



THE POLITICS OF VALUATION:

Value Disjunctures in Bioethics and Fetal Research During the 20th Century

by Francis Lee, Solveig Jülich & Isa Dussauge

This article has two aims: First, the article proposes to sensitize our analytical minds to what we dub “value disjunctures”—clashes, in practice, between different valuations. The article proposes a strategy for analyzing value disjunctures—paying attention to how different value worlds de-cohere. We ask: What happens if we highlight the periods and situations when versions of the world are pulled apart? Second, the article aims to highlight how today’s bioethics can neither be read as a tale of democratization of ethics, nor as a tale solely driven by ethical disasters. What we offer is a story of how the bioethical yardsticks of today were established as dominant in fetal research. The sensitizing concepts we propose shine a light on how bioethicalization is a historical process that intertwines what is good, with what objects are seen as important, as well as how these objects are understood. Bioethicalization is a struggle about valuations, which yardsticks for the good that become salient, but also a struggle about which objects should be valued, as well as the nature of these valued objects. This article highlights how all matters of value—the ethical, the epistemic, and the economic—are intertwined with changing ontologies, thus highlighting how ontologies and values are enacted together.

Keywords: Valuation, enactment, ontological politics, valuography

Author: Francis Lee, Associate professor and senior researcher,
Division for Science, Technology, and Society at Chalmers University of Technology, Sweden

Solveig Jülich, Professor,
Department of History of Science and Ideas at Uppsala University, Sweden

Isa Dussauge, Researcher,
Tyrilli Foundation, Oslo, Norway.

Licensing: All content in NJSTS is published under a [Creative Commons Attribution 4.0 license](#). This means that anyone is free to share (copy and redistribute the material in any medium or format) or adapt (remix, transform, and build upon the material) the material as they like, provided they give appropriate credit, provide a link to the license, and indicate if changes were made.

Introduction

Fetuses are valued in many ways. They are often valued in terms of non-quantified scales such as emotional and ethical value. Sometimes they are valued in terms of their epistemic potential—as raw material for laboratory research. At still other times they are valued as economic objects. However, the value of fetuses is often so controversial that the very idea of fetal research leads to controversies for researchers, politicians, and organizations.

This paper attends to a space—fetal research—where the study of valuation practices is met by a multitude of controversies and hotly contested values. In biomedical research on fetuses, we can observe the intertwining of epistemic work, ethical quandaries, economic transactions, as well as debates about the sanctity of life and abortions. Biomedical research on fetuses becomes something of a balancing act for the involved actors, and switching between different yardsticks and practices of valuation is common. Discussions are sometimes shifted to something “globally more important” than the performed values and ethics of fetal research. For instance, global vaccination campaigns to eradicate disease, family planning to solve pressing issues of overpopulation, or aborted fetuses as waste which becomes possible to value as research material. These examples point to an interesting dynamic in studying value practices: the constant shifting of valuations and their objects.

“The fetus is a fetish,” the political scientist Rosalind Pollack Petchesky wrote in 1987. By this, Petchesky meant that fetuses and pregnant bodies are a political arena in which cultural and social negotiations take place (Petchesky, 1987). Shared and contested meanings are projected onto the fetus—projections made and unmade by different

actors. Some of these meanings draw on mundane imaginaries of where we come from, while others draw on scientific or political yardsticks. Often, and not least historically, these yardsticks of value are profoundly entangled with one another, in argumentation and in practice (Morgan, 2009). Petchesky’s now classic feminist argument intended to politicize any debates over pregnancy and abortion, and to lift fetuses away from strictly moral or scientific playgrounds. Or, rather, Petchesky like many of the 1980s’ feminists reminded their audiences that moral and scientific arenas were, and are, always already political. In other words, practices surrounding the fetus take place in nested and intertwined valuescapes.

Elsewhere, we and other scholars have attended to how actors in biomedicine deal with competing kinds of values in their scientific and mundane practices (Dussauge et al., 2015a; Thompson, 2015). In this article, we want to hone in on what we call “disjunctures of value” in order to foreground conflicts over values in practice. Our argument is theoretical, methodological, and empirical. However, it is grounded in empirical work we have conducted in the history and sociology of biomedicine. The empirical work we draw on in this article come from the history of ethics and fetal research in the 20th century in Sweden. Much of the research stems from a broader research project “Medicine at the Borders of Life: Fetal Research and the Emergence of Ethical Controversy in Sweden,” which has investigated fetal values in Swedish medicine and biomedicine in long-term (Jülich, 2024a). The empirical examples are drawn from empirical studies in the project, as well as other empirical work from mainly the Swedish context.¹

Theory: valuographies & value disjunctures

This article employs what we have elsewhere dubbed a valuographical research strategy (Dussauge et al., 2015a). In this, we join in the pragmatic turn to values, which argues that we attend to value as value practices (cf. Muniesa, 2011). The valuographical perspective takes a performative stance to values, going from values as held or given to values as made in practice (Dussauge et al., 2015c). Our aim is to render emergent the different values, machineries, hierarchies, categories, and boundaries, in order to highlight the multiplicity of values in the world and allow us to attend to several sets of values in our analysis.

Thus, rather than seeing values or norms as drivers of action, values are seen as made in practice. We don’t ask “how do we know what values really are?” but rather how actors locally produce, negotiate, and contest values in practice (cf. Lynch 2013 on ontography). The valuographical strategy aims to avoid pre-established perspectives

and normative judgment in order to attend analytically to the production of values in practice. It stresses the agency of human and non-human actors, and how categories and limits to valuation are made, enacted, and performed.

This strategy aims to decenter the dominance of particular yardsticks for value and to highlight how values are negotiated, contested, and hierarchized in practice (Dussauge et al., 2015c). In particular, we aim to decenter ethical (bioethics) and economic (biocapital) modes of valuing the world to highlight and analyze how multiplicities of values coexist, clash, and are negotiated. We want to analyze the performance of multiplicities of values alongside each other.

Value disjunctures

In this article we propose that we can attend to what we have here termed value disjunctures. “Reality disjunctures” is a term coined by

¹ All translations from Swedish are by the authors.



Melvin Pollner (1975) to talk about the fundamental unsettledness of human experience. Taking “hallucinations” as a counterpoint to “real experiences,” Pollner writes: “Some persons see what other persons do not . . . [C]ontradictory experiences of the world—reality disjunctures as we shall call them—are puzzling events” (Pollner, 1975: 411). A disjuncture is a separation or disconnection—in Pollner’s case a disjuncture of realities—in our case a disjuncture of valuations. The focus on disjunctures highlights the situation of puzzling unsettledness of what version of reality should prevail as a reference for the others—and thus can be seen as an expression of ontological politics (cf. Mol, 1999). According to Pollner “there is a fundamental equivocality inherent in certain disjunctures which renders problematic the determination of which of the parties to a disjuncture is a deficient witness of reality” (p. 411).

We, in turn, want to suggest that we can deploy the concept of value disjunctures as a sensitizing analytical concept, which attunes our analyses to separations and disconnections between values—to disjunctures in valuations (cf. Blumer, 1954). We propose that attending to value disjunctures—puzzling disconnections that lead us to think about the fundamentally unsettledness of valuation—can be a productive strategy for sensitizing ourselves to separations or disconnections different modes of valuing. We choose to call value disjunctures the moments when it is not settled which value-world or value-principle should prevail over the other.

