The Technological Mediation of Morality

A Post-Phenomenological Approach to Moral Subjectivity and Moral Objectivity

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Abstract

This paper analyzes the moral relevance of technological artifacts and its possible role in ethical theory, by taking the postphenomenological approach that has developed around the work of Don Ihde into the domain of ethics. By elaborating a postphenomenological analysis of the mediating role of ultrasound in moral decisions about abortion, the article argues that technologies embody morality, and help to constitute moral subjectivity. This technological mediation of the moral subject is subsequently addressed in terms of Michel Foucault's ethical position, in which ethics is about actively co–shaping one's moral subjectivity. Integrating Foucauldian ethics and postphenomenology, the article argues that the technological mediation of moral subjectivity should be at the heart of an ethical approach that takes the moral dimensions of technology seriously.

1. Introduction

During the past decades, the philosophy of technology has been an important construction site for a new branch of phenomenology. Primarily inspired by the work of Don Ihde, phenomenological philosophy of technology broke away from its one–dimensional opposition to science and technology as second–order and alienating ways to relate to reality (cf. Ihde 1990). By developing analyses of the structure of the relations between humans and technologies, and by investigating the actual roles of technologies in human experience and existence, phenomenology came to analyze technology as a constitutive part of the lifeworld rather than a threat to it. The new phenomenological approached that came into being has

been called "postphenomenological", because of its opposition to some aspects of "classical" phenomenology, as I will elaborate below.

In this article, I will explore the illuminating power of the postphenomenological approach by taking it into the realm of ethics. Ethics and phenomenology have always had only loose connections. Yet, the postphenomenological analysis of the technological mediation of human praxis and experience makes phenomenology immediately relevant for ethics. An analysis of the mediating role of obstetric ultrasound in the relations between expecting parents and unborn child will show that technologies help to shape practices and interpretations of reality which form the basis of moral decisions.

This conclusion urges us to rethink both the status of the object and the status of the subject in ethical theory. Within the predominant ethical frameworks it is not only difficult to assign moral agency to inanimate objects, but also to consider behavior resulting from technological mediation as "moral actions." Such actions are not the product of deliberate and free decisions, after all, but induced by external factors. An analysis of the late work of Foucault will serve as a starting point to develop a notion of the moral subject that incorporates the mediated character of subjectivity. Foucault's investigations of moral subject constitution will appear to go well with the postphenomenological analysis of the technological mediation of subjectivity.

2. Phenomenology and Ethics

2.1 From Phenomenology to Postphenomenology

Postphenomenology aims to revive the phenomenological tradition in a way that overcomes the problems of classical phenomenology. These problems mainly concern what Ihde calls its "foundational" character (Ihde 1998, 113–126). Classical phenomenology explicitly defined itself as an alternative to science. As opposed to the scientific goal to *analyze* reality, phenomenology aimed to *describe* it (Merleau–Ponty 1962, viii–x). This claim to provide a "more authentic" way of accessing reality has become highly problematic in the light of developments in 20th century philosophy, which have shown the mediated character and contextuality of such claims.

As I explained elsewhere (Verbeek 2005, 106–108), the fact that classical phenomenology failed to take the locality and context dependence of human knowledge into account is understandable when the context in which it developed is taken into account. Phenomenology presented itself as a philosophical method that sought to describe "reality

itself," since it opposed itself to the absolutization of the positivistic view of the world arising from modern natural science, which claims to describe reality as it actually is. But the way in which phenomenology proceeded to develop its alternative to science, did not in fact result in a competing way of *describing* reality, but rather in an analysis of the *relations* between humans and reality. Maurice Merleau–Ponty analyzed this relation primarily in terms of perception, Edmund Husserl in terms of human consciousness, and Martin Heidegger in terms of being–in–the–world. It is, therefore, more in accordance with the actual history of phenomenology to see phenomenology as a philosophical movement that seeks to analyze *the relations between human beings and their world* rather than to be a *method* for describing reality.

Redefining phenomenology along these lines, Ihde developed a "nonfoundational" phenomenological approach which he calls "postphenomenological". For Ihde, human–world relations need to be understood in terms of "intentionality", the directness of human beings toward their world. Ihde shows that this intentionality relation is most often technologically mediated. Virtually all human perceptions and actions are mediated by technological devices, ranging from eyeglasses and television sets to cell phones and automobiles. These technological mediations do not so much take us to "the things themselves" that classical phenomenology was longing for, but rather help to construct what is real to us. Many mediated perceptions, after all, do not have a counterpart in everyday reality. Radiotelescopes, for instance, detect forms of radiation which are invisible to the human eye and which need to be "translated" by the device before astronomers can perceive and interpret it. There is no "original" perception here which is mediated by a device; the mediated perception itself is the "original". Phenomenological investigations of this type of mediation cannot possible aim to return to "the things themselves", but rather aim to clarify the structure of technological mediation and its hermeneutic implications.

In my book *What Things Do*, I expanded Ihde's definition of postphenomenology, by elaborating how human–world relationships should not be seen as relations between pre–existing subjects who perceive and act upon a world of objects, but rather as sites where both the objectivity of the world and the subjectivity of those who are experiencing it and existing in it are constituted. What the world "is" and what subjects "are", arises from the interplay between humans and reality; the world humans experience is "interpreted reality", and human existence is "situated subjectivity". Postphenomenology, then, consists in the philosophical analysis of human–world relations–including its technologically mediated character–and of the constitution of subjectivity and objectivity within these relations. It does not close the gap between subject and object by stressing that subject and object are

always linked via the bridge of intentionality, but by claiming that they constitute each other. In the mutual relation between humans and reality, a specific "objectivity" of the world arises, as well as a specific "subjectivity" of human beings.

2.2 Phenomenology and Ethics

Its focus on the mediating role of technology in the constitution of subjectivity and objectivity makes postphenomenology directly relevant to ethics. After all, the postphenomenological approach makes it possible to investigate how technologies help to shape human perceptions and interpretations of reality on the basis of which moral decisions are made. A good example to illustrate this, as I will elaborate more extensively below, is obstetric ultrasound. This technology is not simply a functional means to make visible an unborn child in the womb. It actively helps to shape the way the unborn child is given in human experience, and in doing so it informs the choices his or her expecting parents make. Because of the ways in which ultrasound mediates the relations between fetus and future parents, it constitutes both in specific ways, and therefore it plays a crucial role in moral decision–making.

This conclusion is at odds with the predominantly modernist understanding of the relations between subjects and objects, in which subjects are active and intentional, and objects passive and mute. Postphenomenology moves beyond this modernist framework by showing that human intentionalities can not only be operative "through" embodied technologies, but that in many cases "intentionality" needs to be located in human–technology associations–and therefore partly in artifacts as well–without being able to entirely reduce the resulting intentionality to what was explicitly delegated to them by their designers or users. Moreover, the postphenomenological approach shows that we cannot hold on to the autonomy of the human subject as a prerequisite for moral agency, but that we need to replace the "prime mover" status of the human subject with technologically mediated intentions. In our technological culture, humans and technologies do not have a separate existence anymore, but help to shape each other in myriad ways.

