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Making babies: Routine ultrasound imaging and the cultural construction of the fetus in Montréal, Canada

Mitchell, Lisa Melyn, Ph.D.
Case Western Reserve University, 1993

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MAKING BABIES: ROUTINE ULTRASOUND IMAGING AND THE
CULTURAL CONSTRUCTION OF THE FETUS IN MONTRÉAL, CANADA

by

LISA MERYN MITCHELL

Submitted in partial fulfillment of the requirements
for the Degree of Doctor of Philosophy

Dissertation Advisor: Atwood D. Gaines, PhD, MPH, Associate Professor

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May 1993
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GRADUATE STUDIES

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MAKING BABIES: ROUTINE ULTRASOUND IMAGING AND THE CULTURAL CONSTRUCTION OF THE FETUS IN MONTRÉAL, CANADA

Abstract

by

LISA MERYN MITCHELL

In this dissertation I investigate how prenatal ultrasound images are interpreted as representations of fetal selves by sonographers and by pregnant women at one hospital in Montréal, Canada. In conventional studies, ultrasound is regarded as a neutral and passive technology, a window on to the fetus. In contrast, some critics of ultrasound argue that fetal imaging is a form of social control through which Biomedicine imposes a particular notion of fetal selfhood upon women. I critique both these approaches by focusing on the multifaceted process through which ultrasound fetal images become meaningful for sonographers and for women. Using the literature on ultrasound's technical development, routinization in obstetrical practice, and professional organization, I show how ultrasound echoes have come to be taken for granted as a window on to the fetus. I examine sonographers' interpretations of the ultrasound image for expectant parents and identify how notions of fetal selves (embodied, subjective, conscious, acting, and entailing certain rights and obligations) are central to this process of "showing the baby." I situate the sonographers' interpretations within their local institutional context and within current obstetrical beliefs about the fetus. Drawing from multiple interviews with pregnant women from before the first ultrasound to post-partum, I show how
women's accounts of the fetus reproduce cultural assumptions about nurturing, selfless mothers and active, conscious and sentient fetal selves. I suggest that ultrasound provides women with a means of particularizing and personalizing the fetus by assigning a physical appearance, gender, character and family resemblance. I conclude by arguing that the meaning which ultrasound images hold for women and the extent to which those images inform their behaviour toward the fetus is neither inherent in the technology nor created by sonographers' explanations of the image. Instead, ultrasound fetal images have transitory, complex, and often ambiguous meanings, temporary combinations of assumptions and emotions, structured by existing cultural idioms, institutional agendas, personal histories and relationships of power, dependence and authority.
The concept that the fetus may be a patient ... is alarmingly modern. The fetus could not be taken seriously as long as he remained a medical recluse in an opaque womb; and it was not until the last half of this century that the prying eye of the ultrasonogram rendered the once opaque womb transparent, stripping the veil of mystery from the dark inner sanctum, and letting the light of scientific observation fall on the shy and secretive fetus.

-- Harrison 1982:19

Far from being an inert passenger in a pregnant mother, the foetus is very much in command of the pregnancy. It is the foetus who guarantees the endocrine success of the pregnancy and induces all manner of changes in maternal physiology to make her a suitable host. It is the foetus who, singlehanded, solves the homograft problem. ... It is the foetus who determines the duration of pregnancy. It is the foetus who decides which way he will lie in pregnancy and which way he will present in labour.


We continue ultrasound screening in our unit, despite its marginal benefits, and believe that mother and physician expect ultrasound as essential in the antenatal care package.

-- Shafi et al. 1988:804

"Ultrasound  Sold as Baby's First Picture"

(Vancouver, Canada) Ultrasound videos of fetuses are being marketed as "family entertainment" by an ultrasound technician. At any stage in their pregnancies, expectant mothers pay Derek Kirkham, president of First Moments Video Productions, $49.95 to "capture baby's first pictures on video." The setting for the 10-minute shoot can be anywhere -- a hotel room or the customer's kitchen. Kirkham narrates and lets parents participate by talking to the baby, playing music or reading.

-- Toronto Star, January 12, 1993:C-1.
ACKNOWLEDGEMENTS

This dissertation was produced with the usual array of fits and starts and ups and downs which characterize the anthropological rite of passage to a PhD. To everyone who assisted, guided, and occasionally, dragged me through this rite — I offer my heartfelt thanks.

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A very special thank you to my son, Anand, whose insistence on the importance of play and laughter sustained me in immeasurable ways. Por ultimo, gracias para Héctor Saavedra: "iremos juntos por las aguas del tiempo" (Neruda). Este terminado es nuestro comienzo.

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CHAPTER ONE: INTRODUCTION

In this dissertation I investigate how prenatal ultrasound images are interpreted as representations of fetal selves by sonographers and by pregnant women at one hospital in Montréal, Québec. Ultrasound is conventionally understood as a neutral and passive technology, a "window" through which the viewer can observe the fetus. My approach to ultrasound images is different. I have studied ultrasound images, not as "windows" on to the fetus, but as historically and culturally specific objects with multiple and contingent meanings. In the dissertation I focus on the process through which ultrasound's patterns of echoes become culturally meaningful as selves. I examine the contexts of fetal imaging, including the history of this technology, obstetrical ideology about the fetus, the institutional context of fetal imaging, as well as, the emotional webs of belief and experience in which sonographers, women, men and the fetus are enmeshed. By restoring fetal images to the complex historical and social contexts in which those images are produced, interpreted and experienced, I am able to show how they become culturally meaningful as windows on fetal selves and how they may be a means of social control.
Both fetal selfhood and prenatal ultrasound imaging are controversial in Canada today. In the last ten years, ultrasound fetal imaging has become a routine prenatal procedure for the majority of Canadian women. The impact of this routinization on maternal and newborn health and on the meaning of pregnancy, motherhood and fetus are not clear. The question of fetal selfhood, of whether or not and at what point the fetus possesses consciousness, distinctively human potential, and is eligible for the rights which are guaranteed to other Canadians, has become a national political, legal and social issue. At present, the fetus is not legally a person and is not specifically included in the new Canadian Charter of Rights and Freedoms. Since 1989, a government appointed commission has been studying the use of reproductive technologies like ultrasound and trying to clarify the legal meaning of the "fetus."