This strategy of sensitizing ourselves to separation and disconnection, we believe, is especially fitting in a hotly contested domain such as fetal research—which is filled with actors who believe that their set of values are the right ones—and that other sets of values are fundamentally flawed. Attending to disjunctures is a valuographical strategy that is not different in kind, but in degree. By introducing the concept of disjuncture we want to stress the separation or disconnection of valuations—where one way of valuing the world does not seem to exist in the same value universe as another. They exist where different versions of the world do not seem to meet.²

Attending specifically to disjunctures helps us to analyze how different valuations fundamentally decohere, clash, or collide. We take these disjunctures as potentially being both synchronous and asynchronous. That is, value disjunctures can happen in the meeting of two valuations in a particular situation, but they can also happen when valuations shift over time, or when valuations from different places meet.

For example, take the hotly contested debate about abortion in the USA: where worlds seem to decohere rather than cohere. Each side

wholly convinced that their version of the world is the right one. This is a matter of disjuncture, disconnect, and separation. The concept thus draws attention and sensitizes us to the dynamics of disconnection and separation—rather than negotiation or interaction. Value disjunctures as a concept allows us a window into how people argue about what to do, about priorities, and about the making of the future. As Thévenot (2007) asks: “Which road to follow?”

An anatomy of value disjunctures

In this paper we propose that we can attend to three different aspects of value disjunctures in the valuations of fetal research. We suggest that we may productively pay attention to (1) the clashes of multiple yardsticks for value, (2) to the shifting objects of valuation, and (3) to how objects are performed. These aspects of valuation are often intertwined in practice, one aspect shaping how the other can be performed. As such, they are meant to sensitize us to particular facets of valuation (cf. Blumer, 1954). They are meant to help us analyze and understand the anatomy of value disjunctures—not to make the final ontological statement about the world of valuation.

Yardsticks: The first dimension of value disjunctures that we highlight here are disputes over the *yardsticks* of value.³ Analyzing clashes of yardsticks of value means paying attention to the metrics that are used to measure value. This can entail paying attention to if it is an ethical, economic, or epistemic yardstick that is being performed as relevant. These disjunctures are centered on the ways of measure the value of an object. For example, is the worth of a fetus the inalienability of protecting its rights, or the capacity of its aborted tissues to help produce vaccines that can save millions?

Objects of valuation: The second facet of value disjunctures that we deal with below is the analysis of *objects* of valuation. Analyzing value disjunctures about objects means paying attention to which objects are performed as valuable. In any given situation, it is often not given which objects should be valued. That is, there are often clashes in which objects are deemed valuable in practice. The objects of valuation also change from situation to situation, and from time to time. For example, do we value animals’ lives over the safety granted by the testing of vaccines for humans? In one situation or time, the sanctity of animal life might trump medical testing. In another situation or time, the opposite might be true.

Nature of objects: The third element of value disjunctures is the nature of objects. Analyzing collisions of the nature of objects means paying attention to how the same objects are performed in multiple and different manners. This could for example mean

2 This does not mean that we want to analyze “worlds of worth” in Boltanski & Thévenot’s (2006) fashion. In our view this a much too cumbersome and philosophically burdened way of approaching actors’ value practices. This—just like ethics or economics—reifies particular value worlds as the dominant ones. We want to remain open to actors’ production of values in practice. We want to take an emic stance to value (cf. also Dussauge, Helgesson, Lee, and Woolgar, 2015).

3 A note on the language of yardsticks. By using this particular term we follow some of the valuographical language that is outlined in Dussauge et al., (2015c). It would also be possible to call it registers, measures, gauges or criteria.



that a fetus at one particular time and place is performed as a sacrosanct and inalienable subject while in other times and places it is performed as raw materials for research.

By attending to value disjunctures we want to stress the importance of tracing not only how one set of values comes to dominate another, but also to attend to the “indeterminacy, uncertainty, and disorder” that accompanies valuation situations (Vogel et al., 2021: 4). What objects exist and how these objects should be valued are often uncertain and contested in locally situated practices (Dussauge et al, 2015c).

This is important, not only because it is difficult but also because it shines light on how boundaries are drawn between good or bad, between us and them, between now and then. Value disjunctures let us attend to the politics of valuations: Which concerns and objects of concern should be given the most ethical attention? Which sets of valuation principles and interests come to govern what counts as good? How do ethics, epistemics, or economics come to dominate over one another? Which value worlds and tools should prevail over another?

A note on valuography, normativity, and materiality

Some notes about normativity and materiality: Is then any valuation possible? Can any horrendous act be construed as ethical, moral, good, or efficient?⁴ The strategy of valuography pushes us to analyze how *actors* value the world. Throughout history various people have—in practice—constructed what some people today see as horrendous yardsticks for value.

For instance: The books of Leviticus and Deuteronomy in the Bible hold that certain crimes against Christianity should be punished by stoning. According to the Surah Al-Ma'idah (5:38) in the Quran stealing should be punished by cutting off a hand. Racist and patriarchal oppression seem like horrors to be fought against for many in the Nordic countries. However, with a growing

intolerance against immigrant populations, it also seems that racism is a part of the lives of increasing numbers of people in the same Nordic countries. The killing and eating of animals for many seem to be ecological and moral failings—while for others it is just another day in the kitchen. In the Nordic countries abortion is not a political hot potato, while in the USA the question of abortion is hotly divisive. By looking at humanity in different times and places it indeed seems that it is possible to produce almost anything as ethical and valuable. From our point in history and culture these values and value practices often seem like horrors of a bygone barbaric era. True value disjunctures if there ever were any (cf. Pollner, 1975).

Is valuation then completely arbitrary? Like the arbitrariness of the sign, the relation between what is valued and the object of valuation indeed seems arbitrary (cf. Saussure, 2011 [1916]). However, importantly the arbitrary nature of valuation does not mean that it is solely discursive. Valuation practices are through and through material—and it is through material-semiotic practices that value is produced and changed by actors (cf. Law, 2007). The tools and materialities of valuation are numerous and have large effects: For instance, the abortion issue sometimes hinges on tools and materialities of measuring the start of life: heartbeats, breaths, brains—and these materialities shape how actors value the world, but they do not seem to in the end determine them.

In the valuographical perspective that we employ here, we believe that it is beneficial for our analysis to attempt to be agnostic (however difficult that may be) to the values that actors produce. To attempt to analyze how actors value the world does not mean that we must espouse these values—nor does it mean we must decry them. In the valuographical perspective, we want to stay true to the troubling facets of valuation and true to the question: “how do actors produce value in practice?” This entails remaining open to actors' value practices, but perhaps not to endorse them.

