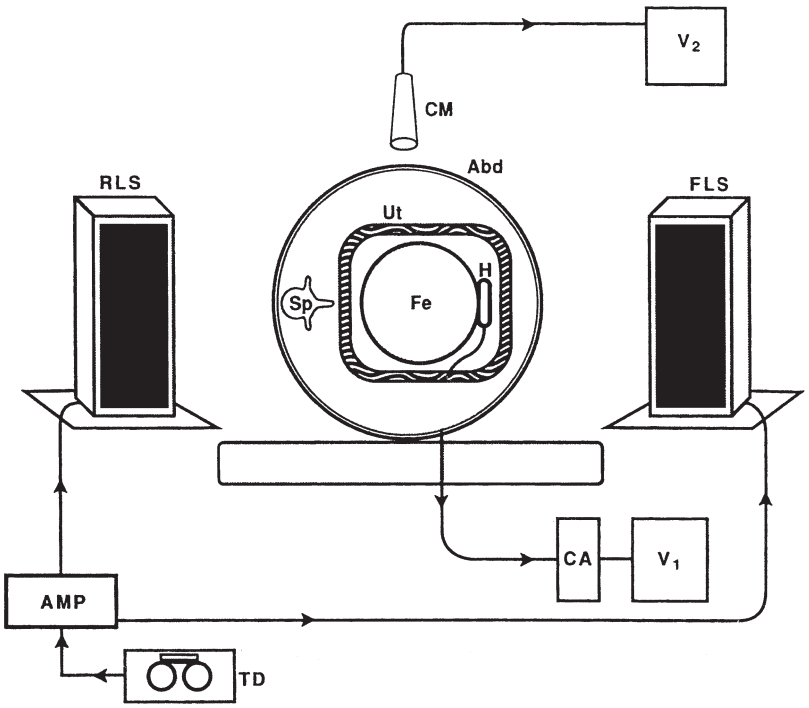
Tango Lesson

Study on the encounter of empirical science and art



Elina Saloranta

Department of Postgraduate Studies, Finnish Academy of Fine Arts

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My work *Tango Lesson* is a four-minute video filmed at a dance rehearsal. The film begins with the sound of speech echoing in the dance studio. A woman appears in the frame, tugging down the sleeve of her t-shirt. At the same instant, we hear music in the room, an Argentine tango. A man approaches the woman and they assume the dance position. Soon after the first steps the music fades into the background. There is a new dominant sound, a noise with distinguishable throbs, reminiscent of heartbeats.

The video is shot with a hand-held camera which follows the dancers at a very close distance. The frame concentrates mainly on the upper body: chest, shoulders and arms. Every now and then, the cameraman loses the dancers or has to refocus the camera. The camera's attempts to keep up with the dancers create an awkward choreography of their own, parallel to the dance patterns.

Halfway into the film, the camera is briefly lowered and it turns out that the dancing woman is pregnant. The moment is so brief that it is easily left unnoticed, but some viewers have described this as a moment that completely changed their interpretation of the work. The gestures of the man have suddenly started to seem protective. The noise and pulse heard on the soundtrack may also gain new dimensions.

Once the music ends, the dancers let go and take a few steps back. For a moment, we see a medium shot of them through the mirror. If the pregnancy has gone unnoticed before, it can certainly be detected now. Once again, however, the scene is over in a blink of an eye. The cameraman refocuses the shot, the image turns blurry and then disappears.

In the end of the film, the interpretation of those viewers who have observed the film from the perspective of a child in the womb is reconfirmed. The noise on the soundtrack has been entitled intrauterine background noise in the screen credits. The film is an attempt to imagine how an unborn child experiences dancing – or what the child can hear through the mother's stomach coats.

First steps of the work

The screen credits also reveal the most important single sources of the work: the article entitled "Intrauterine rhythm and blues?" published in a medical journal and a recording called *Womb Sounds*. These names, with their reference to intrauterine sound worlds, contribute to the discovery of the contents of the work – or at least one of its interpretations. Simultaneously, documenting the sources is a gesture that suggests an analogy to scientific research. This is emphasized by obeying academic conventions of citation in the documentation of the sources.