In this chapter I describe the theoretical framework I use to study ultrasound fetal imaging and the discourse on fetal self in Montréal. I begin by problematizing the three main cultural constructs of this study -- selfhood, the fetus, and ultrasound images. I then introduce the broad social and historical context of those constructs in Canada and in Québec. The various approaches that have been used to study ultrasound and other forms of reproductive technology are then discussed. I conclude the chapter by suggesting how ultrasound fetal imaging may be usefully studied as a materialization of discursive knowledge about social relationships.
I. Deconstructing "Self" and "Fetus"

I.A. The Cultural Meaning of Selves

There is a longstanding tradition of anthropological interest in the self. Anthropologists have argued that ideas about the "self" vary greatly from culture to culture (Lee 1959; Marsella, DeVos and Hsu 1985; Geertz 1973; Kondo 1990; Rosaldo 1980; Schweder and Bourme 1982) and, over time, within cultures (Carrithers et al. 1985; Turner 1985). A wealth of research has shown how concepts of self, and social action based upon those concepts, are constituted differently among different categories of people. Gender (Kondo 1990), class (Bourdieu 1984), religion (Gaines 1982), ethnicity (Blu 1980), profession (Gaines 1990), illness (Kapferer 1979) and disability (Goffman 1963; Murphy 1990) have all been described as important determinants of how individuals comprehend their own selves and the bodies, actions, statements, and feelings of others.

Concepts of self are fundamental to the way in which humans experience, classify, and act in the world (Geertz 1983; Hallowell 1955; Gaines 1982). The relationships of self, physical and social environment, and social action are mutually determining and meaningfully interdependent, continually formed and reformed in ways that have a social and historical specificity within each culture.

There is, within the anthropological and philosophical literature some debate about the nature of selfhood in the West. As in the following
passage, the Western self is conventionally described as

a bounded, unique, more or less integrated motivational and cognitive universe, a dynamic center of awareness, emotional, judgement, and action organized into a distinctive whole and set contrastively both against other such wholes and against its social and natural background Geertz (1983:59).

Shweder and Bourne (1982) argue that the Western self reflects the cultural emphasis placed on the autonomous individual, one who is free, or perceived to be free, from the ties of social relationships. Johnson (1985:113,126) adds that the Western self is analytic (e.g., there is a clear separation of self and other, self and context), monotheistic (e.g., identity and emotion are bipolar, either right or wrong, normal or abnormal, etc.), and rationalistic (that "which cannot be rationally deduced or explained ... [is] irrational or eccentric".

Gaines (1982; 1985) has challenged the assumption that there is one Western self. For Gaines, religion is an important determinant of world view and social organization, and, hence of notions of self. He also emphasizes that "the West" refers not to one culture but to several (Gaines 1993). Gaines has discussed two broad cultural traditions in the West, each with "distinct conceptions of the person implicit in them" (Gaines 1982: 178). Geertz' (1983) definition of the Western self and the characteristics elaborated by Shweder and Bourne (1982) and Johnson (1985) are what Gaines (1985: 231) describes as the "referential person." He also uses the term "Northern European/Germanic Protestant" signifying that this tradition
of self "emphasizes Protestantism (Lutheranism, Calvinism, Methodism, Presbyterianism) as well as pre-existing Germanic cultural notions" (Gaines 1993).

Another dominant view in the geographic area known as the West is the Mediterranean, or indexical self, expressed in versions of the Latin (Catholic), Orthodox, and Islamic traditions (Gaines 1993).

The Latin, "indexical" self is not defined as an abstract entity independent of the social relations and contexts in which the self is presented in interaction (Gaines 1982:182).

The indexical self does not objectify or externalize reality, rather self and reality are co-mingled, such that self and other are not mutually exclusive. There is no inner and outer self, no self distinct from social role, no mask covering and inner true self. For the indexical self, experiences and judgements are contextual, not given. Not all action nor all of the environment is controllable by the indexical self. Nor is the non-material or spiritual world modelled on the material world or seen as any less rational or problematic because of that difference.

Although Gaines began his analyses within a European context, he has shown that his conceptualization of selfhood can be usefully applied elsewhere in the "West" (1982,1992). For example, the referential self appears among North American WASPS (White anglo-saxon Protestants) and in the practice of biomedicine, or at least, among some American psychiatrists (Gaines 1982). (In his 1985 paper on Fundamentalist and
Evangelical Christian psychiatrists, Gaines points out the indexical nature of their notion of personhood.) In the referential self of biomedicine, the individual is understood through the discovery of traits in the physical world (genes, discrete physiological or psychological symptoms, etc.) with little reference to social or spiritual relationships.

Nor is the indexical self, constituted through relationships with others, restricted to either Catholicism or to the Mediterranean. There are historical and ideological links between the religious traditions of Catholicism, Judaism, and Islam and similar patterns of social organization throughout the Mediterranean and Middle East. These religions share a magical or "enchanted world view" (Erickson 1976 in Gaines 1982:179), such that selves are not contrasted with some external world, but constructed through the multiple worlds of nature, society, and spirit. As Gaines (1982:180) elaborates, shared patterns of social organization, such as familialism, flexible bilaterally reckoned descent, and "embedded social networks (where's one's neighbors, friends, work-mates and relatives tend to be the same people)" configure the self to exist only through personal histories and relationships of these world.

Kondo (1990) has recently criticised anthropological studies of the self, arguing they have tended to describe non-Western selves in culture-bound terms. Following Mauss (1938, reprinted in Carrithers, Collins, and Lukes 1985), anthropologists have often distinguished between the inner or
true "self" — emotionally and psychologically constituted — and the outer or social "person" — the mask or social roles that each individual presents to the other. Kondo (1990:34) reminds us that this distinction is a "recapitulation" of the cultural assumption that the self is distinct and separated from society. Kondo's critique and her ethnography of Japanese workers provides an essential corrective to anthropological studies of selfhood. She makes several particularly instructive points.

First, Kondo (1990:37) provides examples of how anthropological "narrative conventions" reinscribe assumptions based on the Western self. She writes,

In the anthropological literature, the conventional assumptions of the presence and unity of "the self" and the use of the self/society binary as a foundational point of departure are reinscribed through rhetorical strategies which emphasize referential meaning, decontextualized examples, and totalizing narrative closure. ... The invocation of "culture and self," "a concept of self," or a "notion of person" links up with static, essentialized global traits where selves can be discussed as a category quite separable from power relations. Typically, these traits are smoothly assembled into a portrait of the "self" in a particular culture. This "self" is almost never contradictory or multiple, and traits of the "self" are held to be equally characteristic of all members of a society (Kondo 1990:36-37, author's emphasis).

