably requires deviation from the grammatical rules governing the written language (Linell, 1994). In addition, human communication includes other modes such as fine-tuning gestures, gazes, and bodily postures that video recordings may capture well. However, translating these visual modes into writing can be difficult. Nevertheless, in order to understand people’s sense-making in situ, a transcript needs to “express the relation between nonverbal and verbal behaviour as accurately as possible” (Ochs, 1979, p. 59), along with the participants’ interplay with artefacts (Cowan, 2014, for a comparison of transcript models on a video sequence from an early year classroom). The second consideration is more pragmatic in nature. On the one hand, as already stated, there is a desire to render into writing as much as possible of the verbal and nonverbal actions; on the other hand, the representation of the communicative actions must be transformed into an intelligible transcription “that displays clearly and systematically utterances and contexts” (Ochs, 1979, p. 59). However, the choice of a transcription model may affect the reader’s understanding of the contingent relation between actions (Davidson, 2009).

In a vertical transcript, it may become difficult to order information about different actions taking place simultaneously. For instance, a transcriber may struggle to describe children who are moving their bodies when playing on a keyboard while verbalising children's perceptions of the produced sounds (Lagerlöf, 2016). Similarly, capturing children's responses, verbal as well as symbolic gestures, to activities on an interactive whiteboard can be difficult (Skantz Åberg, 2017). In order to balance the somewhat contradictory considerations and create a transcript that a reader can make sense of and evaluate, a researcher needs to be aware that the choice of parts to represent and the level of detail employed can have implications for what constitutes a 'picture of reality' (Plowman & Stephen, 2008). While it may appear that our individual studies build on a rather limited amount of data, it is important to recognise that we tend to transcribe all data and analyse activities from initiation to conclusion. This analytical approach, among other things, has the advantage of allowing us to analyse contextualisation, changed participation and other processes – something that is not possible if only brief snippets of many different activities and settings are noted.

Pragmatic validity

The readability of the transcripts and the level of detail also have implications for validity. As discussed, the ecological validity can be increased by conducting studies close to practice and in ordinary ECE settings. Another aspect of validity is what Nuthall (2004) calls pragmatic validity, that is, whether research on education is conducted “in a way that is comprehensible and practically useful for teachers” (Nuthall, 2004, p. 273). We argue that the validity of educational research cannot be reduced to the extent that it is directly applicable to teachers. This is not only because preschool (ECE) is different from school, which is the context of Nuthall's (2004) argument, but also because there is an inherent value in research aimed at furthering collective knowledge regardless of its (immediate) applicability. Further, the criterion for deciding on the merits of educational research cannot be effectivity in learners' outcomes; there are many goals of (early childhood) education, including the promotion of agency and awareness (which cannot be measured in terms of effectivity) and exploratory value.

Critically speaking, the pragmatic validity of research is reflected in the methodology. Studies like the ones we have reviewed in this meta-study should be carried out and presented at a level of description that is intelligible and relevant to teachers in ECE. This level of description (representation of empirical data and analysis) will allow teachers to recognise important features in their activities with children's, and how often subtle differences can change how these activities evolve. Arguably, the level of description employed in our studies has provided a site for mutual sense-making for researchers and teachers, which may facilitate their co-operation in research and development projects and enable other teachers (and researchers) who are not participating in such projects to make use of the generated insights (see Pramling et al., 2019, for a detailed discussion).

