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An ethnographic inquiry into midwifery care in Germany

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CHAPTER 5 – MUSIC TO MY EARS

A MATERIAL-SEMIOTIC ANALYSIS OF FETAL HEART SOUNDS IN MIDWIFERY PRENATAL CARE⁵⁶

Abstract

Unlike sonographic examinations, sonic fetal heartbeat monitoring has received little attention from scholars in the social sciences so far. Using the case of fetal heartbeat monitoring as part of midwifery prenatal care practices in Germany, this contribution takes the aesthetic relations shaped by this practice seriously. Based on ethnographic stories, three situations are compared in which three different tools help to listen to what becomes fetal heart sounds. Depending on the instrument used, particular orchestrations of the care situation, kinds of “heartbeat music,” and versions of fetuses emerge. In the Doppler-based orchestration, audible heartbeat music is taken as a sign of a healthy child in need of obstetrical surveillance and parental love. The Pinard horn makes fetal music that can be appreciated by the midwife as expert-listener alone. The cardiotocograph helps to bring about ephemeral music that recedes behind beautiful and durable scripts. This material-semiotic analysis amplifies how fetal well-beings are shaped in midwifery prenatal care.

Keywords midwifery, pregnancy, fetal monitoring,
aesthetics, sound

Introduction

Visual productions of an embryo's or a fetus's beating heart, one of the first organs to develop in human organisms, are considered the most reliable, early indications of pregnancy in both obstetrical and public circles in Germany. Several weeks after gynecologists have visualized the fetus's heart ultrasonographically, a handheld electronic device is used, often by midwives, to render the heartbeat audible via ultrasound. From then on, the fetal heartbeat is routinely monitored at every prenatal care visit⁵⁷, in order to check the "baby's well-being in the womb" (Grivell et al. 2015, 2). Listening to such fetal heartbeat music, I suggest, is often more common in prenatal care in Germany than is seeing "baby's first picture" in the form of a fetal sonogram (Mitchell 2001).

However, anthropologists have tended to study visual over sonic monitoring technologies. Especially within us feminist scholarship, visual ultrasound technologies have been criticized for making fetuses appear as autonomous persons, entitled with individual statuses, rights, and interests (Petchesky 1987; Morgan and Michaels 1999; Mehaffy 2000; Mitchell 2001; Taylor 2008). It has been argued that fetal sonography has helped to enact two entities that are biologically, medically, and juridically separated, yet also inextricable intertwined: fetuses and their "maternal environments" (Hubbard 1990 cited in Haraway 1992, 312). What has been accepted as an "accurate representation of a real fetus" (Petchesky 1987, 268; see also Haraway 1992, 312) has helped to forge affective relations, to bond a mother, father, and family to their child. Against this backdrop, sonographic images of fetuses have been used in antiabortion campaigns, to assert the independence and individual right to live as well as the lovability of each fetus.

The scholarly works from which this article takes inspiration show how the visual representation of fetuses has helped not only to know but also to relate emotionally and socially to the visual artifacts themselves and to what they are supposed to stand for: the fetus. Sound studies scholars have framed sonic approaches to bodies in medicine as "listening for knowledge" (Bijsterveld 2018, 3). But how is sonic fetal heartbeat monitoring done in midwifery prenatal care, and with which effects?

⁵⁷ Prenatal care visits take place every four weeks until the thirty-sixth week of pregnancy. From the thirty-sixth to the fortieth week of pregnancy, prenatal care visits are scheduled every two weeks; after the fortieth week of pregnancy – after the expected due date – such visits are scheduled every two days. While it is recommended to monitor the fetal heartbeat

at every appointment, and thus, approximately, at least ten times during pregnancy, sonographs are usually only taken three times: between the eighth and the twelfth week, between the eighteenth and the twenty-second week, and between the twenty-eighth and the thirty-second week of pregnancy.

By analyzing specific cases of “fetal heart sound listening,” as the midwives I observed called it, I take the aesthetic dimensions of these epistemological⁵⁸ practices seriously. My analysis shows that emerging fetal heart sounds are interpreted as sensorially and emotionally engaging, and hence give rise to particular aesthetic appreciations. How particular sounds or listening objects become ‘good’ or ‘beautiful,’ and what they are made to show, mean, stand for, index, or symbolize, can best be understood by comparing these sounds to music, I argue.

Stethoscopic Listening for Knowledge

Social-scientific analyses of fetal heartbeat monitoring are sparse (for recent exceptions see Howes-Mischel 2016, 2017; Owens 2017), but social-scientific interest in medical listening or *auscultating*⁵⁹ is not new. This work is firmly grounded in the understanding of sounds as ways of knowing the entity that produces the sound.