Second, continuing her argument, Kondo (1990:43, author's emphasis) suggests anthropologists should be asking how selves in the plural are constructed variously in various situations, how these constructions can be complicated and enlivened by multiplicity and ambiguity, and how they shape, and are shaped by, relationships of power.

To do that, we must pay attention to "the practices creating selves in
concrete situations, [and] ... to the larger historical and institutional processes shaping those selves" (Kondo 1990:42).

Medical and women's representations of fetal selves provide an excellent domain in which to investigate the nature of selves in Western cultures. Although all selves are cultural and social creations, this is perhaps most obvious for the fetus, since the fetal self can only be apprehended through conversations with the other (pregnant women, sonographers). The fetal self is a self constructed by others. That fact alone directs the anthropological gaze to the potential for multiple constructions of the fetus and to the relationships of power in which those constructions are formed.

Prior to explaining how I examine selfhood in this dissertation, I summarize the anthropological literature on the fetal self.

I.B. Deconstructing the Fetus

In large part, this dissertation is concerned with deconstructing what is meant by the term "fetus." Here I want to clarify how I use the term and to draw attention to the cultural specificity of what is meant by the fetus. Historical changes in the medical meaning of the "fetus" are elaborated in Chapter Three.

By fetus, I refer to the stage of human beings prior to birth. My reading of the cross-cultural literature prompted me to define the term in this
way to avoid two cultural assumptions: 1) that prior to birth the fetus is human and 2) that the fetus begins in the womb. The outcome of a Bariba woman's pregnancy is not necessarily human, but may be a witch (Sargent 1982). Premature infants are not regarded by Australian aborigines as young humans, but the offspring of some animal (Montague cited in Morgan 1989:100). Sri Lankan Hindu Tamils believe that the fetus starts out in the father's brain (McGilvary 1982). In referring to fetuses simply as the stage of human beings prior to birth, I differ from conventional biomedical definitions which distinguish the "fetus," that is, "the child in utero from the third month to birth" from the "embryo," or the human from conception to the third gestational month (Taber's Cyclopedic Medical Dictionary 1981).

There are many ethnographic articles and monographs describing cultural variations in beliefs about pregnancy (e.g., Newton 1967; MacCormack 1982), childbirth practices (e.g., Jeffery et al. 1988; Jordan 1980; Sargent 1982, 1989; Lademan 1983), contraception and abortion (e.g., Devereux 1976; Newman 1985). Ethnographic studies of beliefs about conception, fetal development and the social status of the fetus are rarer. LaFleur's (1992) work on Buddhist mizuka or "water babies" who exist in a realm between heaven and earth is an excellent study of Japanese beliefs about the fetus and abortion. Morgan's (1989) review provides the first systematic cross-cultural examination of the question, "When does personhood begin?"
After reviewing the ethnographic literature and Human Area Relations
Files, Morgan concludes there are "two culturally-constructed concepts used
widely to divide the human life cycle continuum at its earliest stages:
human-ness and personhood" (Morgan 1989:99). Although people in
Western societies may assume a priori that human pregnancy will produce a
human infant, in some cultures "the decision to call a fetus 'human' is not
made until biological birth when the newborn's physical attributes can be
assessed (Morgan 1989:99). For example, among the Bariba of Benin, the
fetus born at eight months is not even human — it is an abnormal creature,
whose body has reverted to blood, with no form (Sargent 1982:39).

"Personhood," as defined by Morgan (1989:99), refers to "a socially
recognized moral status" based on shared cultural meanings. There are no
characteristics of personhood which apply universally either to all cultures or
to all stages of the human life cycle. Morgan gives a variety of examples:
In Java "small children, boors, simpletons, the insane and the flagrantly
immoral are said to be ndurung kjawa, 'not yet Javanese' and hence, not yet
persons" (Geertz cited in Morgan 1989:105). An Ashanti newborn is not
immediately assumed to be a person; it may be a wandering ghost. The
newborn who survives past eight days is ritually initiated into the world of
Ashanti persons, but complete personhood is not ascribed until past puberty
(Rattray in Morgan 1989: 107,111). Thus in many societies, the event of
childbirth and the recognition of human physical attributes in the newborn do
not confer the social status of personhood.

In contrast, for many people in Canada and the United States, the categories "human" and "person" are not distinct, but are interchangeable, or at least, overlapping. It is customary to refer to the fetus as the "unborn child" or even the "baby". In some American states, birth certificates are issued and burials held for fetuses weighing more than the 500 grams, but not for those under 500 grams (Whitbeck in Morgan 1989:102). Until recently, people in Western industrialized societies situated the social arrival of a new person at the biological event of birth (Minturn 1989; Morgan 1989). Morgan (1989:102) writes:

Biological birth was the major moral dividing line along the life cycle continuum: every individual who had passed the line was granted the rights and social status of persons, while every individual shy of the line was not. Biological and social birth were inextricably intertwined in legal and medical institutions as well as in popular consciousness. This has changed only recently.

The semantic overlap of these linguistic and social terms -- "human" and "person," the emotional rhetoric of the abortion debate, religious and scientific discourses on "when life begins," criteria like "viability" and medical practices, such as ultrasound, have fundamentally destabilized the social status of the fetus.

I.C. A Conceptual Framework for Studying Fetal Selves

In this section I describe the conceptual dimensions I use to study
fetal selves. I do not present these dimensions as essential traits of self which will be found cross-culturally. Nor do I present them as somehow typical of the cultures of late 20th Century urban North America. Rather they provide starting points with which to study how fetal images are interpreted in Montréal.