1. Yardsticks: disjunctures of measures

What counts as good has changed over time in fetal research, and as we discuss below bioethics seems today to have become the dominant manner in which what comes to count as good research is measured and defined in Sweden today. In the regulation and legislation of how fetuses are to be handled, ethics has competed with other yardsticks, such as scientific yardsticks and economic yardsticks. Attending to shifting yardsticks for value sensitizes us to how matters of concern are measured, evaluated, and calculated (cf. Latour, 2004 on matters of concern). Thus, we can analyze how ethical, epistemic, production-focused, and commercial standards

are produced, hierarchized, and collide and how a particular standard today (bioethics) has become dominant in evaluating the other standards. By analyzing which yardsticks for value are constructed and performed as relevant we can become sensitized to how particular concerns become foregrounded in practice. (In a sense, we are here attending to the production of the “concerns” part of Latour's (2004) matters of concern.)

The first disjuncture we attend to here thus concerns yardsticks for measuring value. How should value be measured in practice?

4. Essentially it highlights the ways in which actors' value things, for instance epistemic value or economic value. Thanks go to our anonymous reviewer for posing these questions.



Which technologies, metrics, scales, or tests are constructed by the actors and used to assign value? Just as Thévenot (2007) has observed, there are many ways of measuring the worth of an object. Our concern here is the struggle to decide which yardstick for value should be used to assign value in different situations. In each situation, a host of yardsticks might be enacted and contested as relevant.⁵

Historically, scientific yardsticks for good research have included epistemic yardsticks that measured the value of species specificity. For instance, in the late nineteenth century and early twentieth-century theories of evolution and development were investigated by comparing embryo features among different species (Morgan, 2009; Hopwood, 2015). Material from pregnant women was very rare and medical researchers used specimens from local farm animals as well as exotic vertebrate embryos to fill in the gaps in the knowledge of human embryology. Increasingly, however, embryologists such as Swedish Ivar Broman argued that these investigations were unreliable due to biological discrepancies between humans and animals. Investigations of "lower" animals could not sufficiently explain fertilization and reproductive processes in primates, even less in humans, and were therefore seen as less valuable for research. Human fetuses held the highest epistemic value in embryological research at the turn of the twentieth century (Jülich, 2022; Jülich, 2024b).

For most of the twentieth century, epistemic yardsticks were deemed more important than the ethical yardsticks, such as the protection of embryos/fetuses or women's consent to the use of material from miscarriages, ectopic pregnancies, and abortions for research.⁶ Even after the establishment of the Nuremberg Code after the Second World War, Swedish medical actors continued to stress the epistemic value of using human material for research and drug and vaccine development, including the polio vaccine (Jülich and Dussauge, 2024). It was not until the 1960s that fetuses began to be portrayed as vulnerable and in need of ethical and legal protection. Issues around women's consent were less prominent and in practice not considered mandatory. In Sweden, it was the introduction of the Transplant Act in 1995 that for the first time regulated the use of aborted fetuses for scientific research, and from that point, it has required the consent of the woman (Jülich and Tinnerholm Ljungberg, 2019). Thus, epistemic yardsticks were

the dominant manner of valuing fetuses in research for most of the 20th century in Sweden.

However, sometimes, epistemic yardsticks do not cohere well with other, economic, production-oriented, yardsticks. For instance, in the 1950s, in a climate of increasing fear of polio epidemics, and in an international vaccine race (Wadman, 2016), the Swedish virologists in charge of developing a national polio vaccine chose human fetal tissues from aborted fetuses as their substrate for growing, researching, and tinkering with poliovirus strains (Wadman, 2016; Jülich and Dussauge, 2024).⁷ They deemed human fetal tissues as more suitable than monkey tissue for epistemic reasons: better immunological compatibility of vaccines with human recipients. Besides, human aborted fetus tissue was free, and the overall costs of vaccine production were another central yardstick, together with national security, in the choice between national production and an import of polio vaccines for the Swedish population. On the other hand, monkey tissue was seen as yielding better antigenicity (vaccine power); and the productivity and reliability of supplies were crucial to large-scale production, and in these yardsticks, human fetuses were not as valuable (not as productive, not as reliable) as monkey tissue.⁸ Here, the value of using human fetuses was valued both using an epistemic yardstick, but also using a production-oriented yardstick, partly economic, partly volume-oriented, which was founded on a concern for large-scale vaccine production.

As we can observe through these examples different ethical, epistemic, and economic yardsticks were constantly in play throughout the 20th century. The yardsticks proliferate in practice. What was deemed to become the dominant yardstick was constantly negotiated in locally situated practices.

Bioethicalization and clashing yardsticks of ethical conduct

If we move our lens to the professionalization of bioethics, we can also observe how new yardsticks for good biomedical research and practice emerged during the 20th century. This also revisits the history of bioethics through a new lens, allowing us to discuss the temporal shifts of what comes to count as ethics. By doing this we aim to show how a manifold of yardsticks of value co-occur, clash, are settled or demolished. In this section, we shine our analytical searchlight on the development of professionalized bioethics and

5 Consequently, situations might also result, where multiple concurrent yardsticks co-exist with tension in the same practice (cf. Lee and Helgesson, 2020). That is, there can exist different levels of tension between yardsticks in a situation. From no tension, to incommensurability. But the level of tension is for the actors to negotiate. Furthermore, in a situation where a high tension between yardsticks is enacted, there might arise moments where there is never any resolution of which yardstick is the correct measurement of value. In such situations, actors need to constantly navigate these value disjunctures in practice, with results that vary. Actors are often aware and reflexive about these disjunctures between yardsticks, and negotiate how the yardsticks relate to each other in each valuation situation.

6 There is no evidence that neither embryologist Ivar Broman nor physicians in the network that he was dependent upon for accessing material ever thought of asking the women involved if they agreed that their dead fetuses be pickled for the purposes of study (Jülich, 2022). This practice was in accordance with existing laws as well as ethical standards of the profession that mostly sought to protect the medical confidentiality of the patients as well as the reputation of colleagues.

7 The discussions surrounding that choice mostly took place between medical experts, and focused on the advantages and drawbacks of fetal tissues as a tool for research (developing and testing a vaccine) and for a large-scale production of a vaccine. The main advantage of human fetal tissue was that they were sterile and human, therefore not exposing users to possible interspecies infections.

8 Eventually, human fetal tissue was chosen as substrate for virus production and was used as the tool for developing and testing the national vaccine; but human fetal tissue was finally abandoned and replaced by other substrates in the large-scale production of vaccine.



how it historically came to overshadow other yardsticks for value in a process we dub *bioethicalization*.⁹

Historically, bioethics, a discipline established in the 1960s, and the traditional medical ethics of doctors have been in conflict with one another. Bioethicists have tended to view the ethics of doctors as dominated by concern for professional interests rather than protecting patients (Rothman 1991; Jonsen 1998). In particular, it has been claimed that the principle of informed consent was an innovation of modern bioethics. However, as recent historical scholarship has shown, considerations about patients' welfare and the public good played an important role in the nineteenth and early twentieth century (Maehle, 2016; Maehle, 2021). Physicians of this period faced difficult situations indeed. For instance, in cases of severely obstructed labor, obstetricians had to decide whether to dismember a living fetus through craniotomy in the hope of saving the woman, or risk the patient's life in daring to perform a Caesarean section. In Protestant Sweden, most physicians stressed that the ultimate decision should be made by the woman alone. Yet, what consent meant and if it was without coercion from the medical practitioner is impossible to know (Franzén, 2020).¹⁰ In effect, more than paternalism and the reputation of the profession were at stake. But this perspective was seldom acknowledged by the early bioethicists who wished to distance their "new" bioethics—driven by non-medical experts and enacted as "patient-oriented"—from the "old" doctors' ethics (Cooter and Stein, 2013).