It is true that completing the work required familiarization with scientific texts, and a research question with academic implications was also involved. However, this question did not exist when I started working on the project; it was formulated during the process. In this essay I begin with examining the first steps of the process and continue to describe the formulation of the research question. Following these discussions, I move on to review literature on the intrauterine sound world. In the conclusion of the text I re-examine the question of the relationship between science and art established in this work.

The video was filmed in August 2006. The woman featured on the film is me, and the man is the father of the child I am expecting. We had been dancing for a few years, and ever since we started I had aspired to make a film about it. The problem was that Argentine tango seemed to be packed with clichés. How to portray dance as an internal experience, as contact with another person? After my stomach started to round up, I realized that this offered me a unique opportunity. The image of a pregnant woman practising Argentine tango was sufficiently distant from all the clichés, such as the dramatic leans.

A former co-student of mine, Klaus Eisenlohr from Germany, promised to film the work, as he happened to be visiting Finland at the time of the shooting. Eisenlohr had filmed dance before, and I particularly admired his ability at hand-held shoots. I asked the cameraman to employ close shots to prevent the attention from being concentrated on the dance technique. I also asked him to keep the picture on the upper bodies of the dancers, the space created by shoulders and arms. This area is crucial in Argentine tango, because the follower observes the movements of the leader's chest.

The filming took place at the premises of a dance studio at the Cable Factory (Kaapelitehdas) in Helsinki. It was an ordinary weekday evening, and the studio was the venue for a so-called *practica* lesson. *Practica* refers to a

dance practice with no instruction. In this sense, the name of the video is a little misleading. It can be misleading in another sense too, as there is another *Tango Lesson*, a movie by Sally Potter from 1997. It was not my intention to refer to Potter's film, but it is possible it influenced me at an unconscious level. It was, at least, an inspiration to me in starting to practise tango. My favourite scenes in Potter's film were the ones in which the main character, a middle-aged woman, is taking her first steps on the floor. I can remember thinking that if I was to do work on tango one day, I would want to portray the language of movement in terms of uncertainty. Thus, I was happy when, on the day of the filming, there were dancers of all different skill levels in the studio, also beginners.

The practice lasted for a couple of hours and when it came to an end, almost the same amount of footage had been shot. At this point, I did not know what I would do with the material. I just watched it and transferred the material to a computer. The scene which eventually ended on the film was one that I first saved in a folder called "Failed", because my round stomach can hardly be seen in the shot.

Research question

The idea for the soundtrack came about some months later. This happened in a manner that was actually rather banal: I was at an Anttila department store music section looking at records, when I noticed a CD for babies that included, in addition to "the most beautiful largos and adagios", sounds of heartbeat.[1] The recording was recommended for adults as well for relaxation and stress relief purposes. First, I laughed about it, but on my way home realized that this would offer a solution for my video in progress. The soundtrack should be made from the perspective of a child in the womb. In other words, my research question had been found: how are sounds in the dance studio transmitted into the womb, and what are the elements that construct the overall sound world of a fetus?

Before starting work on the soundtrack, I wanted to process the visual aspect of the work. My initial idea was to construct the work on the principle of selecting best pieces of the different scenes. This did not seem to work, so I started going through the material I had labelled as failed after the filming. The scene making up the *Tango Lesson* seemed clearly superior to all the others

1 *Vauva. Uinu suloisesti musiikin siivin.* (1997) VL-Musiikki Oy.

now. It was ready for use as it was, with no editing required. I also realized that the feature I had previously thought of as a flaw – the pregnancy being revealed only in the end – created a screenplay of its own to the work.

