



Wearing and daring the hat – Exploring the materialities of children’s experiences in research

Linnea Bodén^a

^aStockholm university, corresponding author, e-mail: linnea.boden@buv.su.se

ABSTRACT: The aim of the paper is to explore how the materialities of EEG caps became vital to produce knowledge on children’s experiences in a research project. By closely examining a six-week exploration together with six five-year-olds at their preschool, the paper focuses on how the making of alternative EEG hats became a worldly and worlding (Haraway, 2008) practice, and was productive of new potential worlds. The exploration is part of a research project that investigates children’s experiences in a large intervention project, at 28 Swedish preschool units. The analysis shows the ways in which materialities were not only related to these experiences, but also crucial for them to emerge. The conclusions highlight that children’s experiences, in the exploratory work, expanded in time and space and that the practices connected to the materialities of the hats came to include other worlding processes, made elsewhere and in other situations.

Keywords: *children’s experiences, EEG caps, exploratory research, worlding*

Introduction

- Is this your job?

- Eh, yes. When you work as a researcher, one of the things you do is to come up with ideas on how to investigate stuff.

(Conversation at preschool between Ethel,
five-years-old and Linnea, 36-years-old
researcher)

Acknowledging the agency and the active participation of children in the knowledge production is highlighted as crucial to produce understandings of “children’s own perspectives on their everyday lives and experiences” (Christensen & James, 2017, p. 4). Emphasizing the importance of such research accounts, the present paper aims to reconsider some of their underpinnings, through the input of feminist posthumanist theorizing. The paper draws on empirical engagements from an exploratory study that I performed together with six five-year-olds, aimed at researching their experiences in a large intervention study in Swedish preschools: *Enhancing preschool children’s attention, language and communication skills* (henceforth: *Enhancing preschool children*)¹. The project was guided by both an individual and a collective level of ethics in relation to the participating children, in order to enable a discussion of what it might mean to introduce unfamiliar methodologies like EEG recordings to the Swedish preschool setting (Frankenberg et al, 2018). Ethics was also what guided the exploratory study with the six five-year-olds. This meant that an important part of my engagements with the children was directed at finding productive methods to study the question of what it might mean to take part in a research project. Or, to return to the answer to Ethel’s question: My job was to – together with the children – come up with ideas on how to investigate the stuff we were part of in *Enhancing preschool children*.

As the present paper will show, the process of finding ways to address this was far from obvious. It became a journey in-between qualitative methodologies, such as interviews and participant observations, through the theoretical jungle of Haraway (2008) – or rather over the open savannah where baboons spend their everyday lives –, over worldly grappings with previous early childhood research, and finally the journey ended up in a hat. The paper will highlight the encounter that seemed to fascinate and engage the children the most among the different research practices they took part in. The encounter was very material: the recordings of brainwaves and the wearing of the EEG cap², which the children named ‘the bathing hat’.

Based on the encounters between children’s questions on ‘the bathing hat’ and on the strange and yet familiar material experience of wearing caps and hats, the children and I built alternative hats together. By closely examining what turned into a six-week exploration together with the children at their preschool, the paper focuses on how the making of alternative hats became a worldly (Haraway 2008) and *worlding* practice.

¹ For more information on the project, see Gerholm et al (2019), Gerholm et al (2018) and Frankenberg et al (2018).

² EEG is an abbreviation for electroencephalogram. The functions of the caps are described in the upcoming section.

That is, the making of the hats will be recognized as both of and with the world as well as productive of (new potential) worlds and ways of being part of the *Enhancing preschool children* project. This means that the paper will zoom in on EEG caps, electrodes, and cords. It will engage with ‘bathing hats’, and with the construction of the alternative hats built from gauze bandage, pipe cleansers and sequins. It will describe the making of headphones from milk bottle corks and volume controls from recycled cardboard. Most importantly, it will unfold how these processes of construction and re-construction, building and re-building enabled understandings of how the children’s experiences in research were always entangled with the everyday practices and materialities surrounding them. Thus, the aim of this paper is to explore how the materialities related to both the EEG caps and the alternative hats became vital to the production of knowledge on children’s experiences in the research project.

The preconditions for the exploration

The exploratory work with the preschool children took place within a specific setting. Not only was *Enhancing preschool children* one of the largest intervention studies in Swedish preschools. It was also the first – and is, to this day, the only – randomized control trial (RCT) study performed in a Swedish preschool setting. In RCT studies, two or more groups are randomly assigned to different interventions, with one group as the control group. Pre- and post-tests are performed to measure the potential effects of the interventions. The randomly assigned control group is what distinguishes RCT studies from so called ‘simpler’ forms of intervention studies, as this group enables the effect of the intervention to be distinguished from other variables affecting all groups (Hanley et al, 2016).

Enhancing preschool children was performed at 28 preschool units at eighteen preschools outside of Stockholm, in 2016–2017. It involved 432 children 4–6 years old, their guardians and 98 educators. The interdisciplinary design of the project involved seventeen researchers and assistants from early childhood education, linguistics, cognitive neuroscience, and developmental psychology (Gerholm et al, 2018; Frankenberg et al, 2018). In the study, two contrasting pedagogical methods were evaluated: explorative learning-processes in smaller groups of children (*SEMLA: Socio-Emotional and Material Learning*) and individual learning with a program on a digital tablet (*DIL: Digital Individual Learning for Body and Mind*). To produce knowledge on how these pedagogical methods affected children’s auditory attention, language development, executive functions, socio-emotional learning and early math skills, each preschool unit was randomly assigned to one of the interventions or to the control

group (Gerholm et al, 2018). The interventions took place during six weeks at each preschool unit. In line with the design of RCT studies, pre- and post-tests were performed together with the children, two weeks preceding the interventions and two weeks after the interventions ended, to study the effects of the interventions. Thus, all children participated in a handful of standardized language, communication, cognitive, socio-emotional and early mathematic tests (Gerholm et al, 2018). A smaller randomized group of children (in total 139 children) participated in a selective attention experiment where brainwaves/EEG were measured and recorded. Since this experiment and the 'bathing hats' the children wore during the experiment are central to the exploratory work the six children and I together created, I will outline it in more detail.