None other than Michel Foucault ([1963] 2003, 17, 164–70, 177–84) has argued that empirical medical knowledge and skills have been crafted through objectifying and classifying patients’ bodies acoustically. Next to seeing and touching, listening to bodies fueled medicine’s revolutionary turn to empirical rationalization at the end of eighteenth- and beginning of nineteenth-century Europe. What Foucault describes as a fundamental shift in the history of ideas was supported by a rather inconspicuous acoustic technology. According to R. T. H. Laennec, the founding father of auscultation, a rolled stack of papers served as provisional predecessor of the stethoscope, a wooden cylindrical ear-trumpet that helped to mediate between a doctor’s ear and a patient’s body (Lachmund 1999, 420; Sterne 2001, 117, 2003, 104; Rice 2010, 289).

Sound study scholars investigating the “genealogy of auscultation” (Lachmund 1999, 420) have studied the stethoscope and its uses in further detail. They explain that the “chest-seeing device”⁶⁰ allowed the

58 Following Jeannette Pols (2014, 193), I understand epistemology as activities of knowing worlds that shape what these worlds become and how they can be lived in.

59 Auscultation in medical environments of the nineteenth century was an active listening or “hearkening” to movements of organs, airs, and fluids in patients’ chests (Sterne 2003, 100).

60 Jonathan Sterne (2003, 105) remarks that this visual metaphor for a listening practice should not be overinterpreted but understood as

an expression of the common French theoretical approach to knowledge of the time. “Ensonment,” writes Sterne (2003, 2), was part of the Enlightenment project, and, he argues, listening was done “in the service of rationality.” Jens Lachmund (1999, 428), however, understands the visual metaphor as hinting at the intertwinement of visual and auditory practices: “Not only was a visual practice, pathological anatomy, the basic point of reference on which the whole project of a physical diagnosis hinged, but visualization practices also remained operative within the organization of auditory experiences.”

auscultation of breathing lungs and pumping hearts, hidden in patient's chests and only rendered visible retroactively in autopsy. Through dissecting and auscultating, bodies, specifically hearts, lungs, and gastrointestinal systems, were sensually identified and categorized, and thereby skillfully evidenced (Lachmund 1999, 424; Sterne 2003, 121-22). As a mediating instrument,⁶¹ the stethoscope made it possible for medical doctors to take not only physical but also social and epistemic distance from their patients' bodies. It thus helped to consolidate gender- and class-related differences between aspiring middle-class male doctors and hardworking yet poor female patients by privileging the truth and worth of the doctor's access to his patient's body as his empirical research object.

A modernist separation between subjects and objects was concretized through separating who knows (the savant doctor) and what is known (the patient's body as physical evidence of disease) (Rice 2012, 302-3; Sterne 2003, 113-20). Clinicians' bodies became epistemic instruments, aspiring to coproduce "diagnostic objectivity" (Lachmund 1999, 441) when examining patients' bodies. Concomitantly, patients' voices became some of the many, formerly absent body sounds, which were then made present and diagnostically relevant (Sterne 2003, 116). Consonant with Foucault's analysis, historical investigations into auscultation practices and their technological and cultural conditions have emphasized their contribution to standardizing and formalizing medical knowledge and skills (see Lachmund 1999, 423-29, 439-42; Sterne 2003, 101-16; Van Drie 2013, 167; Krebs and Van Drie 2014, 104; Harris and Van Drie 2015, 111-12; Volmar 2018).

Ethnographic studies of listening in contemporary medical environments have followed the argument that sounds may produce knowledge (see Rice 2012, 2013, 2015; Harris and Van Drie 2015; Krebs and Van Drie 2014; Maslen 2015; Van Drie 2013). These studies take medical training situations, in which auscultative knowledges and skills are explicated, demonstrated, and exercised, as empirical examples. They argue that apprentices are trained to see the contemporary version of the stethoscope as the "hallmark of a doctor" (Rice 2010), whose ways and purposes of listening are directed towards generating knowledge. Listening analytically to "specific

61 The distance between the patient's and the doctor's bodies was created more by the instrument that was used to avoid direct contact and to "mediate" (Sterne 2003, 105-8) than by the actual spatial distance that the tool of around

25cm in length provided. The tool did not prevent the doctor from smelling the body, feeling the skin's warmth or chill, or, even accidentally, touching the listened-to body.

characteristics of sound” (Supper and Bijsterveld 2015, 133) serves the purpose of monitoring or diagnosing well-defined clinical signs (Supper and Bijsterveld 2015, 135; Bijsterveld 2018, 73).

These studies have been committed to escaping what Sterne (2003, 15) calls the “audiovisual litany.” According to Sterne (2003, 14), the juxtaposition of hearing and seeing, rooted in Christian religion and commonly mobilized in “Western intellectual history,” elevates seeing to a technique of ultimate, exterior, and distant rationalization, and relegates hearing to subjective and worldly interiors. To counter this, scholars have approached listening as a means for “acquiring knowledge about human bodies, ... or other research objects” (Bijsterveld 2018, 4). As a consequence, listening changed sides: instead of figuring as the opposite of knowing, listening has become another variant of seeing as knowing by objectification.