I want to emphasize that I am not following a conventional anthropological approach which begins with a distinction between subject and object and continues with distinctions such as self-other, self-person, and self-society. I use the idea of dimensions of self in order to avoid these binary distinctions. I open the realm of theoretical discourse in another direction. I explore the theoretical possibilities provided by selves within selves (fetuses within women) and selves within machines (ultrasound images of the fetus and the woman). This notion of fluid and inconstant selves derives from the unique study of pregnant women (others within selves; persons or unpersons within selves) and ultrasound imaging (other [fetus] and self [women] within machines). My approach draws upon the writings of Kondo (1990) and Gaines (1982, 1992, 1993) and underscores that the distinction between self and person is variable and inconstant, unlike the characterization which reinscribes western notions of the autonomous self, distinct from other persons. It should be noted here that Gaines' notion of indexical self includes both self and other, since "others, especially relatives, are key aspects of the Mediterranean self" (1993).
In contemporary North American society, conceptions of fetal self may be constituted along four dimensions. One, there may be a social or moral dimension, in which people talk about self in terms of culturally specific identities (e.g., "mother", "doctor", "fetus") each associated with sets of rights and obligations, although these identities are not necessarily mutually exclusive. Two, there may be a physical dimension (e.g., the brain, the body) in which people locate the self in time and space, including some definition of the self's onset and extinction. Three, there may be a subjective dimension. This is usually described in terms of consciousness and self-consciousness (e.g., the self's awareness of its surroundings, its varying distinctiveness from other selves, and its capacity for experiencing certain feelings). Four, there may be a dimension of distinctive propensities and potentialities, usually labelled in the West as "human nature" and referring to the ability of humans to acquire elements of cultural competence such as language, a moral sense, or a role as a "productive" member of society). Self is constituted through all four dimensions. As people's ideas about one dimension change over time, so too does their overall conception of self.

In Canada and the United States, the issue of whether or not the

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1. This framework for studying the fetal self is based upon conversations with my dissertation supervisors, Allan Young and Atwood Gaines, and my reading of the literature on the self, especially fetal selves (e.g., Petchesky (1990)).
fetus is a self is an intrinsic part of the debate over abortion, since moral objections to extinguishing non-selves are generally weak while the act of extinguishing selves is generally regarded as being equivalent to murder. Many Canadians and Americans see the onset of subjectivity (dimension 3) and therefore of selfhood as beginning at birth and ending either at death or with the irreversible loss of critical mental functions. At the same time, however, various interest groups, notably anti-abortion movements, argue along a social-moral dimension and a dimension of human potentiality that selfhood begins with the fetus or at conception (Petchesky 1990 1984]).

The human individual comes into existence first as a minute informational speck, drawn at random from many other minute informational specks his parents possessed out of the common gene pool. ... Thus it can be said that the individual is whoever he is going to become from the moment of impregnation. Thereafter, his subsequent development may be described as a process of becoming the one he already is (Protestant anti-abortion theologian, Paul Ramsey quoted in Petchesky 1990:338).

In arguing their position, anti-abortion groups have sought to strengthen their claims by finding evidence of selfhood along the dimension of fetal subjectivity. That is, they want to demonstrate that the fetus is capable of experiencing pain at a very early stage of neural development (Petchesky 1987).²

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². Perhaps the best known example of an attempt to demonstrate fetal subjectivity is the 1984 film The Silent Scream produced by Dr. Bernard Nathanson and the National Right-to-Life Committee. The Silent Scream claims to show, through real-time ultrasound imaging, the "pain" and "fear" of a twelve-week old fetus being aborted. The film is discussed in Petchesky
In North America, abortion is the most public and politicized field in which there is a controversy over the nature of the fetus and fetal selfhood. The controversy also exists concerning the use of new reproductive technologies (including, in vitro fertilization, embryo freezing, sex pre-selection, prenatal genetic testing), the fetus' rights to medical treatment, the legal admissibility of prenatal abuse or "fetocide," and the nature of maternal-fetal bonding.

Arguments over the nature of the fetus and the limits of the self take a variety of forms. One is the moral argument based on interpretations of sacred texts; the position taken by the Roman Catholic Church. However, the arguments which are widely regarded by urban North Americans as the most compelling are those based on scientific evidence (Turner 1985, 1987). Scientific arguments are also the most likely to influence legal decisions and legislation. For many North Americans, the ability to provide evidence of either fetal consciousness, that is, awareness of surroundings or perception of pain, or the potential of the fetus to become a self (dimensions 3 and 4) is the most critical issue. But where purely moral arguments can claim that the fetus is conscious and therefore possesses selfhood and is entitled to certain human rights, medical science is widely perceived to have the symbolic resources, technological means, and authority to demonstrate (1987).
whether these claims are valid or invalid.

Medical scientific discourses about the body and self are especially powerful for two reasons. First, by convention, they redescribe social facts (e.g., culturally specific notions of pregnancy and disability) as facts of nature, as free from human or social interference (Turner 1987). These "naturalized" social facts also include relations among persons and groups, as in scientific representations of the mother-infant/fetus bond (Eyres 1992). The process of naturalizing social facts includes their materialization in the apparatus, statements and practices of medicine. Second, the content and form of discursive knowledge are determined by technical, social, and cultural factors such that facts (what is held to be true) are unequally distributed among patients and among medical and scientific personnel (Martin 1987; Treichler 1990; Turner 1985; Young 1981). Medical control over the content of and access to these facts imbues these discourses of the body and the self with power.

Medical science has a repertoire of techniques and apparatuses which routinely produce evidence (facts) about fetal and pre-fetal existences. One of the most widely used of these techniques today is ultrasound imaging of the fetus. In much of Canada it is a routine prenatal procedure. As I discuss in the next section, what ultrasound images convey about the fetus and fetal selves is ambiguous and subject to multiple interpretations.
II. Ultrasound Fetal Imaging

II.A. Ultrasound Images

Ultrasound is one of the more recent types of technology used to manage human reproduction. In contrast to forceps, labour-inducing drugs, and abortions, however, ultrasound fetal imaging may be further classified as a kind of prenatal diagnostic technology. Lippman describes prenatal diagnosis as "all the methods and techniques that can be used to obtain information about a fetus during pregnancy" (1989:182).

Three main types of ultrasound are used in obstetrics: (1) Doppler ultrasound, used for listening to the fetal heart rate\(^3\); (2) static or pulsed ultrasound which produces a two-dimensional image of the fetus (now rarely used in North America); and (3) "real-time" imaging (American College of Obstetricians and Gynecologists 1981). Real-time imaging is the newest and, in Canadian obstetrics, the most widely used type of ultrasound imaging. During real-time ultrasound examinations, high energy sound waves are projected into the uterus from a transducer or probe applied to the pregnant woman's abdomen or inserted into her vagina. The reflection of these waves is converted into a picture of the uterus, placenta, and

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3. The term 'Doppler ultrasound' or 'Doppler studies' is also used to describe a recently developed means of visualizing cardiac and umbilical blood flow in the fetus. This form of 'Doppler ultrasound' is used in conjunction with real-time scanning and is now available in colour (Neilson and Grant 1989).
moving fetus which appears on a television-like screen. In this dissertation I
describe and analyze real-time imaging of the fetus as it is used in the
obstetrical department at the Metropolitan Hospital* in Montréal.