An EEG recording measures the electrical fields whose sources are mostly activity of the brain. The brain is active whether one is awake or asleep, which means that the activities of billions of neurons are in constant change. Luck (2012) describes that when the electrical fields of these neurons are oriented in the same way and they are summed into larger fields, the electrical activity can be recorded. EEG is usually recorded from multiple electrodes distributed across the scalp. The recording will consist of a mixture of brain activity and other biological potentials like eye movements and so on (Luck, 2012). This is also true for the EEG recordings in *Enhancing preschool children*. The 'bathing hats' the children wore were small and of different colors depending on their size – yellow, red, red-yellow or yellow-green – made of nylon and covered with 22 electrodes. A mobile lab was set up on site at the preschool, in a separate and quiet room, and two researchers performed the recordings (Gerholm et al, 2018). The children were informed about the study through a book that was distributed to the preschool before the first tests, describing the EEG recordings in texts, illustrations and photos (Frankenberg et al, 2018). The children could also watch a short video of an experimental setup before the tests took place.

Research ethics were highlighted all through the research process, and the researchers followed an ethical protocol throughout the recordings³. Apart from the informed consent given by the guardians, informed consent from the children was obtained continuously during the experiment, sometimes verbally, but also more 'intuitively' by staying attentive to every reaction from the child participating in the experiment. During the experiment, the children were seated in a chair and the EEG cap and the electrodes were applied. A gel was placed between the electrodes and the skin to get a stable electrical connection (cp. Luck, 2012). To attach the gel, a plastic syringe without a

³ See the application for ethical vetting for details, Stockholm EPN: 2015/1664-31/5

needle was used. To some children, the sight of the syringe became the most difficult part of the experiment, as they related the syringe to previous hospital visits. Thus, from an ethical perspective, the researchers performing the recordings worked hard to make the experiment less connected to medical discourses, highlighting how the children's participation in the recordings was an invaluable help to the researchers (cf. Frankenberg et al, 2018). Each session lasted for 30–40 minutes, during which the participating children listened to two simultaneously played stories, while being instructed to pay attention to one of the stories. Pictures from the story of attention were simultaneously displayed on a laptop (Gerholm et al, 2018). What was eventually recorded and analysed was the attention directed to the first story, and the disregarding of the disturbing sound from the second story.

Departing from a posthumanist approach to research (c.f. Haraway, 2008), the EEG caps can be theorized as an agential part of the scientific apparatus, necessary to produce scientific 'facts' (cp. Latour & Woolgar, 1986). The measurement of electrical activity of the brain enacts a particular form of reality and particular knowledge of the effects of the interventions as the waves are recorded, coded and analysed to produce a specific version of the results of the interventions. However, when I started collaborating with the children it was far from obvious that the EEG caps – even if they were called 'bathing hats' – would be of interest. How they did become the main interest in our exploratory work, will be outlined below.

Methodology in four takes

In the following, I will describe the methodological considerations that led to the exploration with the children. It is a description in four takes, where methodology is inevitably intertwined with both theory and previous research.

Take one – starting with the comfortable

To produce knowledge of the children's experiences of partaking in the different practices of part of the RCT study, I worked with more than 60 children, at six different preschools – sometimes in large groups with all children at the preschool unit and sometimes in smaller groups with only a few children. Trained as a critical qualitative educational researcher, I started from the comfortable as I had done many times before (Bodén, 2015; 2016; 2017): by doing interviews with the participating children and by doing fieldwork within the various practices the children were part of. Influenced by the

emphasis to acknowledge the agency of the children, I was eagerly searching for ways that put the children's experiences and perspectives at the centre of attention, which at the same time could blur some of the hierarchies between the children and myself as a researcher. In a sense, this became my first attempt of worlding the project, by engaging with not only the methodologies, but also the materialities of my research world: a notebook and an audio recording device. What is described as 'post qualitative research' (St. Pierre 2011) have sometimes emphasized that educational research should avoid qualitative methodologies, as they reproduce humanistic ideas and ideals. However, this was not the main problem in my work with the children. In a rather naive way, I thought that my collaboration with the children through qualitative methodologies would accomplish an involvement that I, initially, thought that experimental methodologies like EEG recordings and EEG caps were unable to do.

To learn more about how the children engaged with the research project during the time they did not work with the interventions I did participant observations: at lunch time, during free play and so on. Sometimes the children wanted to go to the special SEMLA room or were talking about some of the characters in the program on the tablet. But during the 25 hours of fieldwork, the occasions in which the children wanted to play tag were almost more frequent than the occasions where I thought I was able to learn anything about their experiences of the research project. The same can be said about the interviews. I performed interviews, both in groups and one by one, with 31 children. However, my attempts to try out methodologies focused on the children's experiences in the research project, where I tried to focus on the active participation of the children, but which seemed to produce a methodology somewhat at a distance from the children. The problem was not that the children were passive or became less agential subjects during the observations or the interviews. Rather, it was the opposite. They were *very* active and agential, but the vast majority of them not at all in relation to questions concerning the research project. This will be shown in the following examples from the preschools.

When I asked one group of children about their experiences of the SEMLA intervention, one child told me a story about a holiday at a sea park, which eventually turned into a group story on the size of sharks where we all learned that a killer whale was much larger than the room we were sitting in. On another occasion, a group of children turned into turtles crawling on the floor as I tried to discuss what we in the research group referred to as 'the snake': "a visual calendar about 2.5 m long, to put on the floor or on the wall at children's height [that] provided a clear visual representation of what was going to happen each of the 10 weeks of testing and intervention" (Frankenberg et al, 2018, p. 12). On yet other occasions, children wanted to do individual interviews. One

girl approached me and said that she needed another interview as she had much more to say. We ended up in the dressing area, crowded with winter clothes, and the girl told me about her siblings, her cousins, her birthday party and all kinds of other stuff important to her, but – at first sight – scarcely related to her experiences of the research project. Still, some children *were* interested in the questions on the research project, and described the participation as at times difficult and at times as “sooo long”. Thanks to ‘the snake’, they were however well aware that two weeks of pre-testing, six weeks of intervention, and two weeks of post-testing were indeed a long time. Most times they described the project and their ‘helping the researchers do the research’ (cf. Frankenberg et al, 2018) as fun and how much they loved having the researchers at the preschool. Especially the ones performing the actual EEG recordings.