However, to analyze professional practices as simply objectification contributes to (re)producing a rationalist ideology and does not serve sound studies’ aim of overcoming essentialist and generalizing approaches to bodies and senses. Listening to sounds does not ‘naturally’ lead to (only) knowing the object as if it was seen. As we shall see, listening to fetal heartbeats transforms fetal heart sounds into heartbeat music, making them objects of aesthetic appreciation.

In this study of heart sound listening within midwifery prenatal care practices in Germany, I show how moments of attentive listening to sounds are created (see Hennion 2003, 30) that make these sounds emerge as fetal heartbeat music. Like music, fetal heart sounds are produced with the help of specific instruments and are parts as well as effects of prenatal care orchestrations. Like music, fetal heart sounds are crafted in ways that help to attribute them with a “connotative, associative-affective character” (Tagg 1987, 282). Fetal heart sounds appeal to their listeners; they make them act, appreciate, and know in particular ways (see Gomart and Hennion 1999; Hennion 2005, 2017). Listeners learn how to cultivate their listening to heartbeat music, to interpret what they hear, and to relate to what emerges as the object of listening and as coproducer of the music.

Listening to Fetal Heartbeat Music

Care practices and their material-semiotic participants are “interrelational achievement[s]” (Pols 2014, 176).⁶² In crafting the identities of their participants, these care practices not only set out to know and be known but they also value and are valued. Care practices’ aesthetics consist of socially, technologically, and sensually produced appreciations, which emerge in a specific care practice oriented towards the “improvement” or stabilization of a patient’s situation (Pols 2017b, 423). Studying care practices in aesthetic terms involves demonstrating how and which kinds of relations oriented towards living well are shaped in the doings (in this case, listenings), which is a form of aesthetics of everyday life.

In this article, I respond to the following questions: Which kinds of relations are shaped when different heartbeat monitoring devices are used in midwifery prenatal care practices? What kinds of music do the particular devices help produce? What do the fetuses as ‘objects of listening’ become? To do so, I use three stories based on notes and interview material from my ethnographic research. From February 2015 until March 2016 I accompanied midwives in their daily work providing prenatal, birth, and postpartum care in hospitals and midwife-led birthing centers in Germany. In their prenatal care, midwives used three devices to listen to fetal heart sounds. Two were electronic devices that simulate the fetal heartbeat audibly, the portable Doppler fetal monitor and the cardiotocograph (CTG⁶³). The third instrument, which resembles the historic stethoscope, is called *fetoscope* or, more commonly, the *Pinard horn*, named after the French obstetrician Adolphe Pinard.

Below, I compare three fetal heartbeat listening situations in which these different instruments produced fetal heart sounds in specific ways, and helped to give rise to particular care orchestrations. Locating these practices “somewhere in particular” (Haraway 1999, 182), I also show

62 I build on the empirical ethical studies of technologies’ involvement in care practices led by Jeannette Pols and her colleagues (Pols 2012, 2013, 2014, 2017a, 2017b; Pols and Moser 2009; Mol, Moser, and Pols 2010; Pols and Willems 2011; van Hout, Pols, and Willems 2015; Ceci, Pols, and Purkis 2017) in my study of how epistemological and aesthetic relations are co-crafted in fetal heartbeat listening. Pols’s empirical ethical approach starts from the assumption that not only people but also things, activities, and words become what they are in relation to each other. As an alternative to normative ethics, empirical

ethics analyze specific situations and their “values-in-practice” or “intra-normativities” (Pols 2014, 178). Empirical ethicists study the goods in practice, and compare and weigh them reflexively (Pols 2014, 176–80). They need not agree with the goods and aesthetics they witness, but they need to take them seriously by specifying how aesthetics come into play and what they do (Pols 2017a, 2).

63 The abbreviation CTG not only names the device but also the products, as midwives speak of “writing CTGs.”

how professional discourses present in midwifery and obstetric textbooks affect the prenatal care practices I describe.

Educating Parental Ears

The Doppler fetal monitors, called *Doptones*, I encountered at my field sites were composed of a wired transducer and the device itself. The transducer is held to the woman's belly with one hand while the device, equipped with a small electronic display and a loudspeaker, is held in the other. The *Doptone* is a practical and user-friendly device: hand-sized, it is easy to transport and handle; battery-run, it does not depend on electricity. *Doptones* record the fetal heartbeat via ultrasound, produce sounds acoustically, and make them audible to everyone in hearing distance through an integrated loudspeaker.⁶⁴ These devices were used in both midwife-led and obstetrical surroundings. The following excerpt from my fieldnotes describes its use in a midwife-led birthing place, in which *Doptones* were most commonly used for listening to fetal heartbeats throughout pregnancy and birth.