Ethical challenges with video data

Our practice-based research has followed the ethical codes and regulations formulated by the Swedish Research Council (2017). It has been argued that complying with ethical requirements and considerations is important during the entire research process (e.g. setting up the study, generating data, handling video-recorded material, analysis, and when transcripts are used in scientific publications) (Farrell, 2016; Peterson, 2011; Robson,

2011). However, the introduction of the new data protection regulations under the General Data Protection Regulation (GDPR, EU, 2016/679) may create problems for this practice. The GDPR regulation imposes stricter requirements for protecting the individual and has tighter definitions for what constitutes sensitive information. Nonetheless, how GDPR will affect future practice-based research (in a Swedish context) in ECE is not entirely clear. For instance, while we argue that collaboration among researchers in our approach increases validity, it is likely that tensions may arise between the protection of children and the benefits of sharing data with research colleagues. Rutanen et al.(2018) report such tensions in an international study where they collected video data across seven countries. Worldwide, the interpretations of international ethical codes vary, and in addition, local restrictions also exist. The tension, the authors highlight, concerns, on the one hand, the need for protecting children’s privacy, and on the other hand, the benefits of using non-anonymous video data. Such data enables joint analysis, which is an important quality-assurance aspect of research. While open data has become important in other fields, in educational science, it remains “shrouded in a culture of isolation” (Gilmore et al., 2016, p. 2). Gilmore et al. (2016) note that the sharing of video data requires policies that both protect the privacy of participants and enable the reuse of raw video recordings. It has been argued that generating video data is a time-consuming task, but it is also a method for producing ‘rich’ empirical material. The advantage of rich empirical material is severely curtailed by the fact that to reuse data (from other theoretical points of view and with new research questions), a renewed ethical review process is required according to GDPR.

Generalisation of empirical findings

A common challenge encountered in the kind of studies we conduct – and even in what is often referred to as qualitative research – is their limited generalisability. We argue that this challenge conflates different questions and builds on an under-analysed notion of generalisation. The following arguments could be raised to address this drawback. What is analysed in the studies reviewed here are activities and processes (teaching, learning, playing, participating), not how frequently these are conducted. Theoretically, closely grounded in a detailed analysis of empirical data, such activities and processes constitute important contributions to collective knowing (science), irrespective of their frequency in ECE settings. Access to such activities and processes is vital to educational research because they inform scholars about the nature of educational encounters and how children’s and teachers’ ways of participating in these encounters constitute sense-making practices. However, questions about how these educational activities and processes are represented in other geographical contexts, particularly in socio-economically diverse contexts and in settings with differently qualified personnel, call for an exploration of equity issues (social and cultural sustainability). While these are important questions, they deviate from the ones primarily analysed in the studies reviewed here. However, we acknowledge that the reviewed studies do not always distinguish between preschool teachers and other pedagogical personnel. This in effect may blind us to the importance of education in how teachers engage children in mutual projects (e.g. teaching, playing); therefore, it is something that should be considered in future studies.

We also argue that the criticism against qualitative research in terms of the alleged impossibility to generalise from such studies builds on an under-analysed notion of generalisation. This claim will now be grounded argumentatively. In a fundamental sense, it is impossible not to generalise. This is because the semiotic means of science – as of everyday communication – that is, language in itself, is generalised. To use language is to

generalise (Sapir, 1921; Vygotsky, 1987). Language does not refer to a particular phenomenon or object but to a class or category. It is, paradoxically, through adding more categories that we become more specific in our renderings (Pramling, 2006). As researchers (and as communicators), we cannot not generalise. Given this realisation, it becomes critical to discuss and explicate the kind of generalising we do rather than assuming erroneously that we cannot generalise from so-called qualitative research.

In the kind of studies we discuss here, the primary form of generalisation is conceptual and the secondary is empirical. It is through analysing empirical data in terms of explicated and systematically related theoretical concepts that we constitute what we analyse as instances, exemplars, of categories that are not specific to the here-and-now. Ivarsson (2003, p. 398) argues, “One of the advantages of theoretical concepts is that they, in their capacity as linguistic tools, can be used in different contexts with some meaning preserved. Or put more correctly, since they maintain a relation to earlier contexts, the meaning of concepts can more easily be recreated in new situations”. This process is sometimes referred to as contextualisation (van Oers, 1998). For example, showing how participants mutually constitute what Rommetveit (1974) refers to as temporarily sufficient intersubjectivity (Lagerlöf et al., 2014; Pramling et al., 2019) gives us insight into this important feature of educational communication. Such knowledge is of no less value because this is not achieved in all other (educational) activities. Rather, the contrast between activities in which this is achieved and those in which it is not – or rather how participants fall in and out of intersubjectivity within activities – provides additional insight into the critical importance of such a process in ECE.