The history of bioethics further emphasizes the "critical event narrative," positing that bioethics emerged in the United States as a response to research scandals around human experimentation in the 1960s and 1970s and new biomedical technologies (for a critical discussion, see Wilson, 2014). These scandals also encompassed controversies over the drug thalidomide, organ transplants, and the definition of death as well as the rise of civil rights movements including patient organizations. The nascent field of bioethics made itself relevant and became increasingly populated by analytically trained philosophers that viewed bioethics as a form of applied ethics, and formulated new central ethical principles for research, such as respect for persons, beneficence, and justice.¹¹

As a part of this movement toward bioethicalization, research ethics committees were developed in the 1960s, first in the United States and then in the United Kingdom as well as in Sweden. From the 1970s these national research ethics committees became

more and more invested in applying bioethical frameworks and legal reasoning, and associated yardsticks of value, to medical research.¹²

Thus, yardsticks from outside medicine and physicians' ethics were increasingly brought in via bioethical practices and institutions to value and regulate medical research. Bioethical yardsticks have since then become one of the dominant frames for valuing the ethical character of biomedical research. But as recent work on controversies surrounding research on surplus IVF embryos and new technologies such as genetic enhancement illustrates, bioethical yardsticks are not universal; national histories and sociopolitical contexts condition the dominance and the terms of bioethics in today's policy debates and legislation (Banchoff, 2011).

This section contributes with an additional historical narrative that emphasizes the contents of ethics over the professional struggles that drove them. We have illustrated the historical process that we coin "bioethicalization": 1) how a specific set of yardsticks for value were introduced and became part of defining good biomedical practice and research alongside other understandings of value; and 2) how a specific bioethical set of values were added to other existing value registers (epistemic, economic, etc.) insofar as they were not been made to overlap with bioethics' own yardsticks (such as scientific soundness and scientific necessity which have been integrated as parts of bioethics' yardsticks).

The point that standards for good research change over time is not new, as the scholarship in the history of ethics has shown. Rather, our argument here is that through the analysis of disjunctures in yardsticks—the historical spaces in which ethical yardsticks come to de-cohere from one another—we can analyze how actors value what is good research and good medical practice, "good," in practice, has shifted over time. We opened this article with a question: What comes to count as ethical practice in reproductive research and fetal medicine? In this section, we have answered that question historically by focusing on a first kind of disjuncture—the shifting yardsticks for medicine and biomedical research. First, we have highlighted how biomedical research is tied to a constantly shifting terrain of values, and how bioethics became a central frame for valuation in reproductive research practice over other measures of what is good research, and secondly, which principles have become hegemonic in settling whether something is valued as ethical or not. We refer to these measures and principles as yardsticks of value.

9 In a similar manner, Maria Hedlund uses the term "ethicisation" to describe the tendency to frame scientific and technological issues as bio/ethical and to call for bio/ethics expertise to resolve dilemmas and controversies (Hedlund, 2023).

10 Another dilemma concerned confidentiality in cases of out-of-wedlock pregnancies and illegal abortions. Ivar Broman's reluctance to reveal information about where the fetuses in the embryological collection came from can at least partly be understood as a commitment to protect the anonymity of the female patients involved (Jülich, 2022).

11 These three principles are identified in the 1979 Belmont Report by one of the federal bodies conducting such work (The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979).

12 Critical work in the history of ethics has pointed out that this shows that "the critical event narrative" does not adequately explain the establishment of bioethics (Hedgecoe, 2009; Stark, 2012; Jacobs, 2021; Tinnerholm Ljungberg, 2021). Critical historians of ethics have also stressed that there are examples of how doctors handled issues in reproductive medicine as moral dilemmas centered around the patient[s] interest in the 19th century already, i.e. within the frame of traditional medical ethics (Maehle, 2021).

2. Disjunctures on the objects of valuation

Our second disjuncture deals with the *objects* of valuation. In reproductive research, there are a host of different objects—things, people, ideals—that are valued at different junctures; for instance, women’s autonomy, fetal life, and vaccine production. At times, these different objects of valuation (and the values actors attach to them) come to clash with each other. It is often not self-evident which objects are up for valuation, nor which objects are valuable in a given situation. The core of these controversies is often a conflict about which object the conflict really should be about: first, about which objects of value exist, and then about which object of value should be acknowledged as most valuable over others. At one point in time, it might be the sacred life of the fetus that is the object that matters, at other points in time, it might be the value of aborted fetuses as research objects or vaccine production, and still, at other points, it might be female autonomy that is prioritized over other concerns.

In this section, we explore two historical examples in which value disjunctures of objects are an effect, and a part, of specific actors’ actions. That is, how different actors attempt to change the focus of valuation to their object of choice.

Dichotomies: lifesaving vaccines for the living on the basis of aborted fetuses

In 1952, Sven Gard, the head of the national, and public, polio vaccine development project, and an internationally renowned virologist, was quoted in an interview saying that although possibly morally disturbing, the large-scale use of fetal tissue cultures to produce the national polio vaccine must be seen as the “bright side of the abortion’s medal” (Bernholm, 1952). In its context, this assertion was realizing a difficult rhetorical balancing act: It promoted the systematic use of aborted fetuses in virology while at the same time acknowledging that that practice did have a backside (for a discussion, see Jülich and Dussauge, 2024). Through the use of metaphor, Gard was indirectly implying that abortions had a dark side.

During this time, when abortion and abortion laws were highly controversial in the public eye and amongst physicians, aborted fetuses were used for polio vaccine research and polio vaccine production without the consent of the pregnant persons. Fetal tissues from aborted fetuses were used on a large scale in specific sectors of Swedish medical research, especially vaccine research in the 1950s and 1960s. In the 1950s’ vaccine research, a group of scientists under the leadership of Gard set up an infrastructure of supply, organizing the transfer of newly aborted fetuses from gynecological clinics in the broader Stockholm region, to produce tissue cultures from the fetuses’ organs, in order to cultivate the

poliovirus, use it and research it (Jülich and Dussauge, 2024).

The development of a national vaccine against polio using fetal bodies from legal abortions could have become the object of controversies—but at the time it did not. Quite the opposite. The press portrayed the research team and the trials of the vaccine in heroic ways and emphasized the brand new technological ways of production: culturing the poliovirus in fetal tissue cultures, emphasizing the national uniqueness of the method. The involved team of virologists promoted this method as an exceptional asset in the national mobilization against polio, and brought most attention to the goal of the enterprise rather than its methods. In the press, it was reported that the Swedish vaccine was better than its American counterpart because it was produced from human material instead of tissues from other species (monkeys), thus reducing the risk of side effects (Jülich and Dussauge, 2024).

So, when talking about how the new method was the “bright side of the abortion’s medal,” Gard placed the emphasis on vaccination strategies and the national duty to save the lives of children in the fight against polio. In Gard’s remarks it was the benefit to future children that was enacted as the main reason for using fetal bodies. The press supported this view: “One may of course oppose, on emotional grounds, the method of ‘making medicine’ of unborn children, but concretely this means that the unborn support the living against a disabling, terrible disease” (Svenska barn).