The way the children described their experiences of the research project in the interviews together with my observations could be related to previous research on children’s positions in research. When Mayne and Howitt (2015) performed a meta-analysis of 506 peer-reviewed research articles involving young children (0-8 years old) from 2009 to 2012, a connection between the research methodology and the positioning of the children is suggested: research that involves standardized testing of children tends to position the children as objects; interview methodologies tend to position children as subjects or social actors; and research departing from the children’s own agenda tends to position the children as co-researchers. In Sweden, the turn away from psychological or experimental methodologies has had a strong impact on early childhood research, as well as on the Swedish preschool setting in general. All forms of testing of children have been more or less rejected: educators do not test or screen children and educational researchers do not work with experimental methodologies in preschools (Frankenberg et al, 2018). Some argue that research methodologies from health and medicine disciplines should not be transferred to healthy children, with the argument that research designs of evidence-based projects downplay the role of circumstantial factors and that the educational setting cannot be compared to a clinical context (Hanley et al, 2016; see also Lather, 2004; Biesta, 2010). Others emphasize that the RCT studies operate from a narrow definition of cause and effect that oversimplifies the complexities of the education and neglects the importance of multiple perspectives (Morrison, 2001). Thus, both educators and researchers in Sweden have increasingly turned to social constructivist and socio-cultural perspectives, promoting ethnographic and participatory methodologies (Aronsson & Lenz Taguchi, 2018).

So, here I was, part of a research project working with standardized tests and RCT methodologies, which from this overview clearly would be categorized as producing the children as objects. Still, what emerged through the fieldwork and the interviews I

performed with the children was how qualitative methodologies *also* might produce children at a distance. During the fieldwork and the interviews, it seemed as if I was holding my binoculars upside down, and the participating children became distant and fuzzy. The interviews and the observations during fieldwork did not seem to engage the children, or engage *with* the children, or their questions. The fact that children do not always respond to the questions raised by the researcher have been highlighted by Roos and Rutanen (2014). The authors describe that there is a risk is that the interviewer, as a consequence of this, becomes too controlling during the interview. Instead they suggest that the interview situation should create an open and encouraging environment for the children, and that the researcher should be flexible and attentive to the subjects the children choose to address. Thus, it might be more productive to think of interviews with children as conversations where the main objective is to listen to the children, rather than getting them to answer pre-given questions (Einarsdottir 2007; see also Gollop 2000). It became apparent that my interviews and observations so far had not applied to these suggestions.

To round off this first take, the methodological approaches of the study first and foremost had become the researcher's – my own – perspective on the children's experiences. The children seemed to be engaged in other worlding practices, which highlighted the vulnerability and mutual dependency of the children and the research methodologies I was putting to work. Einarsdottir (2007) addresses a similar theme when she describes how different methods – like interviews, observations or photographs taken by the child – put to work by the same child often produced different results in relation to the topic they were researching. For me, this became a problem not only in relation to the possibilities of ever getting to know anything about the children's experiences of *Enhancing preschool children*, but also an ethical problem on how to seriously engage with the children's ongoing practices both from inside and outside of what I thought belonged to their experiences of the research project. To theorize and rethink this, I turned to Haraway (2008) and her way of emphasizing a practice of 'becoming with'.

Take two – 'becoming with' as a framework for the exploration with the children

While outlining the whereabouts of Barbara Smuts, a primatologist who studied baboons in Kenya for her PhD in the 1970s, Haraway (2008) describes how a transformation of both the researcher/scientist and the research apparatus becomes necessary for the knowledge production. Haraway (2008, p. 23) argues that "the

practice of 'becoming with' reweave the fibers of the scientist's being". Initially, Smuts got the advice that good natural scientists hid themselves and acted neutral (preferably as rocks), so the baboons could go on with their lives as if the humans were not present. Unfortunately, the baboons seemed unimpressed by this act of play. The more Smuts ignored them, the less convinced they appeared. Haraway (2008) argues that Smuts – this new creature on the savannah – presumably appeared to the baboons as someone overlooking their every social code. Accordingly, when Smuts began to modify her behaviour and who she was in accordance with the baboons' social behaviours, they started to treat her as a trustworthy social being around whom it was safe to go on with their everyday 'monkey business'. From this, Haraway (2008, p. 24) points to how "[i]gnoring social cues is far from neutral social behavior". To add to this, I would stress that it is far from a neutral scientific behaviour.

In relation to Haraway's outlining of Smuts' work, the process of research could be described as a 'becoming with' those whom the research foremost concerns; an ethical practice which shows that different words and worlds will emerge depending on how the research apparatus is set up. Words and worlds where the monkeys are more or less able to intervene with the knowledge produced. Or as in Smuts' case, more or less able to go on with their everyday life. Accordingly, the research apparatus could be described as both worldly and worlding – both of the world and productive of specific worlds and realities.

Of course, the worldly and worlding processes and the 'becoming with' looked different in my explorations with the children, compared to the work of Smuts. However, just like the methodologies of the natural sciences that Smuts tries to work with – and eventually questions – neither qualitative methodologies like interviews or participatory observations are straightforward, natural or innocent processes. A question could be asked pertaining to my engagement with the children: What particular realities was I producing through the observations and the interviews, when trying to research the children's experiences of partaking in *Enhancing preschool children*? To paraphrase Haraway (2008, p. 25)⁴: If I really wanted to study something other than how children responded to questions already signed, sealed and delivered by an adult researcher, if I was really interested in the experiences of these children, I had to enter into, not shun, a responsive relationship. It was hardly surprising, when I looked away from my prepared questions, that the children had all kinds of ideas about the RCT project. This is closely

⁴ Original quote reads: "If she really wanted to study something other than how human beings are in the way, if she was really interested in these baboons, Smuts had to enter into, not shun, a responsive relationship" (Haraway, 2008, p. 25).

related to how Roos and Rutanan (2014) describe the urgency of being open rather than occupied by “pre-fixed plans” as a researcher. I thus tried to formulate a collaboration with the children where the “starting point [became] a relevant problem or matter of concern, which [was] formulated in collaboration with the agents that this problem concern[ed]” (Lenz Taguchi, 2017, p. 706). Thinking of this as a worldly and worlding practice, we needed a methodology that was engaged with the already ongoing explorations, and that was more – not less – worldly. To stage this creative exploration together with the children, I turned to early childhood research, which specifically enact exploratory research *together* with young children.