When the moment for listening to the fetal heartbeats has come, Karen seems excited. Her belly undressed, she is lying down on the couch while midwife Julia kneels next to her on the ground. Julia rubs her hands and places them on Karen's belly: "Hello child, how are you doing?" After having palpated Karen's belly to determine the fetus's position in Karen's belly, Julia grabs the *Doptone*, applies some ultrasound gel to the transducer, and turns on the device. Now taking a seat next to Karen on the couch, she holds the transducer to Karen's left groin area. We hear a loud crackling tone. Julia moves the transducer several centimeters towards Karen's navel and a dull electronic beating begins to sound. The beating becomes louder and louder as Julia presses the transducer firmly against Karen's belly until a steady thumping fills the room. "Oh! That is really fast," Karen smiles, looking surprised at the device in Julia's hand. "Yes, it is," Julia replies, "like a small galloping horse [*ein galoppierendes Pferdchen*]." We continue listening for a while until Julia turns it off. "Your child is doing really well in your belly," Julia concludes in a satisfied tone of voice.

64 Unlike other fetal heartbeat listening devices, *Doptones* and similar devices used in professional care environments can also be purchased for home use.

Before listening, midwife Julia touches Karen's belly to get in contact with the fetus and determine its position. Julia carries out the so-called Leopold's maneuvers, named after the German gynecologist and midwifery teacher Christian Gerhard Leopold, in order to know where to, approximately at least, place the transducer, so that it produces audible fetal heart sounds.⁶⁵ The object of listening is directly addressed, verbally and haptically, as "the child" and the sounds are announced as fetal heartbeats. We thus are equipped with particular genres of knowing. The listeners enter a shared acoustic space filled with fetal heart sounds that 'tell' how the child is doing.

While how to listen and what to listen to are framed and directed beforehand, they take concrete shape in the shared sensorial practice. Karen, who is joyfully committing to the listening procedure, hears these sounds for the first time. She responds spontaneously to what she has been prepared for and is looking forward to hear. The sounds and scratches, followed by a fast and monotonous rhythm, are perhaps different from what Karen expected, as she comments that they are "really fast." But what do "really fast" heartbeats mean or stand for? The implicit reference to a much slower adult's such as Karen's own heart rate is appropriate and relevant for the obstetrical surveillance of the fetal heartbeat in pregnancy, relying on different standards of normal heart rates for fetuses and adults. In obstetrical terms, "good" fetal heartbeats are "really fast" in comparison to the resting heart rate of an adult. However, "fast" heartbeats are not only a medical category, called tachycardia, in this situation. As aesthetic artifacts, they also become socioemotional expressions and symbolic communication (Tagg 1987, 285).⁶⁶ They are good heartbeats, whose appropriate rhythm is beautiful and shows that the "child is doing really well" in Karen's belly, as the midwife says. The fetus we jointly get to know and learn to relate to is, according to this evidence, healthy.

The obstetrical, and aesthetic, metaphor Julia introduces for specifying "fast" heartbeats—sounding "like a small galloping horse"—renders these different significations of fetal heartbeat music evident. Midwives and obstetricians learn to differentiate between the fast stamping of a fetal heartbeat and a whooshing, a "vascular soufflé produced by uterine as well as

65 As an experienced examiner, Julia also used to estimate the fetus' weight and age of gestation through this set of touching.

66 In music theory, the relations between rhythms, tempi, and moods of music and human

bodies are called bioacoustics. The idea is that they adapt to each other: a lullaby with its swinging and calm rhythm, and harmonious and repetitive melody, is meant to quiet and to secure children's bodies (Tagg 1987, 286).

fetal vessels” (Gibb and Arulkumaran 2017, 23). Distinguishing maternal from fetal heart rate patterns, in a babble of similar sounds, is crucial for avoiding false interpretations and unnecessary interventions. The instrument needs to produce specific sounds that can be valued distinctly. But the audible heart sounds and their evocative verbal co-enactment⁶⁷ add further possibilities for relating to what we hear and for concretizing the object of listening.

When the midwife suggests that the fetal sounds are like a “small galloping horse” that signify that “the child is doing really well in [her] belly,” she suggests a way of knowing and feeling (sensorially and emotionally) that generates diagnostic and social meanings that inform each other. A “small galloping horse” produces ‘good’ or ‘beautiful’ sounds as it lives and moves – vigorously and boisterously. Furthermore, it is “doing really well” in its element or ‘natural’ habitat, Karen’s belly.