Lennart Nilsson, the fetoplacental unit, and the birth of a new object of valuation

During the 1960s a new object of valuation was born and with it new ways of valuing fetuses and fetal research. In the research conducted by endocrinologists at the medical university in Stockholm, a group of researchers developed a perfusion technique that made it possible to keep human fetuses “alive” for a short period of time after the abortion operation.¹³

These researchers created a new object in reproductive research: the fetoplacental unit (Jülich, 2018; Jülich 2024c). Earlier on, the pregnant woman, the fetus, and the placenta had been considered as functioning separately from each other. The new object of the fetoplacental unit marked a disjuncture from the previous enactment of the fetus as simply nourished by the placenta. In the performance of “the fetoplacental unit,” the fetus was enacted as an active biological contributor to the functioning of the placenta, pregnancy, and fetal development. A new ontological object emerged through this new enactment of fetuses-placentas as a biological entity. However, this new

¹³ This research was supported not only by the Swedish Medical Research Council but also by American federal and philanthropic funding. In Sweden, due to the fairly liberal abortion legislation, the access of aborted fetuses for medical research was less limited than in most other post-war European countries and the United States (Jülich, 2018).



ontology of the fetus was ambiguous and entwined with ongoing value-laden body-political conflicts, as the fetoplacental unit not only became a key concept in fetal physiology but also, in a perhaps more unforeseen way, entered the visual culture of reproduction. Just as Haraway's (1997) analysis of the image of the earth from space entered a new object into our cultural awareness—Lennart Nilsson's images brought the fetus into living color in the cultural awareness. One might argue that a new object of valuation was born.

During this time, photographer Lennart Nilsson collaborated with medical researchers that conducted perfusion studies on fetuses and placentas. Drawing on the more conventional technique of placing specimen in liquid, he produced his soon worldwide famous images of human development in connection to abortions performed at the women's clinics of the Karolinska Institute (Jülich, 2024). The fetoplacental unit played a prominent part in the series of pictures that were published in the 1965 Life-story "Drama of Life before Birth." These pictures were soon mobilized by anti-abortionists to promote the view that the fetus was an individual with its own rights (a statement that is both ontological and value-laden).

On the other side, many sex educators and supporters of abortion rights used the same pictures to promote women's empowerment over their pregnancies and possible abortion decisions. Many feminist scholars interpreted Nilsson's photographs within that context of contemporaneous politics of reproduction and argued that the lack of pregnant bodies in Nilsson's pictures was erasing women's experiences of pregnancy, portraying the fetoplacental unit as an independent entity, and thereby supporting the anti-abortion standpoint that the fetus was an individual with its own rights (Jülich, 2024). Thus, the emergence of this new ontological object was inherently ambiguous and tied to clashing yardsticks of value.

Eventually, the medical researchers' "fetal experiments" were disclosed to the public and became the center of an ethical controversy mobilizing both the media and the medical authorities. Was it ethically defensible to inflict such experimental methods on aborted fetuses? Clergymen, religious politicians, and representatives of the thalidomide victim's association condemned the experiments and argued that the human value and rights of the fetuses must be protected at any cost. For instance, a pastor and member of the Liberal People's Party claimed that an aborted fetus at the age of 20 weeks was to be considered as a unique form of human life, even a child. Free church debaters also asked if no consent from the female patients was required to use their aborted fetuses for medical research (Jülich, 2018).

In response to the criticism directed from religious and other groups, medical researchers and authorities stressed the benefits for health

and welfare that the studies were expected to bring (Tinnerholm Ljungberg, 2024). In particular, the researchers foreshadowed that a new thalidomide disaster could be prevented by investigating how and with what effects drugs were transferred from the pregnant woman to the fetus. In this way, the medical researchers attempted to shift the focus away from the experimentation on the aborted fetus to the protection of the unborn child.

Thus, different actors struggled to shift the focus of the controversy to the objects that they valued as most important: the health of upcoming generations of unborn children, vs. the protection of the pregnant woman.¹⁴

Moreover, in the 1960s and 1970s Swedish reproductive research seemed to provide a tool for solving a perceived global overpopulation problem (Ramsey, 2021). In a collaboration between medical researchers and pharmaceutical companies a new abortion method—abortion pills—was developed at the Karolinska Institute. Women that had been granted abortion were included in clinical trials of a specific compound that was seen as a promising abortifacient. These mid-1960s trials were unsuccessful but led to new legislation that opened possibilities for prostaglandin research, which supported the development of new abortifacient compounds.

However, first a proposition had to be decided by the Parliament. Several parliament members who felt uneasy about this research positioned their concern for protecting fetuses' (and women's) human dignity against the research and its goals to save the future of humanity. Proponents stressed the potential humanitarian value of such work for controlling overpopulation by means of family planning. Thus, what mattered most in this context was humanity at large and less the fetuses and women in the clinical trials. This is a schoolbook example of a disjuncture of objects of value: pitting objects of concern against each other as competitors in a global valuation.

Disjunctures of objects and temporalities

If the analysis of disjunctures of *yardsticks* showed us how actors establish *concerns* in matters of concern, a focus on disjunctures of *objects* of value sensitizes us to which things come to matter, or come to count as matters to care about—matters of concern—and the contestations around these matters (cf. Latour, 2004).

The examples deployed above illustrate situations in which actors in the field of reproductive research shape valuations to focus on the future purposes of their activities rather than the methods for them and ethical considerations related to these—the objects of valuation are shifted. Read sympathetically, this kind of disjuncture sometimes aligns with a frame amplification of the object of concern mobilized by the actors (cf. Epstein, 2016). However, it might also be read as obscuring the objects of valuations that

¹⁴ Perfusion studies on aborted human fetuses were finally abandoned in Sweden in the early 1970s for a range of several reasons, primarily the lack of availability of fetuses from late abortions after the new abortion law of 1974 (Jülich, 2024c).



the actors wish to deflect the attention from, backgrounding contemporary debates concerning fetuses. In doing so, one might read actors as enacting a temporal disjuncture, by mobilizing and valuing specific future objects (e.g., the lives of future children in

a world without polio; the future safety of pregnant people and newborns; the expected public health improvements enabled by a new technology) rather than contemporary objects of concern.

3. Disjunctures on the nature of objects

Our third disjuncture takes on the nature of objects as a part of value practices. It deals with how shifting yardsticks and objects are intertwined with how objects are performed. The nature of objects is often an unsettled matter that is intertwined with practices of valuation in both expected and unexpected ways. In practice, the purposes of objects, their ontological status, as well as how they might be measured are a matter of contention.

The nature of objects is not about conflicts about what objects to value, but of what an object is *performed as being*. In a sense, it is related to Law's (2002) and Mol's (2002) work on the ontological multiplicity of objects in practice. An object might be enacted in different manners in different situations or might even be enacted in different manners in the same situation. This means that the nature of an object of valuation is performed by actors in practice. The nature of objects is meshed with the yardsticks that are used to value them, as well as which objects are performed as valuable. What we deal with here are actors' struggles with the nature of objects.