Accepting the existence of something like technologically mediated morality does not easily fit our conceptual frameworks. As Aaron Smith elaborated, the lack of a human prime mover makes it difficult to attribute responsibility for the actions that occur (Smith 2003). But rather than following his conclusion that "when we look to very complicated situations the human prime mover is concealed and difficult to find, but it is always there" (Smith 2003, 193), I would like to contend that hanging onto the prime movers status of human beings fails to take the moral importance of technology seriously. As the ultrasound case

will show, moral intentions come about on the basis of technological mediations of the relations between humans and reality, and are always properties of human–technology *associations* rather than of "prime movers". Adequate moral reflection about technology requires us to broaden the perspective of ethical theory and the ethics of technology.

3. A Postphenomenology of Ultrasound

By elaborating a concrete case, the ethical relevance of the postphenomenological perspective can become more clearly visible. The case I will elaborate here is obstetric ultrasound. I will analyze in what respects the roles played by this technology transcend the mere functionality of making visible an unborn child in the womb. Ultrasound might seem a rather innocent medical technology. Expecting couples generally like to have a sonogram made, because it is an exciting form of contact with the unborn child in the body of its mother. But even though it might be a "non–invasive" technology in a physical sense, ultrasound is far from non–invasive in a moral sense.

In the Dutch situation, pregnant couples are offered two routine ultrasound scans, one between the 10th and 12th week of pregnancy, and a second one at 20 weeks. The aim of the first scan is to determine the age of the fetus–and the term of pregnancy–but also to calculate the risk that the child will suffer from Down's syndrome. This risk is calculated on the basis of measuring nuchal translucency, which indicates the thickness of the nape in the neck of the fetus, most often in combination with a blood test. The aim of the second scan is to carefully examine the whole body of the unborn child in order to detect possible defects. This examination is done at 20 weeks, because at this time it can reveal more defects than the earlier scan, and because abortion in the Netherlands is legal–under specific conditions–until the 24th week. The examination can reveal a variety of defects, ranging from specific heart conditions to a harelip.

Postphenomenologically speaking, ultrasound constitutes the unborn in a very specific way: it helps to shape how the unborn can be perceptually present, and how it can be interpreted on the basis of the specific ways it is (re)presented. In Don Ihde's terms, a sonogram establishes a hermeneutic relation between the unborn and the people watching it. In hermeneutic relations, technologies produce a representation of reality, which needs to be interpreted by its "readers". Moreover, the technology itself embodies a "material interpretation" of reality, because it has to make a "translation" of what it "perceives" into a

specific representation–in this case, the scanner has to make a relevant translation of reflected ultrasonic sound waves into a picture on a screen.

This implies that a sonogram does not provide a neutral "window to the womb"–as a well–known pro–life movie is called, which makes intensive use of ultrasound imaging (cf. Boucher 2004)–but actively mediates how the unborn is given in human experience. The specific mediation brought about by ultrasound imaging has a number of characteristics. Some of these are directly related to how the unborn is represented on the screen; others have to do with the specific organization of obtaining this visual contact with the unborn and the context against which the unborn can be made present. In all cases, the unborn is constituted in a specific way and so are its parents in their relation to it.

3.1 The Fetus as a Person

First of all, the image on the screen has a specific *size*, and even though the representation on the screen suggests a high degree of realism, the size of the fetus on the screen does not coincide with the size of the unborn in the womb. A fetus of 11 weeks old measures about 8,5 cm and weighs 30 grams, but its representation on the screen makes it appear to have the size of a newborn baby (cf. Boucher 2004, 12). Moreover, a number of techniques are available to construct a realistic image of the unborn. In addition to this, a sonogram depicts the unborn independently from the body of its mother. As Maragete Sandelowski put it: "The fetal sonogram depicts the fetus as if it were floating free in space: as if it were already delivered from or outside its mother's body" (Sandelowski 1994, 240). Ultrasound isolates the unborn from its mother.

All of these technological mediations generate a new ontological status of the fetus. Ultrasound imaging constitutes the fetus as an *individual person*; it is made present as a separate living being, rather than forming a unity with its mother, in whose body it is growing. As such, obstetric ultrasound contributes to the coming about of what has been called "fetal personhood": the unborn is increasingly approached as a person (Mitchell 2001, 118; Boucher 2004, 13), or even as a "baby" which still needs to be born (Sandelowski 1994, 231; Zechmeister 2001, 393–395). This experience of fetal personhood is enhanced by the possibility to see the gender of the unborn: by its ability to reveal the genitals ultrasound genders the unborn. The expecting parents, as a result, can already call the unborn by its name. It is not surprising, then, that a print of the first sonogram is often included in the baby album as "baby's first picture"–as expressed in the title of Lisa Mitchell's book on obstetric ultrasound (Mitchell 2001).

3.2 The Fetus as a Patient

Ultrasound does not only constitute the fetus as a person, but also as a *patient*. An important goal of ultrasound screening is to detect abnormalities. In an early stage of pregnancy, ultrasound can be used for determining the risk of Down's syndrome; in a later stage it can be used to detect a variety of defects. For these purposes, ultrasound scanners are equipped with sophisticated software which helps obstetricians to quantify the body of the unborn in various ways. These measurements help to determine the term of pregnancy, but also the risk of specific diseases. Ultrasound imaging lets the unborn be present in terms of medical variables, and in terms of the risks to suffer from specific diseases (cf. Landsman 1998).

In translating the unborn to a possible patient, ultrasound makes pregnancy into a medical process which needs to be monitored and which requires professional health care. Moreover, ultrasound translates "congenital defects" into preventable forms of suffering. As a result, pregnancy becomes a process of choice: the choice to have tests like neck fold measurements done at all, and the choice what to do if anything is "wrong". The detection of a defect with the help of ultrasound translates "expecting a child" into "choosing a child"– or choosing to terminate the pregnancy.

In fact, the very possibility to have sonograms made at all, and therefore to detect congenital defects before birth, irreversibly changes the character of what used to be called "expecting a child". It inevitably becomes a matter of choice now: also the choice *not* to have an ultrasound scan made is a choice, even a very deliberate one in a society in which the norm is to have these scans made–from the predominant idea that *not* scanning for diseases is irresponsible, because then you then deliberately run the risk to have a disabled or sick child, causing suffering both for the child and for the expecting parents and their families.