More specifically, as one of the most popular German alternative birthing manuals, written by a midwife, suggests, fetal heartbeat listening with the help of the Doptone is a way to not only check the fetal heart rate but to also anticipate and to train for parenting through learning to become attentive to children’s aural expressions: “Listening to the fetal heart sounds, I can point out to parents that also their ears need to prepare themselves for becoming parents” [*Beim Hören der kindlichen Herztöne kann ich die Eltern gleich darauf hinweisen, dass auch ihre Ohren sich auf das Elternwerden vorbereiten müssen*] (Stadelmann 2005, 29–30). Rather than drawing on a widely shared familiarity with human heart sounds as symbols of life and emotions, especially love (Rice 2012, 305; Howes-Mischel 2016, 196), the sonic enactments of “the child” stages the fetus as a biosocial entity-in-action-and-in-relation that should be loved and cared for. Listening to fetal heartbeat music is cultivated as “sonic skills” (Bijsterveld 2018).⁶⁸ In this Doptone orchestration, the focus lies on educating future parents (sentimentally) in how to listen and what to hear.

67 Scholars argue that finding verbal “analogies” (Lachmund 1999, 425) to body sounds and thereby establishing a “new medical semiotics” (Sterne 2003, 128) was the aim of the stethoscope’s inventors. However, establishing a “metalanguage of sound ... that was independent of subjective experience (i.e., independently verifiable)” (Sterne 2003, 129) failed in achieving the status of auscultative objectivity in at least two respects: not only were these verbal descriptions not necessarily helpful for actually retrieving the corresponding

sounds – especially not to untrained ears – but also the sounds could, potentially, indicate “a physical condition of the body” (Sterne 2003, 132) but not its causes, the specific pathologies.

68 Alexandra Super and Karin Bijsterveld have defined sonic skills as multisensorial know-hows, encompassing the ability to use one’s ears and to handle the listening tool as well as “to design, record, store, mimic and retrieve sound” (Supper and Bijsterveld 2015, 140).

Creating a Midwifery Art

The midwife-led birthing center where Agnes works is equipped with all three fetal heartbeat monitoring devices that are used in prenatal care: Doptones, Pinard horns, and CTGs. While the CTGs mostly gathered dust in a corner of the room and were only exceptionally put into practice, the Doptones and Pinard horns were used on a daily basis and thus kept within view and reach. Especially when evaluating women and fetuses further along in pregnancy, midwife Agnes likes to use her Pinard horn, a simple and cheap but elegant device that resembles a wooden champagne flute.

Midwife Agnes suggests concluding the prenatal care visit by “hearkening to the heart sounds” [*nach den Herztönen horchen*]. Ramona agrees. She lifts her blouse and lies down on the couch. In order to “make it more comfortable,” midwife Agnes stuffs a pillow under Ramona’s knees. Kneeling next to Ramona, she rubs her hands, and places them on Ramona’s belly. “Let’s see if it says ‘Hello,’” Agnes says expectantly. Ramona, holding her blouse and fixing on the ceiling, nods. Agnes presses the edges of her hands onto Ramona’s belly midway between the costal arch and the navel. Then she moves her hands to the sides of Ramona’s belly and pushes them forcefully towards each other. “The child lies on the right side, head downwards,” Agnes looks up to Ramona. “Tell me if it becomes too much for you and if you cannot lie on your back any longer.” She grabs her Pinard horn and places it between Ramona’s navel and her right groin. Leaning forward, Agnes puts her ear on the earpiece, takes her hand off and listens. Ramona is lying still, breathing shallowly. Agnes moves the horn several centimeters to the left, listens. Then she moves it downwards, presses the horn more forcefully on Ramona’s belly, so that it seems to sink into the belly, and listens again. After a long silent minute, Agnes grabs the horn, and lifts her head: “Today, I get both of you [*Heute kriege ich euch beide*].”

The Pinard horn amplifies body sounds, but is less ‘sensitive’ than the Doppler ultrasound transducer. In order to “hearken to the fetal heart sounds” with the Pinard horn, to master the technique of auscultating, several conditions need to be met: clinical palpation and auscultation skills are as indispensable as anatomical and physiological knowledge. The fetus’s position in the belly has to be detected as precisely as possible via touch. As a rule of thumb, the listening midwife can hear the fetus’s heart beating loudly and clearly,

if the instrument is placed as close as possible to the fetus's back, at heart level. When this spot is found, the heart sounds need to be differentiated from the babble of abdominal sounds, and especially from the pulse of the 'maternal' blood vessels, so that the tool renders audible what is listened to and known as fetal heart sounds.⁶⁹

Furthermore, the surroundings—and all the participants, except the listened-to fetus—must keep quiet. Only one of the midwife's ears is able to listen to the child-in-the-belly, while the other ear is directed upwards and opens up towards the room and Ramona. Other sounds than those reaching the listening ear placed on the Pinard horn become 'external' and, as such, undesirable; they become disturbing ambient noise in the listening situation. Ramona is not allowed to talk, except to say if it "becomes too much" to lie motionlessly on her back, an uncomfortable position that cannot be held over a longer period of time in advanced pregnancies. For Agnes to auscultate, Ramona needs to become a *patient* in its literal and practical sense: she needs to cooperate by permitting and adapting to Agnes's touching, listening, and talking intervention. Her own ways of sensing and knowing "the child" are not part of the listening situation.⁷⁰ Ramona may (learn how to) feel the fetus moving in reaction to her excitement, to voices, to Agnes's touches, and to the pressure exerted on her belly when the Pinard horn is used. However, she cannot feel or hear the child the way Agnes does when feeling with her hands and listening with the Pinard horn.