Sometimes disjunctures about the nature of objects can be unproblematic and passed over as the natural multiplicity of a thing and in others can give rise to disjunctures—and a need to handle these disjunctures in practice (cf. Mol, 2002). The point is that the nature of objects, and their valuation, is not a settled matter. In the field of reproductive research, enacting the multiple nature of the fetus gives rise to disjunctures of value.

Performing the nature of the fetus

During the twentieth century, the perceived nature and meaning of aborted human fetuses have shifted over time and place in significant ways (for perspectives on the US; see Morgan, 2009; Schoen, 2015; and for the UK see Pfeffer and Kent, 2007). The nature of embryos was ambiguous in the contested field of contraception and abortion as is the ontology of compounds with a contraceptive/abortive effect.

In Sweden, research on contraceptives and abortion pills in the 1960s constantly led to the mobilization, clarification, and blurring of the biological boundary between anti conception and abortion; and between the fetus as an abortable object and a subject worthy of protection (Ramsey, 2021). Chemical compounds and how they

worked in relation to conception had an ambiguous status. Not only the researchers, but also the Swedish Parliament, negotiated a range of ontological-value questions: Was the compound a contraceptive or an abortifacient? Were the reproductive medical trials legal according to the Swedish abortion laws? Were the researchers harming fetuses or just preventing eggs from implanting? Were these fetuses biological objects which could be discarded through abortion, subjects worthy of protection, or both?¹⁵

In Sweden, a waste regime was established around 1900 by the active work of leading embryologists (Jülich and Tinnerholm Ljungberg, 2019). According to them the material from interrupted pregnancies was nothing but waste for the female patients. In the hands of the scientists however, it was converted into valuable research material. This seems to be a common feature of biomedical work—but was also part of a wider trend of valuation in biomedicine (cf. Bahadur et al, 2011).

However, the notion of aborted fetuses as medical waste became increasingly challenged from the 1960s and in the early 1970s, as the fetus became more publicly visible through Lennart Nilsson's spectacular photographs and the media reporting on medical experiments on aborted fetuses (Jülich and Tinnerholm Ljungberg, 2019). According to critics, such as religious parliament members, the fetuses were living humans with heartbeats and breathing worth protecting (Jülich, 2018). Medical experts and authorities on their part maintained that the fetuses had no independent life and were to be seen as dead tissue, similar to amputated organs and tumors. When pressed, some researchers claimed that the fetuses were brain-dead and could not feel pain or any sensations (this new conception of death would not be established until later).

Thus, for these different actors, the human aborted fetus was performed in very different ways which had consequences for what kind of protection and rights it was attributed with. Medical researchers performed aborted fetuses as equivalent to dead organs that were treated as waste. For instance, gynecologist A. Ingelman-Sundberg, described the Swedish praxis: "Where foetuses do not fulfil the criteria for live-born infants according to the regulation, or have not reached a size, or come from a stage of pregnancy where they would not be regarded as still

¹⁵ From the late 1930s in Sweden, abortion was permitted, but submitted to the approval of a board of experts, on medical, humanitarian and eugenical grounds (1938), on socio-medical grounds (1946) and in case of risk of serious fetal damage (1963). In 1974 a new law was created that stated that it was for the woman to decide for an abortion until the end of the eighteenth week. During the latter part of the twentieth century women's legal right and access to contraceptives methods and contraceptive education increased (Jülich, 2024c).



born infants, they can, as in the case of tumours, etc. be examined for the cause of death or used in research and teaching” (quoted by Tinnerholm Ljungberg, 2024). Religious critics, on the other hand, enacted the fetuses used in endocrinological research as living and worthy of protection—or even individuals with rights: “A number of authorities in the field of Christian ethical thought [...] have all declared in unison that it is unthinkable to use human beings on a lower level as objects of research [...], even if it means helping human beings on a higher level” (Gustafsson, 1960, 42).

In sum, disjunctures on the nature of objects

By attending to disjunctures on the nature of objects we wish to open a route to analyze how the enactment of ontology (performing the nature of things) is intertwined with processes of valuation (attributing value to things). By zooming in on disjunctures about the nature of objects, we can trace how different yardsticks become

salient in valuing objects of different natures, how different worlds become realized, and how different performed ontologies of an object are pitted against each other.

This disjuncture points to the possibility of the multiplicities in the objects of valuation. The fetus was performed both as waste and as sacred and the biological processes of pregnancy were performed in different manners. New objects were also performed: the consenting women and the fetoplacental unit, also affecting the multiple natures of the fetus. An important point, however, is that such objects of valuation do not need to be physical objects: they might be processes, people, issues, or anything else. Any thing that actors make valuable (or conversely worthless) in practice is an object of valuation. For instance, an object of valuation might be the process of ethical review in the biosciences, or it might be women’s rights.

Yardsticks, objects, and valuations: an analytical summary

Above, we have traced a few disjunctures of value around “the embryo/fetus” and fetal research. By doing this we have been able to sketch various disjunctures of value in fetal research and medicine. Through the analysis of disjunctures of values surrounding the fetus, we highlight how what counts as valuable has shifted over place and time. This has entailed tracing several different values: including ethical, epistemic, and economic values.

Through tracing these disjunctures, we have analyzed how what came to count as valuable, important, and ethical has shifted over time and place. During most of the 20th century in Sweden, the dominant manner of valuing fetuses was epistemic. In the first half of the century, the human fetus was performed as being uniquely valuable for researching human reproduction, at the same time as economic ways of valuing fetuses were enacted as undesirable. However, the hegemony of epistemic yardsticks started to shift in the mid-century, and a specific set of values centered around the ethics of consent became dominant. As a result of this shift the protection of the rights of human subjects—both in the form of pregnant women and human fetuses—became central to the performance of values.

We have also observed how different objects were performed as valuable at different times. During the first half of the 20th century, fetuses were valued not as human subjects, but rather as epistemic objects for research or tools for producing vaccines. In these performances, other objects replaced the unborn fetus as the objects of valuation. For instance, the safety of infants through the production of vaccines was valued over the fetus.

Fetal tissue was also valued as a tool for polio research. The value of the fetus was not inherent, but as a tool for research, experimentation, or biomedical production. It seems that, in Sweden, the larger good of the population and society, including unborn infants—the collective—trumped individual or fetal rights. Thus, different objects than the fetus-as-individuality were the objects of valuation.

During the 20th century, the nature of objects also shifted. For different actors, the human aborted fetus was defined in very different ways which had consequences for what kind of protection and rights it was attributed with. Medical researchers performed aborted fetuses as equivalent to dead organs that—to other than researchers—were mere waste. Critics enacted the fetuses used in endocrinological research as living and worthy of protection—even individuals with rights. If considering access to abortion and contraceptives, women’s rights have been increasing over time and, somewhat contradictory, in tandem with increased rights for the fetus.

Only at the end of the twentieth century was a new subject position, the consenting woman, established. Postwar reproductive research also created a new object in reproductive research: the fetoplacental unit, which entered the visual culture of reproduction with Lennart Nilsson’s images. The fetoplacental unit marked a disjuncture from the previous understanding of the fetus as simply nourished by the placenta; the fetoplacental unit emphasized the biological contribution of the fetus to the functioning of the placenta, pregnancy, and fetal development.