3.3 Relations Between Unborn and Parents

This isolation of the unborn from its mother creates a new relation between both. On the one hand, the mother is now deprived from her special relation to the unborn (Sandelowski 1994, 231), shifting the privilege of having knowledge about the unborn to health care professionals (Sandelowski 1994, 239). But on the other hand, these detaching effects have their counterpart in an increased bonding between mother, father and unborn. Ultrasound can give expecting parents assurance of the baby's health and the feeling of being closer and more attached to the unborn (Zechmeister 2001, 389). This visual nearness to the

unborn is also used in pro–life campaigns using ultrasound images to support their claim that abortion comes down to murdering a vulnerable person (Boucher 2004).

Another effect of this separation of mother and unborn is that the mother is increasingly seen as the *environment* in which the unborn is living, rather than forming a unity with it. And while the fetus is constituted as a vulnerable subject, its environment is potentially harmful. This opens the way for using ultrasound screening as a form of surveillance, monitoring the lifestyle and habits of expecting women in order to enhance the safety of the unborn. Rather than an intimate place to grow, the womb now becomes a potentially hostile environment which needs to be guarded (Oaks, 2000; Stormer 2000). The role of fathers in pregnancy is often enhanced by ultrasound, though. Fathers appear to feel more involved because of the new visual contact with their unborn. And because of the medical status of having a sonogram made, fathers are more easily allowed to take a few hours off to attend the examination–while accompanying their partners to the regular midwife visits usually is a bigger problem to employers (Sandelowski 1994).

The most important mediating role of ultrasound imaging, however, is that it constitutes expecting parents as decision–makers regarding the life of their unborn child. To be sure, the role of ultrasound is ambivalent here: on the one hand it may encourage abortion, making it possible to prevent suffering; on the other hand it may discourage abortion, enhancing emotional bonds between parents and the unborn by visualizing "fetal personhood". But nevertheless, ultrasound places expecting parents in the position to make a decision about the lives of their unborn child. By constituting both the unborn, the father and the mother in very specific ways, it helps to organize a new relation between the three. What appears to be an innocent look into the womb, can end up being a first step in a decision–making process for which many expecting couples did not explicitly choose.

The impact of ultrasound imaging on moral decision–making regarding abortion is not just an interesting theoretical hypothesis–the use of obstetric ultrasound has important effects on the practice of antenatal diagnostics and abortion. Nuchal fold measurement, for instance–also in its usual combination with a blood test–does not provide certainty about the health condition of the unborn, but only gives an indication of the risk that the unborn will suffer from Down's syndrome. In order to get certainty, an amniocentesis needs to be done, which is an invasive examination giving a risk of about 1:250 to have a miscarriage. Implicitly, for many parents, the desire to exclude the risk of having a child with Down's syndrome appears to be more important than the risk to lose a healthy unborn child. Moreover, the 20–weeks ultrasound examination offered in the Netherlands to all pregnant

women appears to increase the number of abortions of fetuses with less severe defects like a harelip (Dutch national newspaper *Trouw,* 11 December 2006).

It appears to be hard to escape the technological constitution as subjects that have to make a decision about the life of their unborn child. Even when people deliberately choose to use the 11 weeks ultrasound examination only to determine the expected date of birth, the mere possibility that the radiologist might see the thickness of the nuchal fold will make it difficult not to try and interpret the expression of the face of the practitioner. Ultrasound inevitably and radically changes the experience of being pregnant and the interpretations of unborn life.

3.4 Ethical Implications

This postphenomenological analysis of the constitutive role of ultrasound imaging in the relations between parents and unborn child has important implications for ethical theory. Not only does it give occasion to raise the question if some form of moral agency needs to be ascribed to devices like ultrasound scanners, since they appear to actively help to answer our moral questions. It also draws attention to an interesting connection between postphenomenology and ethics: the constitution of the moral subject. Here, postphenomenology touches the work of Michel Foucault. Foucault's ethical work, as laid down in parts 2 and 3 of his *History of Sexuality* and published just before his death, focuses on understanding the moral subject and its role in ethics (Foucault 1984a, 1984b). Foucault did not take the moral subject as given, but as precisely what is at stake in ethics. Ethics is done by "subjecting" oneself to a specific ethical code, and by doing so people constitute themselves as specific moral subjects. For Foucault, ethics consists in making this subject constitution explicit and asking ourselves the question what moral subjects we want to be. Postphenomenology adds a new dimension to this constitution of the moral subject: its technologically mediated character. In what follows I will first elaborate on the question to what extent technologies can be said to 'have' morality. After that, I will explore this intersection between postphenomenology and Foucault's work, in order to elaborate an ethical perspective of technology which addresses the technological mediation of the constitution of moral subjectivity.

4. Do artifacts have morality?[1]

The question of the moral significance of technological artifacts has been playing a role on the backbenches of the philosophy of technology for quite some time now. As early as 1986

Langdon Winner asked himself: "Do artifacts have politics?" This question was grounded in his analysis of a number of 'racist' overpasses in New York, which were deliberately built so low that only cars could pass beneath them, but not buses, thus preventing the dark-skinned population, unable to afford a car, from accessing the beach (Winner, 1986). Bruno Latour (1992) subsequently argued that artifacts are bearers of morality as they constantly help people to take all kinds of moral decisions. For example, he shows that the moral decision of how fast one drives is often delegated to a speed bump in the road with the script 'slow down before reaching me'. Anyone complaining about deteriorating morality, according to Latour, should use their eyes better, as the objects around us are crammed with morality.[2]

Many of our actions and interpretations of the world are co-shaped by the technologies we use. Telephones mediate the way we communicate with others, cars help to determine the acceptable distance from home to work, thermometers co-shape our experience of health and disease, and antenatal diagnostic technologies generate difficult questions regarding pregnancy and abortion, as the previous section of this paper shows. This mediating role of technologies also pertains to actions and decisions we usually call 'moral', ranging from the driving speed we find morally acceptable to our decisions about unborn life. If ethics is about the question 'how to act', and technologies help to answer this question, technologies appear to do ethics, or at least to help us to do so. Analogously to Winner's claim that artifacts have politics, therefore, the conclusion seems justified that artifacts have morality: technologies play an active role in moral action and decision-making.

How can we understand this material morality? Does it actually imply that artifacts can be considered moral agents? In ethical theory, to qualify as a moral agent at least requires the possession of *intentionality* and some degree of *freedom*. In order to be held morally accountable for an action, an agent needs to have the intention to act in a specific way, and the freedom to realize this intention. Both requirements seem problematic with respect to artifacts, at least, at first sight. Artifacts, after all, do not seem to be able to form intentions, and neither do they possess any form of autonomy. Yet, both requirements for moral agency deserve further analysis.

4.1 Technological intentionality

At a first glance, it might seem absurd to speak about artifacts in terms of intentionality. A closer inspection of what we mean by 'intentionality' in relation to what artifacts actually 'do', however, makes it possible to attribute a specific form of intentionality to artifacts. To

show this, it is important to make a distinction here between two aspects of 'intentionality.' One, intentionality entails the ability to *form intentions*, and two, this forming of intentions can be considered something *original* or *spontaneous* in the sense that it literally 'springs from' or is 'originated by' the agent possessing intentionality. Both aspects of intentionality will appear not to be as alien to technological artifacts as at first they might seem.