Once the visual material had been selected, it was time to concentrate on the soundtrack. This was the beginning of the "scientific" part of the work: I started the search for research material on what a child can hear in the uterus. My first reference work was the book *Äänen extreme* (Extreme of the Sound) by Petri Kuljuntausta, with a short section on the intrauterine sound world of a fetus. The text reinforces the idea that heartbeat is one of the first hearing sensations of a human being. Kuljuntausta quotes Soili Perkiö, who has stated that "a fetus lives in the beat of a bass rhythm for nine months."[2] The book also contains description of the intrauterine sounds recorded by researcher Sheila Woodward and published on the record *Womb Sounds*. As Kuljuntausta and I knew each other, I wrote him asking if he was interested in making the soundtrack for my video. Kuljuntausta was too busy to accept, but he recommended a former student of his, Tatu Virtamo, for the sound design. Kuljuntausta also suggested that I should contact Soili Perkiö, lecturer at the Department of Music Education at Sibelius Academy.

Tatu Virtamo was interested in the project, and we had our first meeting discussing the objectives of the soundtrack. I remember naming authenticity as one of the goals. That was perhaps contradictory, because it was not the intention that authentic intrauterine recordings would be used as a part of the work. However, I did cherish the idea that it would be possible to obtain a straightforward answer to the question of what the sound world of a fetus is like and then recreate a similar environment with the means of sound design. I was also under the impression that the task would be easy, especially as Kuljuntausta promised to send us a copy of Sheila Woodward's intrauterine recordings. While waiting for that I read an article co-written by Woodward and Franco J. Guidozzi, a medical doctor.

Fetuses listen to Bach

The article "Intrauterine rhythm and blues?" by Woodward and Guidozzi was published in the medical journal *British Journal of Obstetrics and Gynaecology* in October 1992. However, the perspective of the article is not a medi-

2 Kuljuntausta, P., 2006, p. 16. Soili Perkiö was originally quoted in an article by Heikki Jokinen (2004). Musiikki kasvattaa ja parantaa. *Gramexpress* 4/2004.

cal one; instead, it poses the question of how early on does music start to have an influence on a human child.

The authors start by stating that one of the basic elements of music, the rhythm, is inherently present in the uterus. It is formed by those sounds of the body that rise above the background noise created by blood circulation. The average sound level of the womb is 89 decibels. In addition to the sounds created by blood circulation and intestines, external sounds are also carried into the womb. The sounds are naturally attenuated on their way to the uterus, but not in an equal manner with high sounds being more damped than low sounds, resulting in the reproduction of speech and music being blurry in the womb. The authors state, however, that the nature of music does not change.[3]

So, music is carried into the uterus, but can a fetus hear it? According to the article, the hearing sense of a fetus is sufficiently developed by the 25th week of pregnancy. It does have to be taken into account, however, that the child is floating in amniotic fluid, which also fills the ears. In the last third of the pregnancy, fetuses do however react to acoustic stimulation. In her own study, Sheila Woodward played Bach to 32-week-old fetuses and simultaneously measured changes in their pulse. She stated that 35 fetuses of 40 reacted to the music.[4]

The way in which a fetus perceives music, psychologically or cognitively, is another matter. The authors note that music always takes place in time. In order to be able to experience Bach as something other than merely random sounds, the fetus should possess a memory of some kind. The experiments conducted with newborns do indicate this indeed to be the case. It is possible for babies to recognise sounds from their prenatal development period, for instance their mother's voice or a TV show theme song. Based on all of this, Woodward and Guidozzi state that a human child may perceive music – or at least some of its dimensions – from the last third of the pregnancy.[5]

Microphone in the womb

After reading the article by Woodward and Guidozzi, I began to wonder how studies on intrauterine sounds have been in fact conducted. To clarify this, I tried to find Woodward's doctoral thesis, *The transmission of music into the*

3 Woodward S. C. & Guidozzi F.J., 1992, p. 787.

4 Ibid.

5 Woodward S.C. & Guidozzi F.J., 1992, pp. 787–788.

human uterus and the response to music of the human fetus and neonate (1992). As I was not able to locate it, I searched for other, similar studies. Medical publications offered several articles on the intrauterine sound world, and I copied three randomly selected samples. One of these, "Sound Levels in the Human Uterus" (1992) produced by Douglas S. Richards's research team, contains an illustrative diagram; a scientific adaptation on the classic "mother and child" theme.