Take three – exploratory early childhood research

In connection with posthumanist and artistic research, exploratory early childhood research has come to connote attempts to combine the creative, the problematizing and the challenging, often in close collaboration with the participating children. Thus, through exploratory research, early childhood researchers have opened up to new questions on ethics, power relations and relationality in the preschool setting, showing how the children’s everyday life is always constituted in a more-than-human world (Palmer, 2016).

To open up possibilities to re-theorize her own early childhood teacher activism and to problematize understandings of curricular concepts on belonging, being and becoming, Giugni’s (2011) work with Haraway and the concept of ‘becoming worldly with’ in an Australian preschool. In the study, the strategic use of this theoretical idea turns into experimental and concrete practices – together with the preschool children, with clay, online photographs, and google searches for Jesus – that in turn opens up challenging questions on same-sex marriages, gendered stereotypes, religion and the relations between children and researcher when investigating these questions. The study shows how the ordinary practices of the everyday are most often *extraordinary*. To be able to ‘become with’ and to explore children’s experiences, researchers thus need to engage in a practice “of ‘grappling with’, looking for and creating leakages; colouring outside the lines; pushing ourselves to be, think and do beyond what we consider knowable and comfortable” (Giugni, 2011, p. 26).

Related to this, in close collaboration with the participating children, Palmer (2016) draws on a posthumanist understanding of ethics to address dilemmas and uncomfortable questions in young children’s learning projects. The study focuses on what happens when preschool children’s interests and questions expands to the bigger

world outside of the preschool. Through internet, media and new technology, children's questions are worlded, and stretched from the local and situated to "unpredictable ethically engaged encounters with a global world" (Palmer, 2016, p. 284). Starting with an investigation of tall buildings in the area of a Swedish preschool by drawing maps; continuing with questions on the tallest building in Sweden and in the world by printing out height charts, internet searches take the project quickly to new places and new directions. Everything from Asia and Burj Khalifa, to the United States, the World Trade Centre and the 9/11 attacks. The worldliness becomes immensely related to ethical issues as "images of terror and extinction flow into the preschool" (Palmer, 2016, p. 293). Palmer (2016, p. 293) describes that when the preschool becomes worldly in this way, its practices change, and quotes Haraway (2008, p. 287) saying, "once we know, we cannot not know". The study points to the fact that to become worldly in this ethically imbued way, one needs to follow the children in the investigation of difficult questions and think *with* them through the problems that emerge. The study also shows how the experiences of the children widen an ethical thinking, to not only include human-oriented models of ethics but multitudes of other agents in the situated and material practices of the preschool.

Researching children's experiences is often described as 'giving children a voice' (see for example Hill, 2006; James, 2007; McKechnie, 2002; Morgan et al, 2002; Roberts, 2017). Eriksson and Sand (2017) describe how this vocal metaphor or similar ones that addresses how children 'raise their voice' are used by adults to highlight the necessity of listening to children's expressions and opinions. To enable new meanings of vocal metaphors, the authors show how voice is never produced by humans alone but "always in relation to walls, floors, ceilings, through vibrations and oscillations and in relation to people and various cultural contexts" (Eriksson & Sand, 2017, p. 65). Through inspiration from artistic methods, the study introduces a method of vocal strolls where the metaphor of voice is to re-place – that is, placed in a new setting – when a group of toddlers aged 1,5-3 years meet the physicality and materiality of the Brunkeberg Tunnel in Stockholm, Sweden. In a subsequent paper, Eriksson and Sand (2018) also describe how the travels to the tunnel become a physically and discursive displacement of the preschool (see also Eriksson, forthcoming PhD thesis). Thus, the preschool physically becomes displaced into public places of transports, and the discursive matters that constitute a preschool practice transforms into methods to do these public spaces into 'preschool-practice places'. The authors hereby stress how this displacement "produced a notion of how preschool practice simultaneously holds its shapes and frames but at the same time belongs in the fluid, moving, changing rhythms of a public transport system" (Eriksson & Sand 2018, p. 2).

To summarize, these studies point to different practices of worlding in early childhood research. Giugni (2011) emphasizes how concrete and everyday practices are always and at the same time worlding practices; Palmer (2016) shows how the preschool is worlded by engaging with the outside from within when the world is re-placed in the preschool; and Eriksson and Sand (2017; 2018) show how the displacement of the preschool becomes a worlding of public spaces and public transport into preschool-practices. These studies, together with Haraway (2008) and the methodological queries took me to the hallway at one of the preschools one gloomy February afternoon.

Take four - grappling with the (extra)ordinary

One day as I was leaving the preschool, Li⁵ and Naima were standing by the window, wearing their woolen hats inside. Even if this was in the middle of the Swedish winter, it was an unusual sight, as the children were not allowed to wear winter clothes inside. When I asked the girls about the hats, they explained they had put them on because it was cold inside. However, one of their educators waved at me, and in a giggly tone told me that the girls had all day been pretending to wear the 'bathing hats' they wore during the EEG recordings. I had been unsure how to relate to this part of the project. Measuring brain waves felt unfamiliar to me, and the critique of testing children echoed in my mind. All these doubts seemed to be condensed and put into the materiality of the EEG caps, not only connected to cords but to discourses on the objectifying nature of testing.

Nonetheless, the children seemed very interested in what we together eventually started calling 'the hats'. I realized that the hats and the very material practices connected to them could be a way to ethically engage with the children's questions, and a way to take their experiences of the research project seriously. To return to the Haraway quote above: "To respond was to respect; the practice of 'becoming with' reweave the fibers of the scientist's being" (2008, p. 23). Haraway (2008) suggests that grappling with, rather than generalizing from, the ordinary is one way of learning to become worldly. For my engagement with the children, grappling with the ordinary seemed to be about

⁵ All names, apart from my own, are pseudonyms. The data were collected with approval from the Regional Ethical Review Board (Stockholm EPN: 2015/1664-31/5). An addition to the original application for ethical vetting, that clarifies that the data material can be analyzed in relation to children's experiences, was approved in 2018 (Stockholm EPN: 2018/171-32).

exploring how children related to, played with, and enjoyed the practices of the testing by transforming the hats to an ordinary – yet extraordinary – everyday play in a hallway, while they at the same time challenged the boundaries of what was part of their experiences of *Enhancing preschool children*. Grappling with the ordinary seemed simply to be about grappling with children wearing woollen hats inside, showing how I as a researcher was both vulnerable and dependent on the materialities we together explored, to be able to produce any knowledge at all.