Real-time ultrasound imaging is regarded by many physicians as "the
most important antepartum diagnostic technique available" (Gabbe 1988:1).
Ultrasound is popular because it provides information about the fetus which
is considered to improve physicians' ability to provide prenatal care, to
detect abnormal fetuses, and to prepare for problematic deliveries. In
particular, ultrasound provides information about fetal age, number, growth,
position, and sex, certain fetal abnormalities and placental conditions and
whether or not the fetal heart is beating (Graham 1983; Pretorius and
Mahony 1990). Proponents of ultrasound argue that much of this
information is not as easily, as safely or as reliably available from other
techniques of fetal screening, including history taking, manual examination,
listening to the fetal heart, or amniocentesis.

Real-time ultrasound is described as the only "non-invasive" fetal
screening technique which allows physicians and clients to see the fetus as
they would in a "motion picture" (American College of Obstetricians and

[It is] a window of unsurpassed clarity into the gravid uterus. Over

* Metropolitan Hospital is a pseudonym for the hospital where I conducted this
fieldwork.
the past 10 years, high-resolution real-time ultrasound has undeniably become the most prevalent and accurate means of obstetrical imaging, capable of providing exquisite detail regarding the fetus and the intrauterine environment (Pretorius and Mahony 1990:1).

Although ultrasound is often described as a "window," ultrasound images are, in appearance, ambiguous and need to be interpreted in at least two ways. First, the fetal image appears on the ultrasound monitor as indistinct light and dark areas of grey. Ultrasound technicians and physicians need special training to see these grey areas as a pattern of "landmarks", distinctive uterine and fetal structures which are used to assess fetal physical development (selfhood dimension 2). Several studies have noted that most expectant couples have difficulty recognizing the fetal image in ultrasound without the assistance of physicians or ultrasound technicians who point out fetal shape, anatomy, and movement (Kohn et al. 1980; Villeneuve et al. 1988). In one Montréal study pregnant women and their spouses were asked to complete a questionnaire after their ultrasound at 16-20 weeks and at 30 weeks (Villeneuve et al. 1988). The majority of women (65%) and their spouses indicated that they "either did not see the image clearly or did not understand it" (Villeneuve et al. 1988:532). Nonetheless, the majority of women, particularly women seeing their first ultrasound, described the experience as positive and as reassuring (Villeneuve et al. 1988:533).

Second, whether or not ultrasound provides facts about fetal
selfhood, the nature of those facts, how those facts are represented, and their significance are also a matter of interpretation. The ability to see fetal parts even at 8 weeks post-conception (especially the beating heart) and, later, to see the fetus sucking its thumb, kicking, excreting, and responding to external stimuli demonstrates to many people that the fetus is aware of its surroundings and possesses or has the potential for distinctive human consciousness and selfhood. Anatomical parts (especially, genitals, fingers, the beating heart) may be interpreted to mean that the fetus has reached a stage of physical development which is associated with selfhood (dimension 2) or has the potential to do so (dimension 4).

Interpretations of ultrasound imaging also provide a social or moral dimension to fetal selfhood. Real-time ultrasound is thought to stimulate parents’ emotional attachment or "bond" to the fetus, thereby enhancing parental feelings of obligation toward the fetus (Dewsbury 1980; Lerum and LoBiondo-Wood 1989). Some physicians suggest that parental viewing of the fetus through ultrasound may be a means of increasing women's compliance with prenatal care recommendations about food, cigarette, alcohol or drug intake (Bralow 1983:114; Reading et al. 1982). Parents, however, may interpret the ultrasound image in which fetal anomalies are detected to mean that their fetus does not have the potential to become a fully human self and thus do not feel morally obligated to carry that fetus to term. On the other hand, anti-abortion proponents use the same evidence
to argue that all fetuses, regardless of development stage or abnormality, have the right to life, to fulfill their distinctive potential as humans and that this right entails certain obligations on the part of parents and physicians to nurture and protect the fetus.

Clinical, pro-choice, and anti-abortion facts start from the same technology, but reach three different interpretations regarding fetal selfhood. In clinical practice, ultrasound's fetal images are presented as observations of natural processes which allow physicians to differentiate the onset and existence of fetal selfhood (by stage and normality of physical development) in order to make decisions about abortion or prenatal care. Within the anti-abortion movement, fetal images are presented as proof that all fetuses are persons entitled to full protection of rights to life under the Canadian Constitution. Pro-choice groups argue that decisions about the onset, existence, and implications of fetal selfhood are part of a pregnant woman's right to self-determination over her own body (Hubbard 1983; Petchesky 1990). In concert with that perspective, pro-choice groups have been generally critical of ultrasound fetal images, arguing that they are used by anti-abortion groups to manipulate emotions, focus attention on the fetus, and obscure the link between fetus and woman. In sum, ultrasound is perceived to be a "window" and it is a "window" through which different groups see different objects.

Ultrasound is conventionally understood as a neutral and passive
technology, a “window” through which the viewer can glimpse the fetus. Thus the ambiguity of ultrasound images is described as a technical problem to be overcome by improving the quality of the image or by learning certain skills of observation. I have studied ultrasound in a different way: as an historically and socially variable way of conceptualizing cultural notions of self and social relationships. Ultrasound images are ambiguous because the assumptions and ideas about the fetus, particularly about the fetal self, through which we interpret those images are themselves often indefinite and indeterminate. The ambiguity of ultrasound images means that they are susceptible to multiple interpretations and thus the facts which ultrasound may produce about the fetus are also variable.

II.B. The Routinization of Ultrasound Fetal Imaging

The first use of ultrasound fetal imaging was in Scotland during the late 1950s (Donald et al. 1958). Since then ultrasound imaging has rapidly become a routine part of prenatal care in many developed nations, including Canada. Despite insufficient data on national utilization patterns and rates, Canadian ultrasound use can be situated in a general international context.

In a 1981 World Health Organization survey, only 3 of 24 European countries reported routine ultrasound screening (W.H.O. 1985:17). In 19 other nations, ultrasounds were done selectively, that is, in conjunction with techniques of fetal genetic diagnosis such as amniocentesis, when a fetal
anomaly is suspected, or when the cause of specific conditions (e.g. bleeding during pregnancy) cannot be determined by other means. By 1988 a survey of prenatal screening in nine European nations found that 83% of ultrasound units surveyed "routinely perform ultrasound imaging irrespective of obstetrical risk" (Heringa and Huisjes 1988). Two or three ultrasounds are now routine in many European nations and in urban Australia (Blondel et al. 1989; Blondel 1986; Brown and Lumley 1989 in Lumley 1990:217).