There is a circle in the centre of the picture, with another, smaller circle drawn inside it. These depict a mother with a child in the uterus. The uterus is visualized by using striped frames with rounded corners around the fetus. Inside the uterus, against the child figure, there is a black stick-like form. The caption reveals this to be a microphone designed to be used underwater, i.e. a hydrophone. There is a cable connecting the hydrophone and two electrical devices, marked with abbreviations. I recognize one of these devices to be a voltmeter. Another microphone, also connected to a voltmeter, hangs above the circle representing the mother. There are two more components in the assembly: two black boxes, i.e. the loudspeakers. If you follow the cables connected to them, you find a cassette recorder connected to a sound amplifier in the left-hand bottom corner of the picture.[6]

The text of the article reveals that studies on intrauterine sounds are conducted during labour, when the cervix has opened up. The equipment used can be a standard microphone with a plastic protective cover or a hydrophone that can be used in fluids. The hydrophone used by Richards was 5 cm in length and 0.95 cm in diameter. It was entered into the uterus so that it reached the shoulder level of the fetus.[7]

Richards intended to determine how much sounds are attenuated or enhanced on their way to the uterus. There were eight test persons. In the beginning of the test, they were played a list of words through the loudspeakers at an average sound volume of 90 dB. The words were recited by both a male and a female voice. The test person was then asked to repeat the list. After this, a number of different test sounds were played in the room.[8]

As predictable, the sounds reproduced by the loudspeakers were attenuated on their way to the uterus; the male voice by an average of 2.1 dB and the female voice by an average of 3.2 dB. The higher the sound was, the more it was damped; this was also the conclusion reached by Woodward and

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6 Richards, D.S. et al., 1992, p. 187.

7 Ibid.

8 Richards, D.S. et al., 1992, pp. 186–187.

Guidozzi. However, the speech of the mother was not attenuated, quite the contrary: it was enhanced on its way to the uterus (by 5.2 dB on average). The lowest of the frequencies (below 0.125 kHz) were also somewhat strengthened in the uterus.[9]

A quiet or a noisy womb?

Other studies I had found had been conducted in a method similar to Richards's, however their results were surprisingly varying. In August 1990, Susan Benzaquen described the intrauterine sound world as rather quiet in the *American Journal of Obstetrics and Gynecology*[10]. Around the same time, Carl V. Smith reported in another US publication that his research team had come across a truly astonishing array of intrauterine sounds. Some were easily recognisable to result from the mother's blood circulation or intestines. Higher sounds were also detected, however, and their origins remained unclear to the researchers.[11]

According to Smith, the most dominant sound was the beat of the mother's heart.[12] In Benzaquen's study, however, heartbeat was only heard in two of the ten cases.[13] Consequently, Benzaquen is apprehensive of the idea that we spend the first nine months of our lives in the beat of a bass rhythm created by a heart. She also suspects that the low frequency noise detected in the gauging process cannot originate from the blood circulation of the mother. In tests carried out with sheep, this noise has been detected also in situations when the pregnant dam has deceased.[14]

Elements of intrauterine sound world

The results of the studies were contradictory, but they did describe the elements of the intrauterine sound world. All researchers agreed that there is background noise of some kind in the uterus, even though its origins remained undefined. There was also a consensus over the idea that extrauterine sounds are carried into the uterus, and that low frequencies are more efficient in penetrating the stomach coatings than the high ones. Furthermore, differ-

9 Richards, D.S. et al., 1992, p. 186.
10 Benzaquen, S. et al., 1990, p. 490.
11 Smith, C.V. et al., 1990, p. 314.
12 Ibid.
13 Benzaquen, D.S. et al., 1990, p. 486.
14 Benzaquen, D.S. et al., 1990, p. 489.

ent sounds of bowel movement are included in the sound world of the fetus. Heartbeat was the single issue creating most controversy among the researchers. Tatu Virtamo and I decided not to take Benzaquen's results into account, and would preserve the beat, as it was a sound that would most explicitly take the viewer's thoughts inside the body.