Making and faking the hat – an analysis of the exploration

The upcoming analysis will zoom in on three examples to outline how Li's and Naima's interest in the hats turned into a six-week long collaboration together with six children. The educators at the preschool helped me set up this group, consisting of the children that seemed most interested in the hats and most eager to work with me: Adam, Caesar, Ethel, Li, Naima and Victor. We decided to go bananas with the hats and make our own 'bathing hats' out of bandage, pipe cleansers, sequins and other preschool materials. When we started, I did not know who had been part of the EEG recordings and accordingly worn the EEG cap. During our collaboration, different stories came into being about who had participated in the recordings. This uncertainty opened up possibilities for all children to, at some point, become experts on some part of the hat or its accessories; experts that both me and the other children trusted and mimicked. In addition, I had only seen photos of the EEG cap. I had never touched it, smelt it or felt it on my head. Thus, I had to stay alert to the expertise of the children and at the same time let go of my need to steer and control the process. We were all in the hands of each other's different fascinations of the hats. Our collaboration could be described as aligning with some of the underpinnings of a post qualitative approach to research (see St. Pierre 2011; 2013; 2014; Lather 2013; Lather & St. Pierre 2013), as it aimed at being "responsive to the moment and the movement, while remaining vague and ambivalent since it involves creating an imaginative and fluid practice" (Bodén & Gunnarsson forthcoming). As such, my collaboration with the children is also influenced by what Nordstrom (2018) calls an "antimethodology" as it refuses to sit still or follow pre-given steps on how to perform qualitative research. Instead this approach affirms what is happening in the now. And what happened to us – was hats. In this way, the post qualitative approach also became a way of challenging binaries between me as a researcher, the children and what we together researched. Although the questions or problems we raised in relation to the hats were not the same and sometimes not even mutually intelligible (cp. Aronsson 2019) this became a way of, to return to the words of Haraway (2008, p. 25), "enter[ing] into, not shun, a responsive relationship" within the

group. We worked with the hats for the duration of six weeks where I visited the preschool at least once a week. It was not until after our last encounter that I learned that only two of the participating children had been part of the actual EEG recordings. The rest (of us) had not.

Starting with the comfortable, again

Initially, I was assigned the task of getting hold of the working material we needed to make the hats. In trying to imagine what a preschool-made EEG cap could look like, for the first time I *really* thought about the hat. From photos of the EEG tests, from talks with the six children and from some of the interviews I had done, I knew that the original hat consisted of a stretch fabric – that it was sometimes tight and itchy– and that it had a number of round electrodes. The photos showed the cords connected to the electrodes (but I knew that there were also discourses connected to the electrodes, which were invisible on the pictures, and never mentioned by the children). When figuring out how to find a suitable fabric, easy to work with for our group and comfortable for us to wear, questions emerged on the design of the original hat and on what decisions that were woven into its fibers. The descriptions found on the webpage of a retailer of EEG caps gave some clues: breathable fabric, soft silicone electrode cups, optimal signal quality, quick application, easy cleaning and short drying time, soft to the skin with a comfortable fit (Biomedical, 2017). Clearly, a lot of effort and money had been directed to making the caps both efficient and pleasant to wear. Subsequently, I started with the comfortable again: this time with a comfortable fit, to avoid the itchiness some of the children had described to me. I went to a pharmacy where I found a gauze bandage that seemed soft to the skin and breathable, but most of all stretchy enough for the hats to stay on our heads. In my notes from the first day back at the preschool, I have written:

I pick up the package that stores the bandage to show everyone. I tear it open and put the long bandage tube over my head. Caesar suggests that the bandage needs to be shorter to look more like a hat. I ask him if he wants to try it and when I place the bandage-hat on his head, I realize that it is very tight. I ask him if it hurts, and even if he says no he still wants to remove it. But Adam is very eager, and suggests that we need to have rubber bands to ‘close’ the tube after we have cut it, to fit the shape of our heads. We go round the table, and I help Naima, Ethel, Victor and Li to put on bandages. The children cut each other’s bandage to the right length and suddenly everyone wears a hat, even Caesar. The piece of bandage left is just enough for me to have my own.

(Note from preschool, 1)

This was the first time the children met our working materials. In the setting up of the experiment, I was pretty much alone in deciding what materials to include. Nonetheless, in this first attempt to ‘become with’ the hat, it became apparent how these decisions were formed through both discourses and the materialities of the original hat. The portable lab at the preschool scarcely resembled the experimental design of a health or medical research lab and the researchers performing the recordings had worked really hard to make the setting less connected to hospital-like practices. Still, my first thought when looking for a suitable material was to go to the pharmacy. In that sense, the materials became co-producers that also steered what I was able to imagine as a suitable and a comfortable fabric even for a preschool made hat. Through the fibers of the gauze bandage, the hats were already, and anew, interwoven with a medical practice, and its discourses. In the meeting with electrodes and cords this, however, slightly changed.

‘Becoming with’ the hats

To continue our work, we needed cords and electrodes. Inspired by what was already present in the everyday environment of the preschool, I figured that pipe cleansers or yarn and round sequins would be suitable. However, the only sequins large enough for us to work with were not round at all. Shaped like elephants, leaves, snowflakes, stars and hearts, our electrodes looked far from those on the photos and far from online descriptions of the soft silicone and the optimal signal quality of the electrodes. The notes continue:

Adam takes blue and green sequins, and places the ones with similar shapes in vertical rows on the hat. Victor follows his example, while Ethel and Naima mix different shapes and different colours in asymmetrical patterns. The glue gun is passed over the table, hot. I try to keep an eye on Li and Naima who want to use the glue gun by themselves, while I at the same time help everyone else as much as I can. And try to work on my own hat. I can’t help thinking ‘Oh God, why aren’t I a trained preschool teacher?!’ As I’m not, Isme [a childminder] enters the room to help us. The electrodes shaped as elephants become the most popular ones as Isme tells us that elephants often symbolize fortune and happiness. Adam glues rows of purple elephants to his hat, while Caesar places them here and there. We turn the hats, to put electrodes on all sides. Ethel wants them on the front of the hat only. After we finish, my hat has less than ten electrodes. All are shaped like snowflakes, the ones I found closest to a round shape.