Conclusion

In this article, we have introduced disjunctures of value as a crucial analytical concept for understanding valuation processes amid disruption, especially in domains as contentious as fetal research (cf. Pollner, 1975). By adopting this framework, we shed light on the intricate ways, values are performed, contested, and negotiated within biomedical practices. Attending to these disjunctures—which include yardsticks of value, objects of valuation, and the nature of these objects—allows us to analyze the multifaceted and often conflicting nature of value practices.

By tracing these disjunctures historically and contextually, we highlight how what is considered valuable shifts over time and place, demonstrating that ethical, epistemic, and economic values do not operate in isolation but are deeply intertwined and mutually constitutive (cf. Dussauge et al., 2015). In the Swedish context, the transformation from valuing fetuses primarily as epistemic objects to emphasizing ethical considerations underscores a broader shift in societal values and the increasing prominence of rights and consent.

Our analysis underscores the importance of recognizing these disjunctures as moments of ontological politics where the clash of value systems illuminates broader societal negotiations over what counts as ethical, valuable, and right (cf. Mol, 1999). These moments of disconnection and separation are not mere anomalies but fundamental aspects of how values are constructed, maintained, and challenged. By attending to value disjunctures, we gain a deeper understanding of how different worlds and value systems

collide, coexist, and shape each other.

Importantly, this approach also highlights the spatiotemporal dimensions of valuation, where imagined futures and historical changes play a crucial role in shaping contemporary value practices. The dynamic interplay between past, present, and future valuations demonstrates that value is not static but constantly evolving through practices of negotiation and contestation.

In emphasizing disjunctures of value, we offer a methodological toolkit for STS scholars to engage with the complex and often contentious nature of valuation. This approach not only enriches our understanding of the politics of valuation but also provides a lens to critically examine how different values and ontologies are enacted in practice (cf. Lynch, 2013). By foregrounding these disjunctures, we call for a more nuanced and critical engagement with how values are unmade and clash in the contested terrains of science and technology.

Ultimately, understanding value disjunctures is essential for grasping the ongoing negotiations that shape our world. These disjunctures reveal the underlying tensions and conflicts that actors struggle with, highlighting the importance of critically examining the processes through which values and ontologies are constructed and contested. In doing so, we aim to contribute to a more reflexive and informed discourse on the politics of valuation, urging scholars and practitioners alike to attend to the clashes, complexities, and nuances that define our multiple realities.

Acknowledgements

This article is part of the research program "Medicine at the Borders of Life," funded by the Swedish Research Council (registration number 2014-1749).

Author description

Francis Lee is associate professor and senior researcher at the division for Science, Technology, and Society at Chalmers University of Technology, Sweden. His research deals broadly with how technology shapes society. One of his main research interests is how digital information infrastructures shapes knowledge production. He has published in for example *Science, Technology & Human Values*; *Science as Culture*; *Valuation Studies*, and *History and Technology*. He has edited the *Value Practices in the Life Sciences* (Oxford University Press, 2015). He is currently directing the research program 'A New Scientific Revolution? Big Data and AI in the Biosciences' and is the founder of The Digital STS Hub at Chalmers University of Technology in Sweden. <https://francislee.org>

Solveig Jülich is professor of history of science and ideas at Uppsala University. Her research deals with media history of medicine and historical perspectives on medicine, ethics, and democracy. Between 2015 and 2021 she directed the research program 'Medicine at the Borders of Life: Fetal Research and the Emergence of Ethical Controversy in Sweden,' funded by the Swedish Research Council. She has published articles in journals such as the *Bulletin of the History of Medicine* and *Social History of Medicine* and is coeditor of several volumes, including *Communicating the History of Medicine: Perspectives on Audiences and Impact* (Manchester University Press, 2019) and *Rethinking*



the Public Fetus: Historical Perspectives on the Visual Culture of Pregnancy (University of Rochester Press, 2024). Her most recent publication is the edited volume *Histories of Fetal Knowledge Production in Sweden: Medicine, Politics, and Public Controversy, 1530–2020* (Brill, 2024).

Dussauge is a qualitative researcher in critical drug studies, with a background in the history of medicine, social studies of science and technology, and gender and sexuality studies. They are currently joining the Tyrili Foundation, and completing a history of users' organizing and activism in the Norwegian drug field.

References

- Bahadur, G., Morrison, M., & Machin, L. (2010). Beyond the "embryo question": Human embryonic stem cell ethics in the context of biomaterial donation in the UK. *Reproductive Biomedicine Online*, 21(7), 868–874.
<https://doi.org/10.1016/j.rbmo.2010.10.001>
- Banchoff, T. (2011). *Embryo politics: Ethics and policy in Atlantic democracies*. Cornell University Press.
- Bernholm, B. (1952). Professor Sven Gard i poliointervju. *Expressen*, December 2.
- Blumer, H. (1954). What is Wrong with Social Theory? *American Sociological Review*, 19(1), 3–10.
<https://doi.org/10.2307/2088165>
- Boltanski, L., & Thévenot, L. (2006). *On justification: Economies of worth*. Princeton University Press.
- Callon, M., & Law, J. (1995). Agency and the Hybrid Collectif. *South Atlantic Quarterly*, 94(2), 481–507.
- Cooter, R., & Stein, C. (2013). *Writing History in the Age of Biomedicine*. Yale University Press.
- Dussauge, I., Helgesson, C.-F., & Lee, F. (Eds.). (2015a) *Value Practices in the Life Sciences and Medicine*. Oxford University Press.
- Dussauge, I., Helgesson, C.-F., & Lee, F. (2015b). Valuography: Studying the making of values. In *Value Practices in the Life Sciences and Medicine* (pp. 267–285). Oxford University Press.
- Dussauge, I., Helgesson, C.-F., Lee, F., & Woolgar, S. (2015c). On the omnipresence, diversity, and elusiveness of values in the life sciences and medicine. In I. Dussauge, C.-F. Helgesson, & F. Lee (Eds.), *Value Practices in the Life Sciences and Medicine* (pp. 1–28). Oxford University Press.
- Epstein, S. (2016). The politics of health mobilization in the United States: The promise and pitfalls of "disease constituencies." *Social Science & Medicine* (1982), 165, 246–254.
<https://doi.org/10.1016/j.socscimed.2016.01.048>
- Franzén, H. (2020). From patient to specimen and back again: Radical surgeries and pelvic pathologies in Museum Obstetricum. *Lychnos*.
<https://tidskriftenlychnos.se/article/view/21509>
- Gustafsson, A. (1969). Svar på interpellation av herr Gustafsson i Borås ang. vissa vetenskapliga undersökningar i samband med abortoperationer. In *Riksdagens protokoll*. Vol. 4. *Andra kammarens protokoll*, no. 21, 38–42. Riksdagen.
- Haraway, D. J. (1997). *Modest_Witness@Second_Millennium. FemaleMan@_Meets_OncoMouse: Feminism and technoscience*. Routledge.
- Hedgecoe, A. (2009). "A form of practical machinery": The origins of research ethics committees in the UK, 1967–1972." *Medical History*, 53 (no. 3): 331–350.
- Hedlund, M. Ethicisation and reliance on ethics expertise. *Res Publica* (2023),
<https://doi.org/10.1007/s11158-023-09592-5>
- Hopwood, N. (2015). *Haeckel's embryos: Images, evolution and fraud*. University of Chicago Press.
- Jacobs, N. (2021). "An official conscience and warranting agency": Institutional isomorphism and the rise of dutch ethics review in the 1970s and 1980s. *European Journal for the History of Medicine and Health*, 78 (2): 287–309.
- Jonsen, A. R. (1998). *The birth of bioethics*. Oxford University Press.
- Jülich, S. (2017). Picturing abortion opposition in Sweden: Lennart Nilsson's early photographs of embryos and fetuses. *Social History of Medicine*, 31, (2): 278–307.
- Jülich, S. (2018). Fosterexperimentens produktiva hemlighet: Medicinsk forskning och vita lögnen i 1960- och 1970-talets Sverige. *Lychnos*, 10–49.
- Jülich, S. (2022). Historier kring Tornblad institutet. In M. Thomas Nilsson, and S. Jülich. *Embryologiska rum: Tornblad institutets samling av foster från människor och djur*, (pp. 151–268). Makadam.
- Jülich, S. (2024). The drama of the fetoplacental unit: Reimagining the public fetus of Lennart Nilsson. In E. Björklund and S. Jülich (Ed.) *Rethinking the public fetus: Historical perspectives on the visual culture of pregnancy*, (pp. 143–70). Rochester University Press.
- Jülich, S. Ed. (2024a). *Histories of fetal knowledge production in Sweden: Medicine, politics, and public controversy, 1530–2020*. Brill.
- Jülich, S. (2024b). Embryology and the clinic: Early to mid-twentieth-century stories of pregnancy, abortion, and fetal collecting. In S. Jülich (Ed.) *Histories of fetal knowledge production in Sweden: Medicine, politics, and public controversy, 1530–2020* (pp. 184–209). Brill.
- Jülich, S., and I. Dussauge (2024). Fetuses as instruments of health: Polio vaccine and the nation in the postwar period. In S. Jülich (Ed.) *Histories of Fetal Knowledge Production in Sweden: Medicine, Politics, and Public Controversy, 1530–2020* (pp. 210–37). Brill.
- Jülich, S. (2024c). Historicizing fetal knowledge production, reproductive politics, and conflicted values. In S. Jülich (Ed.) *Histories of fetal knowledge production in Sweden: Medicine, politics, and public controversy, 1530–2020* (pp. 1–62). Brill.
- Jülich, S., and H. Tinnerholm Ljungberg (2019). Från medicinskt avfall till rättighetsinnehavare: Framväxten av värdekonflikter kring