The fact that heartbeat was more clearly audible in some research results than in others can be accounted for the location of the microphone. Another important factor is the type of the microphone used in the tests; a microphone or a hydrophone.[15] This was enough evidence to demonstrate that my conception of empirical data had been naive. Study results were dependent on measurement techniques and equipment. Thus, it would not be possible to gain a straightforward answer to the sounds of the intrauterine world. And even if it was, that would not be enough. Sheila Woodward's recording *Womb Sounds* was the determining factor that convinced me about this.

Authentic intrauterine sounds

Woodward's CD *Womb Sounds* comprises of authentic intrauterine sounds, recorded with a hydrophone during the first stages of labour. The recordings were made as a part of a research project with the objective of determining how sounds are carried into the uterus. During the project, music was played in the maternity room, and mothers and fathers were asked to sing. Some of the voices were recorded simultaneously inside and outside the womb.[16]

Based on these samples, there was no doubt whether heartbeat was the dominating factor in the intrauterine sound world. However, the sound had a curious, machine-like quality. I recall telling the sound designer that if we aimed at a similar result, no-one would understand our intention. The worst outcome could be that the whole ordeal would appear as some kind of a techno tango.

Tatu Virtamo, too, thought that the viewers would not conceive the sound as a heartbeat. He thought it sounded like a soft thump. Virtamo went on to say that even if we strive for realism in the sound design, we must take into account the images usually connected to the bodily sounds. For instance, beating of the heart is usually perceived as a percussive pumping sound. The

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15 Benzaquen, D.S. et al., 1990, p. 489.

16 Woodward, S.C. (1993). Information about the recording was obtained from a leaflet accompanying the recording. The leaflet contains eight unnumbered pages.

importance of this is not diminished by the image being mostly born through films and television.[17]

So, hearing authentic intrauterine sounds was not a solution in the process. On the contrary, it only made things more complicated. In addition to medical publications, we also had to take into account other kind of sources of information, such as *ER* and *Grey's Anatomy*.

Woodward's recordings do indicate, however, that music and speech are transmitted into the uterus rather well. The record features three samples of different kind of music, classical music, jazz and African drums. Of human voices, the sound of the mother's voice is the most clearly audible. On one of the tracks, a mother is trying to find the words for the same nursery rhyme (*Mary had a little lamb*) that Thomas Edison used when testing his phonograph in 1877. This is probably just a coincidence, but I cannot help but think that Woodward's recordings share something in common with those early recordings. Both bring a message from the other side, from a time or a world that we cannot enter.

Womb-shaped drum and a vacuum cleaner

While I was looking into research data, Tatu Virtamo was conducting experiences in his studio. He was imitating the pumping movement of a heart with a balloon and taps on the microphone, to name some of the ways he tried out. When I came in to listen to the results, Virtamo also played a custom "Hollywood heart" he had found in his sound library. It tells a lot when I say that this one was my favourite. Unlike Woodward's recordings, this sounded real! I could tell from the look on Virtamo's face that he did not agree.

At this point it started to feel that we needed to consult someone. I contacted Soili Perkiö, recommended to me by Petri Kuljuntausta, and invited her to look at the work. When we met, Perkiö told me that she had played to the rhythm of the heartbeat to newborn babies. The instrument was an African drum, *udu*, with a shape reminiscent of a womb. In some cultures, ashes of a deceased family member are mixed to the clay, which allows their spirit to be present in the sound. Listening to Perkiö, I experienced a sensation similar to that a few months earlier, when I had been walking home from the Anttila department store. I felt that the solution had been found for the work, this time in the sense of finding the right metaphor. Virtamo was excited about the udu, too, and the following week we got together at the recording

17 Virtamo T., 2007, pp. 1–2.

studio where Perkiö played us sounds of the heartbeat with three drums of different sizes. Of these, the smallest drum can be heard on the video. Its sound has been lowered a little, though, and edited with an equalizer.[18]