First, the 'mediation approach' to technology, already mentioned above, makes it possible to attribute to artifacts the ability to form intentions. In this approach, technologies are analyzed in terms of their mediating roles in relations between humans and reality. The core idea is that technologies, when used, always establish a relation between users and their environment. Technologies enable us to perform actions and have experiences that were scarcely possible before, and in doing so, they also help us to shape *how* we act and experience things. Technologies are not neutral instruments or intermediaries, but active mediators that help shape the relation between people and reality. This mediation has two directions: one pragmatic, concerning action, and the other hermeneutic, concerning interpretation.

Latour's work offers many examples of the pragmatic dimension of technological mediation. With Madeleine Akrich, he coined the term 'script' to indicate that artifacts can prescribe specific actions, just like the script of a film or play which prescribes who does what and when (Latour, 1992; Akrich, 1992). The speed bump mentioned above, for instance, embodies the script 'slow down before reaching me'. Everyday life is loaded with examples of technologies that help to shape our actions. In Dutch supermarkets, shopping carts are equipped with a coin lock, to encourage users to put the cart back in place rather than leaving it at the parking lot. Recently, carts have been introduced with a wheel lock blocking the wheels when the cart is moved outside a designated area, thus preventing it from being stolen.

Don Ihde's work, as elaborated above, concerns the hermeneutic dimension of technological mediation. Ihde analyzes the structure of the relations between human beings and technological artifacts, and investigates how technologies help to shape, on the basis of these relations, human perceptions and interpretations of reality (e.g., Ihde, 1990; 1998). A good example to illustrate this hermeneutic intentionality, which I elaborated above, is obstetric ultrasound. As I showed, the technology of ultrasound does not provide a neutral peek into the womb but helps to constitute parents and their unborn child, and the relations between them, in specific ways which generate moral problems and even inform the ways to answer them.

In all of these examples, artifacts are active: they help to shape human actions,

interpretations, and decisions, which would have been different without the artifact. To be sure, artifacts do not have intentions like human beings do, because they cannot *deliberately* do something. But their lack of consciousness does not take away the fact that artifacts can have intentions in the literal sense of the Latin word 'intendere', which means 'to direct', 'to direct one's course', 'to direct one's mind'. The intentionality of artifacts is to be found in their directing role in the actions and experiences of human beings. Technological mediation, therefore, can be seen as a specific, material form of intentionality.

With regard to the second aspect of intentionality, the 'originality' of intentions, a similar argumentation can be given. For even though artifacts evidently cannot form intentions entirely on their own, again because of their lack of consciousness, their mediating roles cannot be entirely reduced to the intentions of their designers and users either. Otherwise, the intentionalities of artifacts would be a variant of what Searle denoted 'derived intentionality' (Searle, 1983), entirely reducible to human intentionalities. Quite often, technologies mediate human actions and experiences without human beings having told them to do so.

Some technologies, for instance, are used in different ways from those their designers envisaged. The first cars, which only made 15 km/h, were used primarily for sport, and for medical purposes; driving at a speed of 15 km/h was considered to create an environment of 'thin air', which was supposed be healthy for people with lung diseases. Only after cars were interpreted as a means for providing long distance transport did the car get to play its current role in the division between labor and leisure (Baudet, 1986). In this case, unexpected mediations come about in specific use contexts. But unforeseen mediations can also emerge when technologies are used as intended. The very fact that the introduction of mobile phones has led to changes in youth culture – such as that young people appear to make ever less appointments with each other, since everyone can call and be called at any time and place – was not intended by the designers of the cell phone, even though it is used here in precisely the context the designers had envisaged.

It seems plausible, then, to attribute a specific form of intentionality to artifacts. This 'material' form of intentionality is quite different from human intentionality, in that it cannot exist without human intentionalities supporting it. Only within the relations between human beings and reality can artifacts play their 'intending' mediating roles. When mediating the relations between humans and reality, artifacts help to constitute both the objects in reality that are experienced or acted upon and the subjects that are experiencing and acting. This implies that the subjects who act or make decisions about actions are never purely human,

but rather a complex blend of humanity and technology. When making a decision about abortion on the basis of technologically mediated knowledge about the chances that the child will suffer from a serious disease, this decision is not 'purely' human, but neither is it entirely induced by technology. The very situation of having to make this decision and the very ways in which the decision is made, are co-shaped by technological artifacts. Without these technologies, either there would not be a situation of choice, or the decision would be made on the basis of a different relation to the situation. At the same time, the technologies involved do not *determine* human decisions here. Moral decision-making is a joint effort of human beings and technological artifacts.

Strictly speaking, then, there is no such thing as 'technological intentionality'; intentionality is always a hybrid affair, involving both human and nonhuman intentions, or, better, 'composite intentions' with intentionality distributed over the human and the nonhuman elements in human-technology-world relationships. Rather than being 'derived' from human agents, this intentionality comes about in associations between humans and nonhumans. For that reason, it could be called 'hybrid intentionality', or 'distributed intentionality'.

4.2 Technology and freedom

What about the second requirement for moral agency we discerned at the beginning of this chapter: freedom, or even autonomy? Now that we have concluded that artifacts may have some form of intentionality, can we also say that they have *freedom*? Obviously not. Again, freedom requires the possession of a mind, which artifacts do not have. Technologies, therefore, cannot be free agents like human beings are. Nevertheless there are good arguments not to exclude artifacts entirely from the realm of freedom that is required for moral agency. In order to show this, I will first elaborate that human freedom in moral decision-making is never absolute, but always bound to the specific situations in which decisions are to be made, including their material infrastructure. Second, I will argue that in the human-technology associations that embody hybrid intentionality, freedom should also be seen as distributed over the human and nonhuman elements in the associations.

Even though freedom is obviously needed to be accountable for one's actions, the thoroughly technologically mediated character of our daily lives makes it difficult to take freedom as an absolute criterion for moral agency. After all, as became clear above, technologies play an important role in virtually every moral decision we make. The decision how fast to drive and therefore how much risk to run of harming other people is always mediated by the lay-out of the road, the power of the engine of the car, the presence or

absence of speed bumps and speed camera's, et cetera. The decision to have surgery or not is most often mediated by all kinds of imaging technologies, blood tests et cetera, which help us to constitute the body in specific ways, thus organizing specific situations of choice.

To be sure, moral agency does not necessarily require complete autonomy. Some degree of freedom can be enough to be held morally accountable for an action. And not all freedom is taken away by technological mediations, as the examples of abortion and driving speed make clear. In these examples, human behavior is not determined by technology, but rather co-shaped by it, with humans still being able to reflect on their behavior and make decisions about it. This does not take away the fact, however, that most mediations, like those provided by speed bumps and by the presence of ultrasound scanners as a common option in medical practice, occur in a pre-reflexive manner, and can in no way be escaped in moral decision-making. The moral dilemmas of whether or not to have an abortion and of how fast to drive would not exist in the same way without the technologies involved in these practices, such dilemma's are rather *shaped* by these technologies. Technologies cannot be defined away from our daily lives. The concept of freedom presupposes a form of sovereignty with respect to technology that human beings simply no longer possess.