(Note from preschool, 2)

The details – the fit of the hat customized by rubber bands, the placing of electrodes, the fortune elephants and the colours of the sequins – became the most important aspect of

our work. When the colourful sequins were glued to the gauze bandage and the fortune elephants came to dominate the hat, the medical discourse of the gauze bandage was nudged. But more importantly, the focus on the 'becoming with' – in and through the details – could not only “reweave the fibers of the scientist’s being” (Haraway 2008, p. 23) but also the fibers of the hats. Through the details, we stayed within the relation with the hats that the children had already formed during the period of pre-tests – whether or not they had been part of the EEG recordings. These relations were created through the recordings, the information book about the EEG, the video, the talks with the researchers and the friends at the preschool and intensified and had me engaged when I met Li and Naima and their woollen hats in the hallway. Thus, each decision in relation to the hat needed to be carefully examined. What would happen to the hat if this, and not that, sequin was used? Would this affect the trustworthiness of the hat during the recordings? What would happen if the glue slipped through the surface of the gauze bandage, gluing the front to the back, making the head impossible to fit? How would the pipe cleaners or the yarn best be fixed to ensure a smooth transfer of signals to the computer? What would happen if the elephant sequins were too few for everyone to experience fortune and happiness when doing the recordings?

Rather than asking interview questions on how the children experienced the EEG hats or the tests, the questions that emerged during the making of the hats became a way to stay within the experience of the EEG hats. A 'becoming with' the hats and the EEG recordings through a re-making, or even a faking, of the hats. The hats became – or rather continued to be – connected to us as we together wove our worldly experiences into its fibers: fortune and happiness through elephants, straight lines or asymmetry to create order, the worries of a researcher and the expertise of a childminder, and the attempts of the researcher to create a portrait-like hat by pretending that snowflakes are circular. This ongoing experience highlights the interdependence of the hats and the ones making and wearing them. Thus, children taking part of recordings were not the only ones vulnerable in these situations. Me as a researcher and the hats as material objects were in addition, always dependent on other – both human and more-than-human – participants to act (cp. Moberg, 2018).

What is outlined above might enable a problematizing of the line of thinking where EEG recordings and the wearing of hats are per default an objectifying practice. Through the details, it became possible to stay within what could be described as a responsive relationship with the hats that the children had already formed during the period that preceded the participation in both the project and in the tests. It is tempting to say, that in the work together with the children, the devil seemed to be in the details, not in the EEG tests. However, one needs to be careful and not without consideration transfer the

questions our hats enable to the original caps. Even if a lot of effort was put into making the hats look like the EEG caps, the children's exploration was directed to more and other questions than just the ones concerning their experiences of the research project. Nonetheless, this way of working methodologically with the children and the hats opened up an engagement with the worldly and often ethically saturated problems and dilemmas that the children were interested in (cp. Palmer, 2016), like the care for each other and the hats when distributing elephants and happiness. Furthermore, even if the hats we made were contaminated by our collective worldly influences extending far beyond the walls of the preschools and the premises of the EEG recordings, the efforts to create cords with good quality signals, show how the care for the research project also seemed to be present.

Exploratory research with headphones

For the hats to work we needed something that enabled us to listen to stories, just like the children had done during the EEG recordings. Already at our first meeting, Li suggested that we needed to construct headphones. Several weeks later, Naima picks up on this and says that we have to make headphones. The exploration takes off in a new direction and our last three meetings became dedicated to accessories for the hats, as milk bottle corks and pipe cleaners turned into headphones. Ethel twists together a pink and a green pipe cleaner, and when she puts them on it looks like she is wearing small cat ears. Naima glues a standing purple elephant to the pipe cleaners on the top of her headphones. Victor colours his corks in red, white and black, to resemble Pokémon balls and Caesar glues a seashell shaped sequin to each cork. To make the headphones stick to the head, we add a rubber band to put under the chin. Another of my notes reads:

The children move their bodies to the music in their headphones and when I ask Caesar about his headphones he cannot hear me. "What?!" I ask him again. "What?!" and when he laughs I realize that he had tricked me to believe that the sound from his headphones is too loud for him to hear me.

(Note from preschool, 3)

Bringing a portable EEG lab to a preschool could certainly be described as an extraordinary practice in the Swedish preschool setting. However – and almost as a reversal of Giugni's (2011) description of how ordinary practices of the everyday are most often extraordinary – the children's engagements with the EEG recordings through headphones, music, Pokémon milk bottle corks and cat ears show how the extraordinary could turn into something fairly ordinary and everyday like. Or rather, how extraordinary research methodologies turn into new and yet unknown

extraordinarinesses when both researchers and children bring their different worldings to the preschool. It could be claimed that the working with the hats and the headphones re-replaces preschool practices, in a metaphorical sense, into unfamiliar spaces like portable labs and EEG recordings. But also in a more literal way as in Eriksson's and Sand's (2017; 2018) work, which is shown in the following.

As a closure of our experiment, we arranged a vernissage to show the work we had done for the rest of the children at the preschool, for the educators and for the two researchers who had performed the EEG recordings with the children. The hour-long video recording from this day, shows five anxious children (Ethel was unfortunately sick) and a nervously smiling researcher that enter the largest room of the preschool, wearing our hats. We start describing our hats and all their features. The children in the crowd ask us questions, the educators ask the children questions, me and the other hat makers(researchers) ask questions to the crowd, the EEG researchers ask us questions and we ask them. How many electrodes do the hats have? Do all electrodes have a cord connected to them? What about the headphones? Because, of course, the headphones and the control buttons attract attention. Especially when a sudden silence spreads in the room and Caesar explains that it is because he had muted the volume. This short moment of silence becomes the crescendo of the exploration. It turned out – or was explained by the EEG researchers – that in the setting up of the portable EEG lab at the preschool, there had never been any headphones. There had only been speakers, but no headphones.