The device separates out body sounds, distinguishing between the silent outside of a bounded body and its sonorous inside. The midwife's body emerges as an extension of the listening instrument that conveys the sounds it produces directly and exclusively into the midwife's ear. As (part of) an instrument, the midwife's body is spatially close to Ramona's and the fetus's bodies,⁷¹ but yet distant in regard to its perceptual and epistemic possibilities. Ramona is surrounded by a silence that she (must) coproduce, and is left

69 Once the heart sounds are made audible, they are counted for a minute in order to detect the fetal heart rate. The results are documented twice: one patient record, the so-called Mutterpass, is kept by the pregnant woman and another one is kept in the birthing center or ob-gyn practice. It is common to just mark a "+" that signals that the fetal heartbeat [*Herzaktion*] as a sign of the fetus's vitality has been detected.

70 The fetus's movements can also be signs for its vitality or well-being. These movements

can best be detected by Ramona herself, who learns to feel them over time and to get familiar with their patterns.

71 When pressing the horn on Ramona's belly with the help of her head, Agnes's cheek nearly comes to lie on Ramona's belly. Agnes can smell Ramona's skin and feel its warmth on her cheek and Ramona feels Agnes's breath and hair touching her belly. The Dopitone, in comparison, allows one hand to approach, but keeps the rest of the examiner's body at arm's length.

to listen to Agnes's words translating or, more precisely, enacting, the touching and listening object. Ramona laboriously contributes to bringing about, in strikingly present absence, the heartbeat music and its significations, but cannot perceive the music herself. Ramona's attention and curiosity, raised by the secret music as a sign of the hidden fetus, are directed towards Agnes's body, which has privileged access. The Pinard horn thus grants the midwife the professional authority to know and explicate what emerges as the-child-in-Ramona's-belly and to incite Ramona to trust the midwife in what she does: monitoring the fetus. The music produced via the Pinard horn can be appreciated by the midwife's skilled ear alone.

Pinard horns are mainly used in so-called extra-clinical, midwife-led environments, and mostly, if not exclusively, by midwives. They have attained an iconic status especially in these environments, which are often considered non-medicalized alternatives to obstetric settings (Skeide 2019). Ironically, Pinard horns are classic medical tools, developed and initially used by obstetricians. It seems that what the stethoscope is to the medical profession today, the fetoscope is to independently working midwives in Germany: it helps to enact identity and belonging, and is a symbol of, and tool for, midwives' knowledgeable craftwork and expertise (see Rice 2010, 300; Harris and Van Drie 2015, 111). Listening with the help of the Pinard horn provides the sociomaterial, epistemological, and aesthetic conditions for bringing about what has been called—often in opposition or in addition to science—the art of midwifery (Kennedy, Anderson, and Leap 2010). The Pinard horn helps to orchestrate midwifery care situations, in which midwives develop, use, and train in knowledge repertoires and sets of skills that are highly specialized and demand continuous clinical practice.

Beautiful Evidence

Cardiotocographs (CTGs) are machines of the size of small home printers, and, as they are rather cumbersome, they are placed on trolleys. These CTG trolleys stand next to a cot or bed; a pregnant woman lies down, two wired transducers are attached to her belly with two large rubber straps, and the CTG registers the fetal heartbeat via Doppler ultrasound and measures, if necessary, the frequency of uterine contractions as tensions of the abdominal wall.⁷²

⁷² There are wireless devices as well, but these are a lot more expensive and do not seem to be commonly used in German ob-gyn practices and hospitals.

Next to widely audible sounds, CTGs produce another, documentary, artifact: they transcribe the fetal heart rate as a jagged curve on scaled paper, which is printed out simultaneously with the recording.