Other elements of the intrauterine sound world had then to be created. We decided to leave out any growls caused by bowel movement, but the low frequency background noise could not be overridden, if only for the reason that the drum beats sounded separate on their own. Suddenly, I remember seeing an online posting comparing intrauterine noise to a vacuum cleaner. When I started to look for the piece, I found several sites, not only making the comparison between the two but also marketing vacuum cleaner sounds. For instance on amazon.com these were available for less than 13 dollars for a-60-minute recording (*Baby's Vacuum Cleaner CD*). We did not end up ordering the vacuum cleaner hum online, though; instead, Virtamo recorded the sound of his own Volta. The vacuum cleaner brand name is listed in the screen credits in a manner similar to the hydrophone details of the medical articles: "Volta U4502 HEPA filter 1800 W vacuum cleaner".

Two transitions

The extrauterine sound world in the work consists of the sounds in the practice studio. They were recorded while filming with a microphone located in one of the corners of the room. Virtamo thought the recording was of poor quality, and to make things worse, the tango playing in the room, *La casita de mis viejos*, was recorded in the 1950's.[19] I was not disturbed by the quality of the recording, and the scratchy singing sounded like it was coming through a thick wall as it was.

In the beginning of the work, the sounds in the studio are heard as they were, only cleaned up a little. The objective was to create a point of comparison for the intrauterine sound world, in a similar manner to that of Woodward's CD. The transmission to the intrauterine space happens gradually, during the first verse of the tango. It is done by decreasing the higher frequencies of the music while the noise and heartbeat start to appear. Here, we paid close attention to the results of the studies we had read, although we did leave the music a bit more audible than in Woodward's recordings.

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18 Virtamo, T., 2007, p. 2.

19 *La casita de mis viejos*. Written by Juan Carlos Cobián, lyrics Enrique Domingo Cadícamo (1931). On the record heard in my work, the song is performed by Jorge Vidal (vocals) and Héctor Artola y su Orquesta Típica (1956).

Another transition is carried out on the soundtrack while the credits are displayed. The music has paused at this point, but the noise and beat continue. Then, the noise starts to fade away. This transition is created with the intention to introduce the elements on the soundtrack, offering the viewer an opportunity to distinguish the elements that make up the intrauterine sound world. The structure once again is reminiscent of Woodward's recording, on which the first track consists of intrauterine noise and beat, without speech or music penetrating from the outside.

Picture drawn by sound waves

After the work was completed, I produced a hundred piece batch of DVDs for myself. This entails having a small "manufactory" in the editing studio, where I burned the discs one by one, sticking labels on with a device that looks something you could use to cut gingerbread into shapes. I have been doing this for a long time always after I have completed a new video. Two of my works – *Rakastavaisten vuode* (*The Lovers' Bed*, 2004) and *Unohtuneet sanat (Words Left Behind,* 2005), have also been published "for real" in cooperation with the Kustannus Oy Taide publishing company.

The "mass production" of DVDs is connected to my concept of the video being a publishing medium similar to books. Just like books, videos are easily reproduced and distributed from hand to hand. With their cases, they are even similar in size to a print product. I would most like to see videos as inexpensive paperbacks, items that are intended for use. I like the idea of anyone being able to acquire a piece of video art, and watch it at home, on their own screen. In exhibitions too, I regard monitors a display method worth to consider. A viewer sitting in front of a small screen, with headphones over the ears, bears great resemblance to a reader immersed in a book.

The typography of my works and the DVD layouts are produced by graphic designer Jorma Hinkka. The body type in the credits of *Tango Lesson* is the same one (Verdana) we had used in my previous videos, but the name of the work is written in my own handwriting. There is something dance-like in its arcs striving upwards, and the handwritten text seems to complement the hand-held camera shots of the video. After the texts were completed, Hinkka thought that the viewers should be given some kind of indication of what was to come. He suggested that a small picture of a fetus be inserted in the DVD label. When the disc would be started, the fetus would start spinning around with the disc. First, we looked for the right kind of picture in medical text-

books, but in the end we chose the ultrasound image of my child. It is a picture drawn by sound waves.