This conclusion can be read in two distinct ways. The first is that mediation has nothing to do with morality whatsoever. If moral agency requires freedom and technological mediation limits or even annihilates human freedom, only non-technologically mediated situations leave room for morality. Technological artifacts are unable to make moral decisions, and technology-induced human behavior has a non-moral character. A good example of this criticism are the commonly heard negative reactions to explicit behavior-steering technologies like speed limiters in cars. Usually, the resistance against such technologies is supported by two kinds of arguments. One, there is the fear that human freedom is threatened and that democracy is exchanged for technocracy. Should all human actions be guided by technology, the criticism goes, the outcome would be a technocratic society in which moral problems are solved by machines instead of people. Two, there is the charge of immorality or, at best, amorality. Actions not the product of our own free will but induced by technology can not be described as 'moral'; and, what is worse, behavior-steering technologies might create a form of moral laziness that is fatal to the moral abilities of citizens.

These criticisms are deeply problematic. The analyses of technological mediation given above show that human actions are *always* mediated. To phrase it in Latour's words: "Without technological detours, the properly human cannot exist. (...) Morality is no more human than technology, in the sense that it would originate from an already constituted

human who would be master of itself as well as of the universe. Let us say that it traverses the world and, like technology, that it engenders in its wake forms of humanity, choices of subjectivity, modes of objectification, various types of attachment." (Latour, 2002). This is precisely what opponents of speed limitation forget. Also without speed limiters, the actions of drivers are continually mediated: indeed, cars can easily exceed speed limits and because our roads are so wide and the bends so gentle that we can drive too fast, we are constantly invited to explore the space between the accelerator and the floor. Therefore, giving the inevitable technological mediations a desirable form rather than rejecting outright the idea of a 'moralized technology' in fact attests to a sense of responsibility.

The conclusion that mediation and morality are at odds with each other, therefore, is not satisfying. It is virtually impossible to think of any morally relevant situation in which technology does not play a role. And it would be throwing out the baby with the bathwater to conclude that there is no room for morality and moral judgments in all situations in which technologies play a role. Therefore, an alternative solution is needed of the apparent tension between technological mediation and ethics. Rather than taking absolute freedom as a prerequisite for moral agency, we need to reinterpret freedom as an agent's ability to relate to what determines him or her. Human actions always take place in a stubborn reality, and for this reason, absolute freedom can only be attained by ignoring reality, and therefore by giving up the possibility to act at all. Freedom is not a lack of forces and constraints; it rather is the existential space human beings have within which to realize their existence. Humans have a relation to their own existence and to the ways in which this is co-shaped by the material culture in which it takes place. The material situatedness of human existence *creates* specific forms of freedom, rather than impedes them. Freedom exists in the possibilities that are opened up for human beings to have a relationship with the environment in which they live and to which they are bound, as I will elaborate in section 5

This redefinition of freedom, to be sure, still leaves no room to actually attribute freedom to technological artifacts. But it does take artifacts back into the realm of freedom, rather than excluding them from it altogether. On the one hand, after all, they help to *constitute* freedom, by providing the material environment in which human existence takes place and takes its form. And on the other hand, artifacts can enter associations with human beings, while these associations, consisting partly of material artifacts, are the places where freedom is to be located. For even though freedom is never absolute but is always gets shaped by technological and contextual mediations, these very mediations also create the space for moral decision-making. Just like intentionality, freedom also appears to be a hybrid affair, most often located in associations of humans and artifacts.

4.3 Materiality and moral agency

This expansion of the concepts of intentionality and freedom might raise the question if we really need to fiddle with such fundamental ethical concepts to understand the moral relevance of technological artifacts. In order to show that the answer to this question is yes, we can connect to an example elaborated by Latour: the debate between the National Rifle Association in the USA and its opponents. In this debate, those opposing the virtually unlimited availability of guns in the USA use the slogan "Guns Kill People", while the NRA replies with the slogan "Guns don't kill people; people kill people" (Latour 1999, 176).

The NRA position seems to be most in line with mainstream thinking about ethics. If someone is shot, nobody would ever think about keeping the gun responsible for this. Yet, the anti-gun position evidently also has a point here: in a society without guns, fewer fights would result in murder. A gun is not a mere instrument, a medium for the free will of human beings; it helps to define situations and agents by offering specific possibilities for action. A gun constitutes the person holding the gun as a potential gunman and his or her adversary as a potential lethal victim. Without denying the importance of human responsibility in any way, this example illustrates that when a person is shot, agency should not be located exclusively in either the gun or the person shooting, but in the assembly of both.

The example, therefore, illustrates that we need to develop a new perspective of both concepts. It does not imply that artifacts can 'have' intentionality and freedom, just like humans are supposed to have. Rather, the example shows that (1) intentionality is hardly ever a purely human affair, but most often a matter of human-technology associations; and (2) freedom should not be understood as the absence of 'external' influences on agents, but as a practice of *dealing* with such influences or mediations.

5. Technology and Moral Subjectivity[3]

The main conclusion that can be drawn from the analysis above is that ethics is not a solely human affair, but a matter of associations between humans and technologies. This implies that the ethics of technology cannot depart from a separation between humans and technology, which characterizes so many ethical approaches. This separation, for instance, hides behind precautionary approaches which aim to pull the emergency brake when a specific technological development would be a threat to society. And it hides behind approaches that aim to find the most prudent and just way to deal with the risks that are

connected to the introduction of a new technology. In these approaches, humans are placed on the one side of a line, technologies on the other side, and humans have the task to see to it that technologies do not cross the line too far and start to interfere in the human world in undesirable ways. This scheme is at the roots of many moral frameworks which are still influential, like Habermas's lifeworld–system model (Habermas 1984) and Heidegger's plea for an attitude of "releasement" in dealing with technology (Heidegger 1969), aiming to use technology only when it is unavoidable, without letting ourselves be determined by it.

Positions like these perfectly see that very close relations can exist between humans and technologies–contrary to the at least equally influential position of *instrumentalism* which (wrongly) holds that technology is primarily an instrument which can be used for good and bad purposes and in good or bad ways, without being good or bad in itself. Yet, the technophobia which is implicit in it, to use a concept of Gilbert Hottois (Hottois 1996) has counterproductive effects. Rather than taking the interwoven character of the human and the technological as a point of departure for ethical reflection, the technological is taken as a threat, which needs to be kept away from the human with the help of ethics.