Not only in midwife-led environments but also in ob-gyn practices, where most women are attended to during pregnancy in Germany, it is common to use Doptones for fetal heartbeat listening, at least in early pregnancies. Later, from around the twenty-sixth week of pregnancy on, the fetal heartbeat is often monitored with the help of CTGs in ob-gyn practices, even though it is medically indicated only for specific, potentially pathological events such as preterm labor.⁷³ Obstetricians as well as midwifery and public health researchers emphasize that this practice is problematic. This is because CTG recordings are no more than “snapshots” whose predictive value is quite limited, as midwives themselves were quick to point out. According to the midwives I observed, the (re)assurance that CTGs may provide pregnant women is thus based on a “false faith,” as the registered heartbeat cannot guarantee fetal well-being in the future. CTG scripts also serve as juridical and medical evidence for fetal well-being at the time of the CTG (Grivell et al. 2015, 1). The scripts are used for justifying obstetrical surveillance of fetal well-being and for proving that suitable obstetric measures have been taken in situations in which a ‘good’ fetal health state is doubted or appears ‘bad.’⁷⁴ Without indications, CTGs in pregnancy are unnecessary and potentially harmful interventions that, in addition, facilitate further unnecessary and potentially harmful interventions (DGGG 2012, 7; Schäfers and Kolip 2015, 6).⁷⁵

Midwife Vera, who provides prenatal care in cooperation with an obstetrician in her ob-gyn practice two days per week, shares these concerns

⁷³ According to the German Association for Gynecology and Obstetrics [*Deutsche Gesellschaft für Gynäkologie und Geburtshilfe*] 90 percent of all pregnant women experience CTG during pregnancy (DGGG 2012, 7). However, the relevant, so called maternity guidelines [*Mutterschafts-Richtlinien*], which prescribe prenatal care interventions and form the basis for remuneration, foresee that CTGs should be used for fetal heartbeat monitoring only in case of an imminent premature birth in the twenty-sixth week of pregnancy. From the twenty-eighth week of pregnancy on, a CTG is indicated for preterm labor or for cases in which the heart rate determined with the help of auscultatory methods shows “alterations.” Several further indications are defined for repeating cardiocography from that point on (G-BA 2019 [1985], 23).

⁷⁴ CTG scripts must be archived for at least ten years.

⁷⁵ On the one hand, fetal heart curves do not necessarily correlate with the factual health condition of the fetus. On the other hand, it is difficult to know for sure what a CTG says about the “well-being” of the fetus because it is challenging to interpret. This is because, unlike the Doptone and the Pinard horn, the CTG produces a curve that contains very detailed information about the heart’s activities, if one knows how to read it. It describes the basal fetal heart rate (beats per minute) and its deviations, accelerations and decelerations, as well as so-called oscillations. Oscillations are variabilities of the beat-to-beat intervals whose frequency and amplitude have to be counted. These criteria are checked when interpreting and scoring the curve. Depending on the score, CTGs are judged to be “physiological,” “suspect,” or “pathological.” “Suspect” and “pathological” CTGs receive further examinations and interventions.

with most of her colleagues with whom I spoke. Vera thinks that monitoring the fetal heartbeat works better with a Doptone and that “CTGs are mostly unnecessary.” However, she also emphasized that pregnant women “expect to get CTGs” as much as they demand fetal ultrasound.

In the prenatal care practices I witnessed in ob-gyn practices, the situation turned out to be more complicated than that. Many women, such as Jenny, thought of the CTG as a “necessary evil” that needed to be done in order “assure that the child is doing well.” Others, such as Anna, were indeed looking forward to cardiocography. It was “the best part of the prenatal care visit,” Anna told me. As part of rather hasty prenatal care visits—Vera disposed of half an hour for the entire prenatal exam—the CTG ran for twenty minutes. During that period of time, Anna was on her own in the prenatal care room. Lying on a cot, equipped with a pillow under her cheek and between her legs, the heartbeat listening was her occasion to relax, to doze off even, while being lulled by the steady and soft beating of “the child’s heart,” “the loveliest music” to her ears [*die schönste Musik in meinen Ohren*], as she called it. Bathing in the heartbeat music the CTG produced, Anna appreciated not only the intimate one-to-one-encounter with “the child” that the heart sounds provided but also that the CTG writing promoted her well-being.

For the midwives, however, the CTG produced different aesthetic values. For them, “beautiful CTGs” (scripts) were much more important than beautiful heart sounds. As “snapshots,” these papers can prove the fetus’s state of health at a certain moment in time. However, their durable materiality, together with the visibility of the data, the fetal heart rate, they provide, also bestows them with a probative force that exceeds the ‘captured’ moment. A panoply of inventive strategies was applied in order to craft “beautiful” scripts depicting a ‘good’ fetal heart rate in form of a continuous curve running within the ideal range and showing the variations defined as normal (see footnote 75). The coproduced ephemeral sounds often lost their epistemic value in favor of the produced ‘good,’ durable, and hard facts,’ which to create was often a laborious venture for all participants.