Little brown envelope

Even though the work was completed, I was still curious to read Sheila Woodward's dissertation. I went as far as inquiring for it via e-mail from Woodward herself, but never got a reply. Finally, the doctoral thesis was ordered to the Finnish Academy of Fine Art's library from Cape Town, where Woodward did her PhD. The unpublished thesis arrived in the form of micro cards in a small, brown envelope. The old-fashioned format created an attractive contrast to the subject matter that requires such advanced technology.

The dissertation had been done for the Department of Music Education at the University of Cape Town, and its objective was to establish if music influences a human being in the prenatal phase. To examine this, Woodward conducted three tests. The first one bore very much resemblance to the research resulting in the recording of *Womb Sounds*. In this test, Woodward examined, with the help of intrauterine recordings, if music is carried to the womb, and if its nature is changed on the way. The test group consisted of eight women in labour, and the device employed was a hydrophone. The musical sample consisted of the first 60 seconds of a *Brandenburg concerto* by J.S. Bach.[20] It was played at a distance of one metre from the mother, at the volume of 80 dB. In addition, three sweeps of sine wave sounds were played in the maternity room, with the frequency of these sounds varying between 50 Hz and 10 KHz.[21] Sine sounds are sounds comprising of only one frequency, allowing for the determination of how different frequencies are carried into the uterus. The mother's speech and singing and other human voices were also recorded during the test.

The article "Intrauterine rhythm and blues?" has already familiarised us with the results of the test: music is carried to the uterus with no major alterations. However, it would have been interesting to hear the recordings and compare them with the examples on *Womb Sounds*. The recordings were not included in shipment with the micro cards, and we did not receive them even after requests sent to Cape Town.

After concluding that music is carried into the uterus, Woodward examined the reactions fetuses had on the sounds. The method was once again

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20 Woodward, S.C., 1992, p. 165.

21 Woodward, S.C., 1992, p. 169.

familiar from the article by Woodward and Guidozzi: the researcher played Bach to 32-week-old fetuses simultaneously measuring the changes encountered in their pulse. As the reader can recall, 35 of the fetuses tested reacted to the music.[22] It was stated in the dissertation that in the five cases where there was no reaction, the fetuses were asleep.[23] During this test, the music was played through headphones located on the mother's stomach, near the head of the fetus.[24] This was probably a means of ensuring that any reactions by the mother would not influence the results.

In the third test, pregnant women listened to a certain song determined in advance, two times a day from the 34th week of pregnancy. After the children had been born, it was examined if they could recall the music. The device used to determine this was a dummy connected to a sound reproduction system. The mother held the dummy lightly in the child's mouth. By sucking on the dummy, the child could activate the familiar song to play in the room and by quitting the sucking he or she would hear another song, a previously unfamiliar one. Sometimes the order was reversed. The results remained the same: the babies strove to hear the music they were familiar with.[25]

Woodward's tests established that music is carried into the uterus, and that fetuses do react to it, at least from the 32nd pregnancy week on. The results of the study also indicated that newborns can remember music they have heard in the uterus. Because I was familiar with the results from earlier sources, I tried to focus on factors that would help me to understand the measuring methods better. One of these details was the volume of the intrauterine background noise. I had been wondering how it is possible for the level of noise in the womb to be that high, an average of 89 dB. Now it occurred to me that the high volume is mainly constituted by low frequencies, to which the human ear is not particularly sensitive. If the results are converted to a decibel scale that better conforms to the human hearing (also known as the A scale), the figure 89 dB turns into 65 dB. This corresponds to the volume of normal conversation.[26]

Another matter I had been wondering was how the test persons experienced the intrauterine recordings. I could not help but think of a video work by Martha Rosler (*Vital Statistics of a Citizen, Simply Obtained,* 1977), where a

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22 Woodward S.C.,& Guidozzi, F.J., 1992, p. 787.