Grappling with the (extra)ordinary through wearing and daring the hat

The explorative work with the children highlights the complexities of researching children's experiences and the myriad of ways in which materialities were not only related to the children's experiences, but also crucial for these experiences to emerge. This means that rather than answering the questions of what knowledge that could be produced on children's experiences in a research project, the paper shows how the children and I together explored what children's experiences of a research project could contain.

What seemed to engage Adam, Caesar, Ethel, Li, Naima and Victor was sometimes joint fascinations like the elephants or the headphones, and sometimes individual things like cat ears, seashells and Pokémon balls. When this group of children met with the crowd at the vernissage, more and other engagements came into being and spread in new

directions through the questions and experiences of the children in the crowd. Nevertheless, what emerged as a common thread in our work with the hats and their accessories was how the different fascinations were closely tied to each child's worldly engagements. Thus, the worlding process of making the hats sheds light on the *mutual* dependence of the children and the hats. The children's parts of the research project were not the only ones that were vulnerable and dependent. The hats were vulnerable and dependent too – always related to the children, to other materialities, discourses and so on in order to continue to work as powerful measurement tools. Furthermore, I as a researcher was both vulnerable and very much dependent on these worldly processes to be able to 'do my job', as Ethel articulated it. From an ethical perspective, what was needed in the collaboration with the children was thus ways of working that included all the practices that were already part of the relations in-between the children and the hats: may they be symbols to bring luck when doing the recordings, or imagined headphones. The children seemed to have little interest in my first attempt of worlding their experiences through interviews and observations. Instead, they worlded themselves and me, and my job was to investigate stuff by 'becoming with' their worldings. However, I am not arguing that we should abandoned qualitative methodologies like interviews or observations. The collaboration with the children rather shows that we need *more* and *multiple* ways of doing research. As emphasised by Lenz Taguchi, in an interview by Semeneć and Diaz-Diaz (forthcoming), the

...argument for multiple or more rather than less methods, and more and more innovative epistemologies and methodologies rather than less [...] reflects this urgency of not just knowing more, but knowing together *with* the agents the questions concern, and of knowing *well* – that is, ethically and sustainably – in relation to these agents and in relation to the context and world in which they and we live together.

What was needed was thus ways of working within the context and the world of the children, to stay within the moment and the movement (cp. Bodén & Gunnarsson forthcoming). Nonetheless, one should be careful in promoting this exploratory way of working with children as 'more ethical' than other research practices. Even if the making of hats could be described as starting from the children's fascinations, the free leashes during our work made it somehow difficult for the children to know what was expected of them, and maybe even difficult to remember that what they were doing was part of a research project. In a way, this might be understood as more problematic than the structured practices of the EEG recording and it might be yet another way of understanding Ethel's question: Is this your job? However, our hats became other than a mere representation of the EEG caps or something that mirrored the children's experiences of wearing the caps and being part of the recordings. Rather, the

exploration became an extension of their experience of being part of the EEG recordings in particular, and maybe also of being part of the RCT study in general. Through the responsive relations with the hats, the children's experiences seemed to be an ongoing production, that extended both in time and space. Through talks with researchers and friends, through the information book and the video, experiences were produced *before* the children were part of the recordings, even for those who never wore the original EEG cap. Experiences were produced *simultaneously* as recordings were performed; *after* the recordings in joint constructions and re-constructions, buildings and re-buildings, and in the *yet-to-come*, as the practices connected to the hats came to include other experiences of the children, made elsewhere and in other situations. One way of theorizing these experiences could be to describe them as produced through a 'post-participatory' methodology, that blurred past, present and future experiences within our collaboration. The children's experiences were always and at the same time produced beforehand, in the midst, in hindsight, and in the future.

The making and faking of hats became a way of problematizing a notion that children's experiences could be defined outside of our common engagements, and 'caught' if a researcher only asks the right questions and listens carefully enough. Instead, as stressed by Giugni (2011), what was needed was a research apparatus in which we were able to grapple with both the ordinary and the *extraordinary*. We made the hats, and we faked the hats, pretended there to be headphones that never existed. We coloured outside the lines, by looking for and creating leakages (cp. Giugni, 2011). Rather than problematizing the possibilities of children's agency and participation in RCT studies, we – together – produced the experiences of and in a research project. And foremost, we produced research: from wearing the hat, to daring the hat.

Acknowledgements

My sincerest thanks to all children and adults in *Enhancing preschool children*. The paper has been developed in conversations with great scholars and friends, thank you! Thanks also to the two anonymous reviewers for productive comments.

References

Aronsson, L. (2019). Reconsidering the concept of difference. A proposal to connect education and neuroscience in new ways. *Policy Futures in Education*.