Estimates on the use of ultrasound fetal imaging in the United States suggest a similar pattern of increasing use. In 1983, the Food and Drug Administration estimated that "[r]oughly a third of the women pregnant each year receive at least one — and likely more than one — ultrasound examination" (Thompson 1983:9). In 1984, the National Institutes of Health (1984:236) estimated that 15% to 40% of American women have at least one ultrasound during pregnancy. By the late 1980s, estimates extrapolated from regional surveys indicate "ultrasound is used at least once after 16 weeks gestation in approximately 70% of pregnancies" (Horger and Tsai 1989:618). There are some indications that ultrasound screening may be less commonly used among rural women and poor women in the United States (Nsiah-Jefferson and Hall 1989).

Although the Society of Obstetricians and Gynaecologists of Canada do not recommend routine ultrasounds, most Canadian women do have ultrasound fetal imaging during their pregnancy (Muggah 1984). In Québec,
approximately 90% of all pregnant women undergo at least one ultrasound (Teasdale 1985). Despite the existence of a publicly funded universal medical system in Canada, the use of routine ultrasound is not uniform throughout the country. Some variation in utilization reflects the uneven distribution of resources so that routine ultrasounds tend to be more common in urban rather than remote areas where selective scanning is the norm. While most ultrasound imaging in Canada is done in hospitals through medical insurance, there are a growing number of fee for service ultrasounds done in private clinics or physician's offices.

There are additional factors that account for variation in the use of routine obstetrical ultrasounds in Canada. With provincial jurisdiction over health care budgets there is provincial variation in the both number of routine scans and the reimbursement for which a physician can bill. There is also considerable variation in routine scanning policies and traditions of obstetrical practice among hospitals and between departments, for example, radiology or obstetrics.

The reasons for the routinization of ultrasound imaging in Canada and elsewhere are not clearly linked to improvements in maternal or neonatal health. Although the technique is widely used in clinical practice and is assumed to improve obstetrical care, studies have not consistently demonstrated that the routine use of ultrasound in early or late pregnancy improves either maternal or fetal outcome (National Institutes of Health
1984; Neilson and Grant 1989). For example, some randomised controlled trials found routine ultrasounds associated with lower rates of labour induction and higher infant birthweights (Waldenstrom et al. 1988; Eik-Nes et al. 1984) and reduced perinatal mortality (Saari-Kemppainen et al. 1990) In some other studies, no benefit to routine prenatal scans have been found (Bennett et al. 1982; Neilson et al. 1984; Bakketeig et al. 1984). Nor has research demonstrated that ultrasound is safe; rather, a "lack of risk has been assumed because no adverse effects have been demonstrated clearly in humans" (National Institutes of Health 1984:1). Concern about ultrasound's safety derive from some in vitro and animal studies indicating that ultrasound's non-ionizing radiation causes cellular and chromosomal damage (Bolsen 1982; Stratmeyer and Christman 1983) and because there is no agreed upon method of quantifying ultrasound exposure (Gonzalez 1984; Neilson and Grant 1989).

Despite the fact that research has not yet shown obstetrical ultrasound imaging to be safe or cost-effective, its use is covered by each of the provincial health insurance plans in Canada. Further, although a woman's consent must be obtained for fetal genetic screening, physicians do not have to request a woman's consent for ultrasound. One critic thus refers to ultrasound as "the first non-voluntary application of prenatal diagnosis" (Lippman 1986:442).
III. The Canadian and Québec Contexts

Like every distinctive feature of social life, the routinization of ultrasound and its interpretations of fetal selfhood exists in an historical and cultural context. In Canada, three important factors characterize this context. In discussing these factors I draw attention to their relevance in Québec, the Canadian province in which I carried out the fieldwork.

III.A. Changes in Conventional Notions of Selfhood

The past two decades have witnessed significant changes in Canadian society. Some of these changes have transformed conventional notions of selfhood and social identity. Throughout Canada many groups have sought legal and social recognition of their collective identity defined in terms of cultural distinctiveness, language rights, and among aboriginal peoples, land claims. Canadians have also lobbied along civil libertarian lines for individual rights, including the rights of women, homosexuals, the disabled and the fetus. In 1982 some of these changes were formalized in Canada’s Charter of Rights and Freedoms. The Charter entrenches legal rights “to life, liberty and the security of the person” and rights guaranteeing equality. Under the Charter there is protection of the law “without discrimination based upon race, national or ethnic origin, colour, religion, sex, age or mental or physical disability” (Government of Canada 1987).

However, the Charter does not deal specifically with two fundamental
issues of selfhood in Canada. Importantly, the Charter leaves unstated whether these rights extend to the fetus. The question of fetal rights in Canada has been largely an issue of maternal versus fetal rights in cases of abortion. Equally significant for this study is the issue of Québec's status within Canada. The Charter does not specify that the predominantly French-speaking province of Québec is a distinct society. For this reason Québec’s premier chose not to sign the federal Charter and attempts in 1990 and 1992 to draft a Constitution including Québec have failed. Today, the collective conception of selfhood among Francophone Canadians, nearly one-quarter of the country's population (Statistics Canada 1987a:v), is increasingly voiced in the language of Québécois national independence.

III.B. Fetal Rights and the Abortion Issue

Among the different interpretations of selfhood which exist in Canada, one is central to the activities and philosophies of the widely publicized anti-abortion groups, such as Campagne Québec Vie and Operation Rescue Canada. Anti-abortion groups in Canada argue that the onset of self occurs at the moment of conception. In this argument conventional medical and scientific distinctions between fertilized ovum, embryo and fetus are collapsed. Anti-abortion proponents want to transform public opinion about the fetal self in order to have constitutional rights extended to all embryos and fetuses, thus reinstating abortion as a crime. In attempting to legislate
its view of fetal selfhood, anti-abortion groups have made extensive use of ultrasound fetal images in newspapers, billboards, demonstrations and films. These images are used as "evidence" that the fetus possesses consciousness and a distinctly human nature.