23 Woodward, S.C., 1992, p. 203.

24 Woodward, S.C., 1992, p. 197.

25 Woodward, S.C., 1992, p. 209.

26 Woodward, S.C., 1992, p. 30.

man in a white coat measures a woman's body and, in the end, sticks a ruler into her vagina. Is it not possible to let women have some privacy, even when they are giving birth?

Woodward portrays the test situation as a rather humane one. She describes that the hydrophone was placed in the uterus by a doctor as a part of a routine pelvic examination. The researcher and her assistant only entered the room after this. The recording took a few minutes. After that, the researchers left and the doctor took the hydrophone out on the next visit. Woodward reassures that no test person had to undergo any pain on the account of the study, and that all of them volunteered to participate.[27]

At the end of the chapter on intrauterine recordings, Woodward reminds that even though her research provides information on the acoustic environment of the uterus, it does not even set to examine the hearing of a fetus. In any research aiming to go further, Woodward thinks that attention should be paid to at least bone conduction.[28] Bone conduction refers to a phenomenon in which sounds are transmitted to the brain through bones in the skull. This happens, for instance, when diving, as the human eardrum cannot function underwater. The major part of a fetus's hearing sensations are also transmitted through bone conduction, because the ears of a fetus are filled with water.[29]

When I think of it now, I should have extended my research to examine the hearing of a fetus. I depended too much on the results of the intrauterine recordings and failed to ask what happens to the sounds inside the head of a fetus. However, taking hearing into account would not have necessarily made a difference in the outcome of my work. Brain researcher Minna Huotilainen states that the sound reaching the inner ear is damped in any case, and that high frequencies in particular are left unheard.[30]

Conclusion

In this essay, the discussion mainly concentrates on the soundtrack of the work, as it was in the focus of the question that the work posed, the "research problem". Finding a solution to the problem required the review of academic research, resulting in the relationship between a work of art and empirical science being established as one of the themes in the work.

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27 Woodward, S.C., 1992, pp.167–170.

28 Woodward, S.C., 1992, p. 173.

29 Kuljuntausta, P., 2006, p. 17.

30 Huotilainen, M., 2006, p. 143.

I initially held a rather simplified conception of science. I needed information on the intrauterine sound world and was under the impression that I could find it in almost any study investigating the subject. I soon encountered the relativity of empirical knowledge. It was even more confusing to realise that authentic sounds of the heart sounded machine-made whereas the Hollywood heart seemed real. I ended up using metaphors for the uterus, an udu drum and the hum of a vacuum cleaner, in my work. The scientific studies I had read did, however, influence the structure of the soundtrack and the manner in which the external sounds were treated.

While writing, I have had to define the relationship between science and art on a linguistic level. When I started drafting the text, I prepared exact notes from my reference material and my object was to understand their scientific vocabulary. After this, it took a considerable amount of time before I could let go of the material which was not required in my work. In addition, the language of the studies had to be translated into my language, the speech of a visual artist. At some point I realised I was using expressions that were explicitly every-day in tone, as if I was talking to someone. This was one of the stages of separation from academic language. Another strategy was to assume an aesthetical approach to the sources: the diagram in the medical article turned into a painting, and only a little brown envelope remained of the PhD dissertation.

In the video, the connection to academic research is only revealed at the credits. This time, I have not attempted to relieve myself from academic linguistic conventions, on the contrary: these have been relished on. In the list of references, every full stop and comma is in the right place, and the vacuum cleaner product specification has been stated with scientific exactness, even though "Volta U4502 HEPA filter" hardly increases the academic credibility of the work. On the contrary, after that even the *British Journal of Obstetrics and Gynaecology* assumes the sound of conceptual art. What started off as an innocent attempt to find out the scientific truth turned out to be playing with science.

Translation: Katja Sandelin

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Front cover picture: Richards, D.S. et al., 1992, p. 187.


Tango Lesson
Elina Saloranta
4 min.
Made in Finland
Elina Saloranta ©2007
DVD
VIDEO
PAL