One of the requirements for crafting a “beautiful” CTG was to get a clear and continuous signal while recording. In order to achieve that, the transducer sometimes needed to be pressed firmly against the belly. It could become necessary to do so throughout the recording, often by the pregnant woman herself. If “the child does not like the CTG,” as Vera said, and “moved away from the transducer,” it was moved to other spots on the belly every now and then

in order to “catch the child,” as Vera put it, and thereby get a continuous curve. Another trick was for the pregnant woman to turn around and to position the transducer on the other side of the belly. If the heart rate curve was either wide or flat—read as signs of an “overly active” fetus or a fetus that “takes a rest” or “sleeps”—Vera tried “to wake it up” by clapping her hands or wiggling the woman’s belly. Sometimes, however, nothing helped. In these cases, Vera suggested trying again some hours later or the next day in the hope that it would work better then.⁷⁶

In order to participate as proper objects of CTG surveillance, fetuses are enacted as unruly children that have their own particular concerns, who may try to escape from the CTG transducer. Their future mothers and midwives jointly try to do their best to tame and to discipline them for the sake of their own good, as the fetuses emerge in this process as fragile beings whose health and lives are continually at risk and in need of protection. This endeavor may be impossible or interminable but can, at least, be documented and proven.

Aesthetics of Fetal Heart Sound Listening Situations

When fetal heartbeats were monitored in the midwifery prenatal care situations I described, sounds were produced that helped to know (about) fetuses, and music was made that could be appreciated for its affective and associative qualities. Fetal heartbeat music emerged from particular orchestrations, including specific instruments that helped to make distinct kinds of music. All three situations have in common that the participants actively engaged in shaping the listening procedures. The situated aesthetic artifacts brought about—the fetal heartbeat music and the CTG scripts—are both material-semiotic co-productions and co-actors. And so are the fetuses whose social lives are qualified through their fetal heart sounds and music, which are, interrelatedly, made to signify and to prove their well-beings.

When the Doptone produced sounds audible to everyone in the hearing vicinity, the aesthetic togetherness of the participants—Karen, the child-in-the-belly, and midwife Julia—revolved around teaching the mother-to-be how to listen to what emerges as fetal heartbeat music.

⁷⁶ Independently of the device used, there is, of course, the possibility that the fetal heartbeat shows irregularities that are not episodic but persistent, and that indeed

indicate pathology or even death. This is, fortunately, rare, and I did not encounter such a situation during my fieldwork.

The heartbeat music is evoked as a sign of a healthy child in need of obstetrical surveillance and parental care and love. In the Doptone orchestration, this cooperation in making fetal heartbeat music was rewarded by the music becoming audible, understandable, and appreciable to Karen as well.

When the Pinard horn served to produce fetal heartbeat music, the midwife alone could listen to and make sense of it, a situation that bestowed on the midwife interpretative authority by excluding how and what the pregnant woman heard and felt. The instrument produced esoteric music for initiated ears that have access to hidden and invisible worlds, the fetus-in-the-belly. In this orchestration the midwife became the key figure, whose appreciations of the heartbeat music were the sole or predominant concern.

The heartbeat music produced by the CTG was as an aesthetic artifact, valued by Anna as soothing background music, part of a relaxing and pleasing situation that contributed to her well-being. Midwife Vera's aesthetic appreciation was, in contrast, directed towards creating a 'beautiful' CTG script. This script could also be understood as musical notations, a visual version of the music 'played' via the CTG. The fetus was granted an important position in the CTG orchestration as its disciplined cooperation was indispensable for fabricating beautiful sonic and visual musical notes. Similar to the music made by the Pinard horn, CTG scripts were only to be appreciated by knowledgeable and skilled experts.

Who or what knows fetal heart sounds? Who appreciates fetal heartbeat music in which ways? Which kinds of sounds and objects of listening can be known and appreciated? The answers to these questions partly differ and partly overlap in the three orchestrations I described. In all of the three cases, however, knowing and appreciating cannot be separated, but need to be understood as intertwined practices.

Conclusion

Tracing the aesthetic relations that are built into fetal heart sound listening situations is a way to study how biological or obstetrical facts are based on what the different care participants are moved by, what they hold dear and find important, and what they appreciate aesthetically. This relational analysis shows that good fetal heart rates, both sonically and visually produced, belong to a genre not only of facts but also of appreciating and of valuing

sounds aesthetically, a way of interpreting sound that used to be reserved for musical practices. The confines of “accepted ‘normal’ limits for fetal heart rate parameters” (Grivell et al. 2015, 7) are affective, interpretative, and relational achievements. Concurrently, knowing a fetus cannot be separated from relating to a lovable, fragile, or unruly child as a material and sensual product of attentive and guided listening and its associated activities. When fetal heart-beat music is appreciated as sonic sign for a child in need of love, care, and obstetric surveillance, “relations that are aesthetically pleasing or good” (Pols 2017b, 423) are created that broaden the study of sound in various practices, such as care practices that include fetal heart sound listening. This allows us to better hear how women’s and fetal well-beings are shaped in midwifery prenatal care.