Many of the communicative patterns we have identified in our studies are reflected in studies from a rich variety of settings and in relation to many topics: music (Lagerlöf, 2015; Wallerstedt et al., 2014, 2015), art-making (Nilsen et al., 2015), literacy (Magnusson & Pramling, 2016; Skantz Åberg, 2018), technology use (Lagerlöf & Peterson, 2018; Lagerlöf et al., 2013; Nilsen et al., 2021; Skantz Åberg et al., 2013, 2015, 2017), multi-lingualism (Kultti, 2013, 2014; Kultti & Pramling, 2017, 2018, 2021), oral storytelling (Oshiro et al., 2017, 2019; Pihl et al., 2017, 2018) and play (Kultti, 2015, 2016; Kultti & Pramling, 2015a; Magnusson & Pramling, 2017; Wallerstedt & Pramling, 2012a; Pramling et al., 2019). Some patterns emerge despite the differences in settings and topics points to an empirical generalisation that these patterns are not specific to a particular setting, topic, or context.

While our research interests often require us to analyse a single activity in situ from initiation, during development and until conclusion, we do not generally conduct case studies. That is, the focus of our analyses is not a particular case. The focus of a case study, as described by Vasconcelos (2010, p. 329), is “the study of the particular”. Rather, in our work, the activity studied is analysed as an example of more overarching issues, such as what happens to children’s interaction and learning if the teacher communicatively re-frames or re-mediates the activity as play (as if it were). Through conceptual generalisation, allowing empirical generalisation across individual studies, we are able to further illuminate the communicative phenomena that are used in many of our studies, encompassing particular activities and cultural tools/artefacts (Lagerlöf et al., 2014; Nilsen et al., 2021). Our reasoning does not imply deductive research, where empirical data are read through, or sorted into, pre-defined categories. Rather, we would argue that all research can be placed along a continuum where deductive and inductive constitute extreme anchor points, with all research actually falling between, somewhere more or less towards one or the other extreme. According to this view, all research is abductive, in the sense that empirical

investigation is contingent on theoretical premises and concepts but with these potentially re-definable (for a contemporary discussion on abduction in research, see Rudbäck, 2020).

SIA and Conclusions

As mentioned in the introduction, we argue that the research studies reviewed here constitute an emerging research program. We refer to this program as Socioculturally-informed Interaction Analysis (SIA). The methodology of SIA can be summarised as follows:

Learning is understood through the metaphor of appropriating cultural tools and changed participation, and in analysing learning, the unit of analysis is tool-mediated activities. Knowledge is seen as co-constructed through jointly conducted activities, mediated by tools (both verbal and physical ones).

The researcher avoids bias through the use of video (or audio) recordings. This enables repeated reviewing of data, collaborative data sessions and a sense of distance from the material being studied.

Transcription is regarded as an iterative, interpretative process. The level of detail in transcription is decided by taking into account authenticity (what and how something is said or shown) and readability. The latter is important for pragmatic validity, where excerpts from transcripts are presented with adjacent analysis, and for doing research with the teacher profession.

Claims made are closely aligned with what is studied (ecological validity).

Context is seen both as a description of the setting as well as employed as an analytical concept; the latter is done by analysing how participants weave together what they encounter in an activity.

Generalisation from studies is primarily made at a conceptual level, which, we argue, allows for empirical generalisation across contexts (contexts here understood in the descriptive, narrative sense [see the distinction between context as a narrative and contextualising as an analytical concept above]).

We argue that these methodological standpoints are valuable for practice-based research in ECE settings.

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(*indicates studies included in the meta-analysis)

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