- aborterade foster i Sverige. *Tidskrift för genusvetenskap*, 40, (3–4): 33–54.
- Latour, B. (2004). Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern. *Critical Inquiry*, 30, 225–248.
- Law, J. (2002). *Aircraft stories: Decentering the object in technoscience*. Duke University Press.
- Law, J. (2007). *Actor Network Theory and Material Semiotics*. <http://www.heterogeneities.net/publications/Law2007ANTandMaterialSemiotics.pdf>
- Lee, F., & Helgesson, C.-F. (2020). Styles of Valuation: Algorithms and Agency in High-throughput Bioscience. *Science, Technology, & Human Values*, 45(4), 659–85. <https://doi.org/10.1177/0162243919866898>
- Lynch, M. (2013). Ontography: Investigating the production of things, deflating ontology. *Social Studies of Science*, 43(3), 444–462. <https://doi.org/10.1177/0306312713475925>
- Maehle, A.-H. (2016). *Contesting medical confidentiality: Origins of the debate in the United States, Britain, and Germany*. University of Chicago Press.
- Maehle, A.-H. (2021). *A Short History of British Medical Ethics*. Ockham Publishing.
- Mol, A. (1999). Ontological Politics: A Word and Some Questions. In J. Law and J. Hassard (Eds.) *Actor-Network Theory and After*, 74–89. Blackwell.
- Mol, A. (2002). *The Body Multiple: Ontology in Medical Practice*. Duke University Press.
- Morgan, L. M. (2009). *Icons of life: A cultural history of human embryos*. University of California Press.
- Muniesa, F. (2011). A flank movement in the understanding of valuation. *The Sociological Review*, 59(s2), 24–38. <https://doi.org/10.1111/j.1467-954X.2012.02056.x>
- National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. 1979. *The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research*. [Bethesda, Md.]: The Commission.
- Petchesky, R. P. (1987). Fetal images: The power of visual culture in the politics of reproduction," *Feminist Studies*, 13(2): 263–292.
- Pfeffer, N., and J. Kent (2007). Framing women, framing fetuses: How Britain regulates arrangements for the collection and use of aborted fetuses in stem cell research and therapies." *BioSocieties*, 2(4): 429–47.
- Pollner, M. (1975). "The Very Coinage of Your Brain": The Anatomy of Reality Disjunctures. *Philosophy of the Social Sciences*, 5(3), 411–30. <https://doi.org/10.1177/004839317500500304>
- Ramsey, M. (2021). *The Swedish abortion pill: Co-producing medical abortion and values, ca. 1965–1992*. PhD thesis. Uppsala University.
- Rothman, D. J. (1991). *Strangers at the bedside: A history of how law and bioethics transformed medical decision making*. BasicBooks.
- Saussure, F. de. (1916). *Course in General Linguistics*. Columbia University Press.
- Schoen, J. (2015). *Abortion after Roe*. The University of North Carolina Press.
- Stark, L. (2012). *Behind closed doors: IRBs and the making of ethical research*. University of Chicago Press.
- Svenska barn blir immuna i tre år. *Aftonbladet*, April 13, 1955.
- Thevenot, L. (2002). Which Road to Follow? The Moral Complexity of an "Equipped" Humanity. In A. Mol (Ed.), *Complexities* (pp. 53–87). Duke University Press. <https://doi.org/10.1215/9780822383550-003>
- Thompson, C. (2005). *Making Parents: The Ontological Choreography of Reproductive Technologies*. MIT Press.
- Tinnerholm Ljungberg, H. (2021). Regulating research: The origins and institutionalization of research ethics committees in Sweden. *European Journal for the History of Medicine and Health*, 78 (2): 267–286.
- Tinnerholm Ljungberg, H. (2024). The moral imperative of fetal research: Framing the scientific use of aborted fetuses in the 1960s and 1970s. In S. Jülich (Ed.) *Histories of fetal knowledge production in Sweden: Medicine, politics, and public controversy, 1530–2020* (pp. 238–59). Brill.
- Vogel, E., Moats, D., Woolgar, S., & Helgesson, C.-F. (2021). Thinking with Imposters: The Imposter as Analytic. In *The imposter as social theory: Thinking with gatecrashers, cheats and charlatans*. Bristol University Press. <http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-449933>
- Wadman, M. (2016). *The vaccine race: Science, politics, and the human costs of defeating disease*. Viking.
- Wilson, D. (2014). *The making of British bioethics*. Manchester University Press.