In 1969 abortions were decriminalized in Canada. Even so, the 1969 law restricted abortions to a limited number of hospitals and each abortion request was subject to hospital approval which could be granted only if pregnancy endangered "the woman's life or health" (Persky 1988:5). In January 1988 the Supreme Court of Canada ruled that this law "violated a woman's constitutional guarantee to life, liberty and security of the person" (Tedesco 1988:10). Three years later, both Houses of the Canadian Parliament failed to support a government bill to recriminalize abortion. Canada remains without an abortion law.

The cultural contests over the meaning of the fetus and abortion have been distinctive in Québec. The majority (87%) of Québécois continue to define themselves as Catholics (Latouche 1985:1518) and the Vatican continues to be strongly anti-abortion. However, anti-abortion groups in Québec are poorly organized, less active, and receive less organizational or financial support from the Catholic Church (Collins 1985:42). In fact, pro-life demonstrations in Québec are sometimes composed mainly of people from outside the province, either from Ontario or from the United States (CBC Radio, 26 May 1989). Even more telling perhaps is that the ratio of
abortions to live births in Québec (20 per 100 live births) is higher here than the national average (17.2 per 100 live births), although not the highest among the provinces (The Gazette June 14, 1990, p. A15). While Québec health insurance will pay only for in-hospital abortions (Lamey 1991:A4), the wide availability of abortions in hospitals, community clinics, and in private clinics in the province suggests that access to abortion in Québec is "the easiest" in Canada (Priegert 1989:A6). Furthermore, a Canadian poll found that support for a woman’s right to abortion even if her partner was opposed to the abortion was greatest in Québec (67% in Québec, 62% in British Colombia, 55% in Ontario, 51% in the Prairies, and 38% in the Atlantic provinces) (La Presse, 24 août, 1989a).

While the Canadian government and the Supreme Court of Canada resisted clarifying the legal status of the fetus, Québec courts took the initiative. During the summer of 1989, three upper level courts in Québec ruled that under the Québec Charter of Rights and Freedoms an unborn child is entitled to the same guarantees as other human beings (Moore 1989:A1). A short time later, the Canadian Supreme Court overturned the Québec decisions (Paquin 1989:A1). In 1991 the Supreme Court of Canada decided unanimously that a fetus is not a person under the Criminal Code (Bindman 1991). The Court has not yet ruled, however, on the status of the fetus under the Canadian Charter of Rights and Freedoms (The Gazette, March 22, 1991:A1-A2).
In 1989 the Canadian government established a Royal Commission on New Reproductive Technologies partly in response to the constitutional debate over abortion rights and fetal selfhood. The mandate of the commission includes the obligation to examine the "social, ethical, health, research, legal and economic implications [of those] procedures or techniques which focus on the embryo or fetus ... [including] ultrasound ..." (Royal Commission on New Reproductive Technologies 1990: 3,5).

Although the Commission's findings have not yet been released, many of the submissions made at its public hearings in 1990 and the objectives of its Research Program specifically concern (1) defining the terms "fetus" and "embryo", (2) clarifying the status and rights of fetuses and embryos, and (3) outlining the status and rights of the men and women who use, administer or develop reproductive technologies (Royal Commission on New Reproductive Technologies 1990;1991).

III.C. Changes in Canadian and Québécois Identity

The provision and use of fetal imaging must be understood within the context of historical and contemporary relations among Canada's many cultural groups. Particularly important to this research are the relations between French- and English-speaking Canadians. Historically, language has been an important determinant of ethnicity in Canada: 61% of Canadians are native English speakers, 24% are French-speakers and 11%
have a different native language (Statistics Canada 1987a:v). Although it was once a French colony, following 1759, Canada was built upon a British model of society and "being Canadian" has historically meant being an English-speaker (Breton 1987). Resistance to these sources of identity have been particularly strong in Québec, where about 83% of the population are French speakers and about 10% are native English speakers (Bourbeau 1989:15).

During the second half of the twentieth century, two important and inter-related social transformations occurred in Québec. One was the rise of nationalism, the other was the attenuation of the Roman Catholic Church’s authority "to protect and differentiate" the collective identity of French-speaking Canadians (Trofimenkoff 1983:276). Until the 1960s, the Catholic Church was the most influential social institution and predominant source of cultural identity in Québec:

[The Church's] very presence as much as its power in schools, colleges, and universities, in unions and youth groups, among the poor, the old and the orphaned gave the distinguishing mark to French Canada (Trofimenkoff 1983:276).

The legitimacy for francophones in Québec of the two traditional sources of power and identity – the Roman Catholic Church and Anglo-Canada – underwent its strongest challenge during Québec's Quiet Revolution of the 1960s. In the subsequent years of rapid modernization and marked decline in the influence of the Roman Catholic Church, Québec
governments have adopted an increasingly protectionist attitude towards the French language and towards the rights and opportunities of French speakers. To that end, francophone provincial governments have taken control of the cultural character of Québec's public institutions (e.g. governmental, legal, educational, and medical). By the mid-1980s, Québec's economy and society were managed by French-speakers. Importantly, "the collective self-conception changed from French-Canadians -- a minority situation -- to Québécois" (Breton 1987:56) congruent with Québec's aspirations to be recognized as a distinct nation within Canada (Eliot 1983).

III.D. The Context of Fetal Imaging in Québec

The changes in Canadian and Québécois collective identity during the past twenty years have affected the social, institutional and cultural context of ultrasound fetal imaging in Québec. I have already noted the Catholic Church's relatively low profile in the debate over abortion in Québec. Two additional factors are of particular interest to this study: (1) the secularization of health care in Québec, including hospitals where fetal imaging is provided, and (2) demographic changes and increasing cultural diversity in the context of Québec nationalism.
III.D.1. Health Care in Québec

Prior to the 1960s, health care in Québec was administered according to the initiatives of the Catholic Church and other private sector groups (Renaud 1981:371). As part of its ideology of "preserving and promoting" the distinctive character of Québec society, the provincial government transformed both the cultural character and the organization and control of its health care system during the 1960s and 1970s. Québec instituted bureaucratic rationalization, tighter controls over hospital utilization and spending, and universal medical insurance throughout the province (Renaud 1981; Rodwin 1984). What has made Québec’s health care system distinctive among other provinces is its attempt to implement a notion of social medicine, including increased participation of the public in health care, greater equality among health care professionals, and an emphasis on community-level care based on medical care, social services and public health programmes (Rodwin 1984:122).