Simple examples can make visible the failure of this reasoning. Gerard de Vries, for example, showed how the moral evaluation of anesthesia has changed drastically over time (De Vries 1993). While the application of anesthesia was initially condemned severely, on various moral and theological grounds, nowadays it would be highly immoral to perform surgery *without* anesthesia. Seen from the past, the critics of those times would probably interpret this development as the results of entering a slippery slope, but from the perspective of the present it becomes clear that ethics is a dynamic phenomenon, which develops in interaction with technology.

5.1 Ethics and Moral Self–Constitution

The late work of Michel Foucault opens a perspective on ethics which offers room to do justice to this relation between ethics and technological developments, and to the technologically mediated character of moral action. In the last two volumes of his *History of Sexuality* he elaborates an approach to ethics which differs radically from the prevailing ethical frameworks (Foucault 1984a, 1984b). For Foucault, ethics is not primarily about the question which imperatives we need to follow, but about the ways in which human beings constitute themselves as "subjects" of a moral code. And rather than aiming to develop a new code himself, Foucault investigates what these codes "do" to people and how humans "subject" themselves to it.

In order to achieve this, Foucault connects to ethical approaches from classical antiquity, in which ethics was explicitly directed at "developing a self"; at constituting oneself as a specific subject. The word "subject" perfectly brings to expression that ethics is not only a matter of a person who is the "subject" of his or her life–like the "subject" of a sentence–but that this person also "subjects" him– or herself to a specific moral code–a specific vision of what constitutes a good life and a good person. In this very "subjection", Foucault locates ethics. Moral "subjection" has already taken many forms, like the Kantian subject that wants to keep its intentions pure and assesses them in terms of their potential to function as universal laws; or the utilitarian subject that aims to examine the consequences of its actions in order to attain a prevalence of positive outcomes over negative outcomes. The most important characteristic of classical ethical frameworks, however, is that they show that in ethics not only the moral rightness of our actions is at stake, but also our moral *subjectivity*. For the constitution of subjectivity did not take place implicitly then, but in an explicit way.

Foucault's investigation of classical ethics primarily concerns the ethics in dealing with sexuality. He convincingly shows that in classical Antiquity, sexuality was not organized via a moral code of imperatives and prohibitions, but primarily in terms of *styling*. Ethics consisted in finding such a relationship to one's sexual passions and drives that they do not *determine* the self but become the object of active styling in the form of 'self practices". Rather than letting the subject take shape *implicitly*, e.g. by subordinating its passions to Christian sexual morality, or by subordinating its intentions to a Kantian categorical imperative, in classical Antiquity subject constitution took place *explicitly*, in a variety of ascetic and aesthetic practices. The purpose of these practices was not to subordinate the passions to a code, but to stylize one's sexual behavior. Or, put more broadly: ethics was not about showing the morally right behavior, but about living a good life. Foucault indicated these practices of moral selfconstitution as "techniques of the self" or "practices of the self": the explicit styling, practicing and shaping of oneself into a specific moral individual.

This does not imply that Foucault wanted to return to the specific subject of classical antiquity. But he did want to return to *the way in which* that subject came into being: the explicit shaping of one's subjectivity by deliberately "subjecting" oneself to a specific code and specific moral practices. In fact, Foucault's approach implies that *any* form of ethics is based on a specific form of "subjection"–even modern ethical systems like Kantian deontology and utilitarian consequentialism. Any ethical system, after all, not only defines a code of behavior but also a subject that is supposed to follow this code. Also following the

Kantian categorical imperative or acting such that desirable consequences prevail over undesirable consequences are ways to constitute oneself as a moral subject.

5.2 Ethics of Technology and the Moral Subject

This approach to ethics in terms of moral self–constitution has particular relevance for the ethics of technology. Foucault's ethical perspective unites two aspects that usually remain opposites in ethics: the radically mediated character of the subject on the one hand, which causes the subject to lose the autonomy it used to have ever since the Enlightenment; and the ability of the subject to relate itself to what mediates the subject on the other hand, which enables the subject to actively help to shape these mediations. Just like the ancient Greek and Romans did not deny or suppress the sexual passions, but rather acknowledged and actively helped to shape them, we can develop a relation to what appears to determine us by actively shaping these "determinants". And in our times, technology is a pre–eminent example of these determinants–without, to be sure, aiming to downplay the important role of sexuality in our culture.

If technology fundamentally mediates what kind of humans we are, by shaping our actions and experiences, and even our moral decisions, this does not yet imply that "humanity" is mastered by "technology" or that "the system" has entered "the lifeworld" and causes humans not to be treated as subjects but as objects, as some Heideggerian and Habermasian positions want us to believe. From a Foucauldian perspective, the technologically mediated character of life in a technological culture does not need to be seen as a *threat* to the subject but rather forms a specific way in which the subject is *constituted*. This technologically mediated constitution of the subject, then, is not merely a state of affairs we simply have to accept; it rather is the starting point for moral self–practices (cf. Dorrestijn 2004, 89–104).

By acknowledging the inevitability of the mediated character of human subjectivity, and the fact that technology is one of the sources of mediation, it becomes possible to connect ethics with the phenomenon of technological mediation. Ethics then does not merely come down to protecting "humanity" against "technology", but consists in carefully assessing and experimenting with technological mediations, in order to explicitly shape the way in which we are subjects in our technological culture.

Connecting again to the example of ultrasound can clarify what such experiments can entail. As we saw, ultrasound substantially contributes to the experience of expecting a child, by framing pregnancy in medical terms, and confronting expecting parents with a dilemma if their unborn appears to have a significant risk of a serious disease. From a moral

point of view, this role of ultrasound imaging is at least as important as, e.g., the possible health risk for the fetus caused by ultrasonic sound waves, which would be the natural focus of many ethical approaches to technology. This is especially true when taking into account that such dilemmas have a tragic dimension. As explained above, the risk–estimation offered by ultrasound can only be converted into certainty by having an amniocentesis done, which has a risk of provoking a miscarriage–and in many cases this risk is higher than the risk to have a child suffering from Down's syndrome. Having antenatal ultrasound examinations done, therefore, inevitably implies the choice for a specific kind of subjectivity, in which humans are constituted as subjects that have to make decisions about the life of their unborn child, and in which obtaining certainty about the health condition of an unborn child is worth the price of losing healthy unborn child as a result of the required test.

When this specific form of subject constitution becomes subject of moral reflection, we gain the space to explicitly relate ourselves to it. By deliberately dealing with ultrasound imaging, after all, this subject constitution can be modified, changed, and refined. For instance, by only using ultrasound to determine the expected date of birth, without wanting to have further information about nuchal translucency or neural tube defects. Or by only using antenatal examinations to estimate a risk, in order to be prepared for the possible birth of a child with health problems, without exposing oneself to the risks of having an amniocentesis done. Or by actually having all tests done, as an explicit choice rather than an unintended side–effect of the normative workings that are hidden behind offering such diagnostic tests at a large scale. Or by refusing ultrasound examinations at all (cf. Rapp 1998).