- Aronsson, L., & Lenz Taguchi, H. (2018). Mapping a collaborative cartography of the encounters between the neurosciences and early childhood education practices. *Discourse: Studies in the Cultural Politics of Education*, 39(2), 242-257.
- Alderson, P. & Morrow, V. (2011). *The Ethics of Research with Children and Young People. A Practical Handbook*. (2nd ed.) Los Angeles: Sage.
- Biesta, G. (2010). Why 'What Works' Still Won't Work. From Evidence-Based Education to Value-Based Education. *Studies in Philosophy and Education*, 29(5), 491-503.
- Biomedical (2017). *WaveGuard Connect - 19 Channel EEG Cap*.
<https://bio-medical.com/waveguard-connect-19-channel-eeeg-cap.html> [2018-08-28]
- Bodén, L. (2017). Going with the affective flows of digital school absence text messages. *Learning, Media and Technology*, 42(4), 406-419.
- Bodén, L. (2016). Dexter time. The space, time and matterings of school absence registration. *Discourse: Studies in the Cultural Politics of Education*, 37(2), 245-255.
- Bodén, L. (2015). The presence of school absenteeism. Exploring methodologies for researching the material-discursive practice of school absence registration. *Cultural Studies Critical Methodologies*, 15(3), 192-202.
- Bodén, L. & Gunnarsson, K. (forthcoming). Nothing, anything and everything. Conversations on post-qualitative methodology. *Qualitative Inquiry*.
- Christensen, P. & James, A. (2017). *Research with Children. Perspectives and Practices*. (3. ed.) London: Routledge.
- Einarsdottir, J. (2007). Research with children. Methodological and ethical Challenges. *European Early Childhood Education Research Journal*, 15(2), 197-211.
- Eriksson, C. (forthcoming PhD thesis). *A Preschool that Brings the Children Back to the Streets. Curating Transactions through Strolls, Mappings and Displacements*.
- Eriksson, C., & Sand, M. (2017). Placing voice meetings through vocal strolls. Toddlers in resonance with public space. *SoundEffects. An Interdisciplinary Journal of Sound and Sound Experience*, 7(2), 64-78.
- Eriksson, C., & Sand, M. (2018). Belonging in transience. Vocal mapping for a commuting preschool practice. *Emotion, Space and Society*, 29, 1-8.
- Frankenberg, S. J., Lenz Taguchi, H., Gerholm, T., Bodén, L., Kallioinen, P., Kjällander, S., Palmer, A., & Tonér, S. (2018). Bidirectional collaborations in an intervention randomized controlled trial performed in the Swedish early childhood education context. *Journal of Cognition and Development*, 20(2), 182-202.
- Gerholm, T., Hörberg, T., Tonér, S., Kallioinen, P., Frankenberg, S., Kjällander, S. Palmer, A, Tonér, S., & Lenz Taguchi, H. (2018). A protocol for a three-arm cluster randomized controlled superiority trial investigating the effects of two pedagogical methodologies in Swedish preschool settings on language and communication, executive functions, auditive selective attention, socioemotional skills and early maths skills. *BMC Psychology*, 6(1), 29.
- Gerholm, T., Kallioinen, P., Tonér, S., Frankenberg, S., Kjällander, S., Palmer, A., & Lenz-Taguchi, H. (2019). A randomized controlled trial to examine the effect of two teaching methods

- on preschool children's language and communication, executive functions, socioemotional comprehension, and early math skills. *BMC psychology*, 7(1), 59.
- Giugni, M. (2011). 'Becoming worldly with'. An encounter with the Early Years Learning Framework. *Contemporary Issues in Early Childhood*, 12(1), 11-27.
- Gollop, M. M. (2000). Interviewing children. A research perspective. In A. B. Smith, N. J. Taylor & M. M. Gollop (Eds.), *Children's voices. Research, Policy and Practice*. (pp. 18-37). New Zealand: Pearson Education.
- Hanley, P., Chambers, B., & Haslam, J. (2016). Reassessing RCTs as the 'gold standard'. Synergy not separatism in evaluation designs. *International Journal of Research & Method in Education*, 39(3), 287-298.
- Haraway, D. J. (2008). *When Species Meet*. Minneapolis: University of Minnesota Press.
- Hill, M. (2006). Children's voices on ways of having a voice. Children's and young people's perspectives on methods used in research and consultation. *Childhood*, 13(1), 69-89.
- James, A. (2007). Giving voice to children's voices. Practices and problems, pitfalls and potentials. *American anthropologist*, 109(2), 261-272.
- Lather, P. (2004). This IS your father's paradigm. Government intrusion and the case of qualitative research in education. *Qualitative Inquiry*, 10(1), 15-34.
- Lather, P. (2013). Methodology-21. What do we do in the afterward? *International Journal of Qualitative Studies in Education*, 26(6), 634-645.
- Lather, P. & St. Pierre, E.A. (2013). Post-qualitative research. *International Journal of Qualitative Studies in Education*, 26(6), 629-633.
- Latour, B. & Woolgar, S. (1986). *Laboratory life: the construction of scientific facts*. Princeton, N.J.: Princeton University Press.
- Lenz Taguchi, H. (2017). "This is not a photograph of a fetus". A feminist reconfiguration of the concept of posthumanism as the ultrasoundfetusimage. *Qualitative Inquiry*, 23(9), 699-710.
- Lenz Taguchi, H., Semenec, P., & Diaz-Diaz, C. (forthcoming). Interview with Hillevi Lenz Taguchi. In C. Diaz-Diaz and P. Semenec (Eds.), *Research after the Child. Engaging with Posthumanist and New Materialist Methodologies*. New York: Springer.
- Luck, S. J. (2014). *An introduction to the event-related potential technique*. Massachusetts: The MIT Press.
- McKechnie, J. (2002). Children's voices and researching childhood. In B. Goldson, M. Lavalette and J. McKechnie (Eds.), *Children, Welfare and the State*. London: Sage.
- Moberg, E. (2018). Children, sub-headings and verbal discussions creating evaluations: acknowledging the productiveness of ambivalence. *Pedagogy, Culture & Society*, 26(3), 363-379.
- Morgan, M., Gibbs, S., Maxwell, K., & Britten, N. (2002). Hearing children's voices: methodological issues in conducting focus groups with children aged 7-11 years. *Qualitative research*, 2(1), 5-20.

- Nordstrom, S. N. (2018). Antimethodology. Postqualitative generative conventions. *Qualitative Inquiry*, 24(3), 215-226.
- Palmer, A. (2016). 'Is this the tallest building in the world?' A posthuman approach to ethical dilemmas in young children's learning projects. *Global Studies Of Childhood*, 6(3), 283-298.
- Percy-Smith, B. & Thomas, N. (2010). *A Handbook of Children and Young People's Participation. Perspectives from Theory and Practice*. London: Routledge.
- Roberts, H. (2017). Listening to children. And hearing them. In P. Christensen & A. James (Eds.), *Research with children. Perspectives and practices*. (pp. 154-171). London: Routledge.
- Roos, P. & Rutanen, N. (2014). Metodologisia haasteita ja kysymyksiä lasten tutkimushaastattelussa. *Journal of Early Childhood Education Research*, 3(2), 27-47.
- St. Pierre, E. A. (2011). Post qualitative research. The critique and the coming after. In N.K. Denzin & Y.S. Lincoln (Eds.), *Sage Handbook of Qualitative Inquiry (4th ed.)* (pp. 611-635). Los Angeles, CA: Sage.
- St. Pierre, E. A. (2013). The appearance of data. *Cultural Studies Critical Methodologies*, 13(4), 223-227.
- St. Pierre, E. A. (2014). A brief and personal history of post qualitative research. Toward "post inquiry". *Journal of Curriculum Theorizing*, 30(2), 2-19.