This explicit relation to the mediating role of technology embodies a form of *freedom* that is an interesting alternative to *autonomy*. Recognizing that our experiences and actions are inevitably mediated by technology, the choice is here to explicitly "shape" and "stylize" these mediations, in order to help to shape one's own subjectivity. Freedom here is not the *absence* of factors that steer and shape the subject, but the very *relation* to these factors. Our existence, after all, takes place in an environment that shows resistance; without this resistance we simply could not exist. Freedom is a *practice* that is co–organized by the technological infrastructure of our existence, and which forms the basis for the shape our subjectivity takes. The subject, in Foucault's words, is a *form* that always needs to get shape in concrete "self practices" (O'Leary 2002, 2–3).

5.3 Technologically Mediated Subject Constitution

Foucault does not directly relate his analysis of subject constitution to technology. Yet, in view of his ethics of moral subjectivity, the technologically mediated constitution of the moral subject, deserves a central place in the ethics of technology. In this section, I will further elaborate how Foucault's ethical work and the postphenomenological analysis of technological mediation can be integrated to accomplish this.

Foucault discerns four aspects of moral self–constitution: the *ethical substance* which is the object of ethical work; the *mode of subjection* that is applied; the *self practices* in which the ethical substance gets shape; and the *teleology* of these practices, which consists in the way of existing we aspire to by acting in a moral way. Connecting these four aspects of moral self–constitution to the ways in which technologies help to shape the subject makes it possible to open an ethical perspective of technology in which the interwoven character of humans and technology is be the starting point of ethical reflection.

The *ethical substance* concerns what people in a specific historical period take as the "material" of ethical self–work; the point of application for subjectivation. This can be the *intentions* behind our actions, as elaborated in the work of Kant, but also the *passions*, which have been, for instance, the object of Christian morality and of classical Greek ethics (Foucault 1997, 263). In the ethical perspective opened by Foucault himself, the material for ethics is the "subject form" in a more general sense: the subject taken purely as a form that receives content by being 'subject–ed" in a specific way. For a Foucauldian perspective of technology, this subject form is the ethical substance: the subjectivity that is getting shape in interaction with both technology and with our own ways of dealing with these technological mediations. The human subject is constituted in a complex interplay of mediating technology, the reality to which it relates itself, and the way in which it relates itself to its own subjectivity and to the ways in which it is technologically mediated.

For Foucault, the *mode of subjection* is the way in which people are invited or stimulated to recognize a specific code as a morally obliging. This can be a divine law which is revealed in a book, a cosmic order of natural laws, or a universal and rational rule (Foucault 1997, 264). In our technological culture, this mode of subjection in many cases exists in the phenomenon of technological mediation itself. The ways in which technologies help to shape our actions and the interpretations on the basis of which we make decisions, after all, determine to a high degree what can be recognized as a moral obligation, what moral problems are morally relevant, and what persons have specific moral responsibilities. Technologies shape us as specific moral subjects–like ultrasound constitutes expecting parents as subjects that have to make a decision regarding the life of their unborn, and

makes it possible to prevent the birth of children with serious diseases. Not only the religious frameworks, views of life, and philosophical systems that were handed down to us impose moral tasks and obligations upon us, but so do technological artifacts.

Subsequently, *self practices* in a technological culture consist in deliberately dealing with this phenomenon of technological mediation, in order to help shape the ways in which technologies are used and impact our daily lives. Foucault indicates the "self–forming activities" of self practices as "ascetism": a form of ascesis, defined broadly, in which human beings take a distance from what determines them. This ascesis does not necessarily exist in radically *abandoning* things, like comfort, sex, or specific kinds of food, to mention some ascetic examples from the past. What is crucial here for Foucault, is the *distance* which makes that the subject is not simply handed over to the powers that aim to shape it, but explicitly *takes a stance* toward these powers–not denying their important role in subject constitution, but actively accompanying and reshaping this role.

In our culture, technology is one of the most important powers that help shape subjectivity. Ascesis in a technological culture, therefore, primarily means: deliberately using technology by anticipating and modifying its mediating role in our existence, realizing that each use practice helps to shape one's subjectivity. It does *not* imply, therefore, that one should refrain from technology, and only use it reluctantly when it is unavoidable, as embodied in Heidegger's attitude of "releasement" (*Gelassenheit*). Technological ascesis, to the contrary, consists in *using* technology, but in a deliberate and responsible way, such that the "self" that results from it–including its relations to other people–acquires a desirable shape. Not the moral acceptability, then, is central in ethical reflection on technology use, but the quality of the *practices* that result from it, and the *subjects* that are constituted in it.

Teleology, to conclude, for Foucault is about the question what kind of beings we aspire to be when we behave morally. What do we aim at when we literally 'subject" ourselves to a specific moral code–what kind of subjects do we want to be? In Foucault's words, regarding the ethical systems from the past: "Do we want to become pure, or immortal, of free, or masters over ourselves?" (Foucault 1997, 265). Given the technologically mediated character of subjectivity, answering the question what kind of subjects we want to be is one of the major challenges of our technological culture. Integrating Foucault's analysis of moral subject constitution and the postphenomenological analysis of technological mediation, a teleological perspective in our technological culture should address the question of how to shape ourselves in dealing with technology: what kind of mediated subjects do we want to be? Rather than separating the human domain from the domain of technology, we need to

ask ourselves in what ways we want both domains to interfere. Their interwoven character is unavoidable–and therefore ethics should not try to save humanity from technology, but to let both domains interfere in desirable ways.

For answering the question of what kind of mediated subjects we want to be, to be sure, the ethical frameworks from classical virtue ethics and modern deontological and utilitarian systems can continue to play an important role. Foucault's thesis that all ethical systems eventually embody a specific form of subject constitution, after all, does not take away the fact that the frameworks that were handed down to us from the past can still prove to be valuable for dealing with the technological mediation of our subjectivity and with the question of what kind of subjects we want to be. Moral self–practices in a technological culture, in which human beings attempt to give a desirable shape to the technological mediation of their subjectivity, offer plenty of space for the virtue ethical pursuit of the good life, the deontological ambition to meet moral norms, and the utilitarian goal to reach a preponderance of positive effects over negative effects.

Regarding the case of obstetric ultrasound, parents can for instance choose to have their unborn child screened for diseases because the birth of a child with a serious disease can have very negative effects on the other children in the family. They can also refuse ultrasound screening, for instance on the basis of the norm that unborn life may not be terminated, or from the desire not to be brought in a position of having to make a decision about the life of one's unborn child. In all of these cases, there is a deliberate shaping of the ways in which humans are being constituted as a moral subject, from the realization that technology plays a mediating role here too. Human beings are not fully autonomous in their subject constitution; they have to accept both the pregnancy and the possibility to have ultrasound screening done as a given fact. But they do have the freedom to let themselves be constituted as a specific subject–a subject that will have to decide about the life of its unborn child; a subject that orients itself on norms which exist separately from the situation in which they need to be applied; or a subject that wants to use the availability of a technological form of contact with unborn life for a careful assessment of all possible consequences of letting or letting a child be born with a serious disease.

6. Conclusion

In our technological culture, it is of vital importance not to consider technology and morality as two separate phenomena located in two separate domains. Technologies play a

fundamentally mediating role in human practices and experiences, and for this reason it can be argued that moral agency is distributed over both humans and technological artifacts. This technologically mediated character of moral agency deserves a central place in the ethics of technology. Rather than focusing mainly on the early detection and just distribution of risks, the ethics of technology should also address the phenomenon of technological mediation.

One of the most important ways to do this, besides analyzing the moral role of artifacts, is to address the role technology plays in the ways human beings are constituted as moral subjects. This can be done by connecting the postphenomenological approach of technological mediation to Foucault's ethical perspective. Such a connection enables the ethics of technology to address the quality of the technological mediations of moral decisions. This can be done by enabling designers to actively anticipate the morally relevant role of technology. But it can also be done by developing a specific attitude to technology in which the technological constitution of moral subjectivity is explicitly reflected upon and actively reshaped. Only by explicitly addressing how technologies help to constitute humans as moral subjects, the ethics of technology can do justice to both the moral character of technology and the technological character of morality.

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References

–––, "Abortus om hazenlip komt voor–onderzoeken of echo's leiden tot meer zwangerschapsafbrekingen". *Trouw* 11 December 2006 (Dutch national newspaper)

Akrich, M., 1992), The de-scription of technical objects, in: *Shaping Technology / Building Society*, W. E. Bijker and J. Law, eds., MIT Press, Cambridge, MA, pp. 205-224.

Baudet, H., 1986, *Een vertrouwde wereld: 100 jaar innovatie in Nederland*, Bert Bakker, Amsterdam.

Boucher, J. (2004). Ultrasound: A Window to the Womb?: Obstetric Ultrasound and the Abortion Rights Debate. *Journal of Medical Humanities* 25/1, 7–19

Dorrestijn, S. (2004). *Bestaanskunst in de technologische cultuur: over de ethiek van door techniek beïnvloed gedrag*. University of Twente: Master's thesis.

Foucault, M. (1984a). *L'usage des plaisirs*. Paris: Gallimard

Foucault, M. (1984b). *Le souci de soi*. Paris: Gallimard

Foucault, M. (1997). *Ethics: Subjectivity and Truth* (ed. P. Rabinow). New York: The New Press

Habermas, J. (1984). *The Theory of Communicative Action*. Boston: Beacon.

Heidegger, M. (1969). *Discourse on Thinking* (trans. J. M. Anderson and E. H. Freund). New York: Harper & Row.

Hottois, G. (1996). *Symbool en techniek*. Kampen / Kapellen: Kok Agora / Pelckmans.

Ihde, D. (1990). *Technology and the Lifeworld*. Bloomington/Minneapolis: Indiana University Press

Ihde, D. (1998). *Expanding Hermeneutics*. Evanston, Il.: Northwestern University Press.

Landsman, G.H. (1998). Reconstructing Motherhood in the Age of "Perfect" Babies: Mothers of Infants and Toddlers with Disabilities. *Signs* 24/1, 69–99

Latour, B., 1992, Where are the missing masses? - the sociology of a few mundane artifacts, in: *Shaping Technology / Building Society*, W. E. Bijker and J. Law, eds., MIT Press, Cambridge, MA, pp. 225-258.

Latour, B., 1999. *Pandora's Hope – Essays on the Reality of Science Studies*, Harvard University Press, Harvard.

Latour, B., 2002, Morality and technology: the end of the means, *Theory, Culture & Society* 19(5-6): 247-260.

Merleau–Ponty, M. (1962). *Phenomenology of Perception* (trans. Colin Smith). London: Routledge en Kegan Paul.

Mitchell, L. (2001). *Baby's First Picture: Ultrasound and the Politics of Fetal Subjects*. Toronto: University of Toronto Press.

O'Leary, T. (2002). *Foucault. The art of ethics*. Londen / New York: Continuum.

Oaks, L. (2000). Smoke–Filled Wombs and Fragile Fetuses: The Social Politics of Fetal Representation. *Signs* 26/1, 63–108

Petchesky, R.P. (1987). Fetal Images: The Power of Visual Culture in the Politics of Reproduction. *Feminist Studies* 13/2, 263–292

Rapp, R. (1998). Refusing Prenatal Diagnosis: The Meanings of Bioscience in a Multicultural World. *Science, Technology, and Human Values* 23/1, 45–70

Sandelowski, M. (1994). Separate, but Less Unequal: Fetal Ultrasonography and the Transformation of Expectant Mother/Fatherhood. *Gender and Society* 8/2, 230–245

Searle, J. R., 1983, *Intentionality: An Essay in the Philosophy of Mind*, Cambridge University Press, Cambridge.

Smith, A. (2003). Do You Believe in Ethics? Latour and Ihde in the Trenches of the Science Wars (Or: Watch Out, Latour, Ihde's Got a Gun). In: D. Ihde, E. Selinger (eds.), *Chasing Technoscience: Matrix for Materiality*. Bloomington & Indianapolis: Indiana University Press.

Stormer, N. (2000). Prenatal Space. *Signs* 26/1, 109–144

Verbeek, P.P. (2005). *What Things Do: Philosophical Reflections on Technology, Agency, and Design*. University Park, PA: Pennsylvania State University Press.

Verbeek, P.P. (2006). The Morality of Things–A Postphenomenological Inquiry. In: E. Selinger (ed.), *Postphenomenology: A Critical Companion to Ihde*. New York: State University of New York Press

Vries, G. de (1993). *Gerede twijfel: over de rol van de medische ethiek in Nederland*. Amsterdam: De Balie

Winner, L., 1986, Do artifacts have politics?, in: *The Whale and the Reactor*, L. Winner, ed., University of Chicago Press, Chicago, pp. 19-39.

Zechmeister, I. (2001). Foetal Images: The Power of Visual Technology in Antenatal Care and the Implications for Women's Reproductive Freedom. *Health Care Analysis* 9:387–400

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[1] This section is based on a section of my chapter for the book *Philosophy and Design: From Engineering to Architecture* (eds. Pieter E. Vermaas, Peter Kroes, Andrew Light, and Steven A. Moore, forthcoming with Springer, Dordrecht)

[2] For other analyses of the moral relevance of technological artifacts, see Borgmann (1995) and Achterhuis (1995).

[3] Parts of this section are based on fragments from a section of my article 'Ethiek en technologie: moreel actorschap en subjectiviteit in een technologische cultuur' (*Ethische Perspectieven* 16:3, Sept. 2006, pp. 267-289).