The shift away from hospital-based care to primary care and prevention at the community-level incurred major changes in the administration of Québec hospitals. The vast majority of hospitals became public institutions administered by hospital boards composed of medical, public, and community services representatives (Renaud 1981). Many hospital services, including pediatric, neonatal and obstetric services, were re-organized and centralized during the early 1970s and are now available
only at certain hospitals.

Hospital financing has also changed dramatically in the past 20 years. Québec government expenditure on hospital operating costs and medical equipment and technology is now the lowest among the ten Canadian provinces (Gagnon 1991: B3; Heinrich 1991b: B4). Government constraints on payments to hospitals have led hospitals to turn to additional sources of funding, including private donors, and facilities and equipment grants. Requests for funds for ultrasound equipment are not uncommon in hospital newsletters. With outpatient services, such as ultrasound fetal imaging, hospitals can bill directly to the Québec Health Insurance Board (le Regie de l’Assurance Maladie du Québec) thereby securing additional funds for medical services (Rodwin 1984: 135).

Recent reforms in health care legislation have dealt with the issue of language in the provision of services. Although these reforms apply throughout Québec their effect is most dramatic in Montréal since this is where the majority of Québec’s non-French speakers live. Historically, most of Montréal’s hospitals had fairly clear language and religious affiliations; there were Roman Catholic francophone hospitals and Catholic, Protestant and Jewish anglophone hospitals, as well as a hospital for Italians and one for the Chinese community. Teaching hospitals likewise were identified with either a "French" or an "English" medical school. Hospitals which were once exclusively for English-speakers must now offer services in French and
their professional staff must pass French language competency tests (Schachter 1982). The hospitals are permitted to use bilingual signs only if a majority of their patient population speaks a language other than French (Thompson 1990). The linguistic divisions among hospitals are less clear today because there are a large number of patients whose first language is neither French nor English. The terms "English" and "French" are still used to distinguish among hospitals in Montréal and, to some extent, these labels may reflect continuing differences (or perceived differences) in styles of patient care, religious orientation of hospitals, and the linguistic, economic, and cultural characteristics of medical staff and patients. Thus, the institutional context merits close analysis for understanding how fetal images are interpreted.

III.D.2. Cultural Diversity and Linguistic Authority

Cultural relations in Québec have historically been constituted along the lines of power drawn between the French- and English-speaking communities. The balance of power and cultural authority has shifted recently in favour of francophones and the francophone provincial government continues to be concerned with maintaining this trend. Language use in education, business, and institutions is regulated through legislation and the Québec government keeps a watchful eye on the size of the francophone population. The low birthrate of that population is
perceived by many Québécois as a threat to the survival of francophone culture in a predominantly English-speaking Canada.

The francophone birthrate in Québec, once the highest in Canada and feared by anglophones as "the revenge of the cradle", has fallen by over 50 per cent since the 1950s (Rose 1988). Today Québec's French-speaking population has the lowest birthrate in Canada. In 1988, Robert Bourassa, the Premier of Québec, described the falling birthrate as "the No. 1 national [i.e., Québécois] question of the time, much more [important] than the creation of an independent republic of Québec" (Rose 1988:12). That same year his government introduced cash incentives for families having babies. Since then the newly created Ministry for Family Affairs has proposed numerous reforms to ameliorate the social and economic circumstances of families, including extensive unpaid maternity and paternity leaves, subsidized housing, and daycare reforms. Although the current rate of 1.6 babies per woman remains below replacement level (Maser 1991:B2; Wadhera 1989), Québec's birthrate has begun to edge upwards.

Obstetrical services, pared down during the late 1970s and 1980s, are now straining to accommodate the growing birthrate. For example, the obstetrical unit at the Montréal hospital, where my research was done, was designed to handle 2000 deliveries annually and is now delivering almost twice that number of babies each year. As a result of this kind of demand, obstetrical departments across the province, including my fieldsite, are
attempting to expand, rationalize, and modernize their services.

In the past ten years, anxiety about the preservation of Québécois culture has expanded from relationships between English and French speakers to the issue of language and identity among Québec's other cultural communities. The low birthrate has encouraged Québec to increase the number of immigrants (Conseil du patronat du Québec 1991). The vast majority of these immigrants settle in Montréal and it is there that concerns about cultural diversity and the preservation of the French language and Québécois authority have been centred (Fontaine 1989:A2).

Montréal is Canada's second largest city and a centre of historical and cultural significance for both French- and English-Canadians. Montréal is also the country's most ethnically diverse and ethnically segregated city (Balakrishnan and Kralt 1987). According to 1991 census data, approximately 68% of metropolitan Montréal's 3.3 million people are native French speakers and 15% are native English speakers (Statistics Canada 1992). The remainder (nearly 17%) are Canadians and recent immigrants, referred to as "allophones," whose first language is neither French nor English. There are large communities of people from Southern Europe, the Middle East and North Africa, Southeast Asia, Central America, and the Caribbean. Most allophones and new immigrants are required to send their children to French schools and the majority of these immigrants remain in Québec (Johnston 1989).
IV. Ultrasound Imaging and the Discourse of Fetal Selfhood

The theoretical framework for this study derives from a longstanding anthropological interest in the way that the production and distribution of knowledge and power classifies and organizes individuals and groups in society. Anthropologists argue that in any society an individual's knowledge and behaviour are constituted through discourses which make existing knowledge, behaviour and social relations seem inevitable and natural. A discourse is an historically determined and culturally specific set of ideas, beliefs and statements. Discourses also refers to the knowledge which is materialized in practices, objects, and relationships (Turner 1987; Young 1981; Young 1987). Discourses delineate in specific ways what we can know, what we feel is worth knowing, and what we can do (Young 1987).

Several sociologists and anthropologists have begun to study reproduction within a framework of discursive knowledge (Arney 1982; Martin 1987; Oakley 1986a; Petchesky 1987,1990; Rapp 1988a,b, 1991; Rothman 1986,1989). Further, they have sought to show that contemporary North American and British discourses on reproduction, like other discourses, are effective because of the way in which they are lived and experienced in the body, socially constructed and transmitted within particular institutions, and imbued with cultural meaning. Medical discourses are employed as a means of observing and regulating individuals and groups (Schepers-Hughes and Lock 1987; Turner 1987). For example, Arney
(1982) and Oakley (1986a) argue that the success of modern obstetrics in Great Britain and the United States, is not the result of "technological imperatives or the accumulation of scientific advances", but a strategic response by medicine to develop and maintain authority over childbirth (Arney 1982:19). Techniques like ultrasound, which enable physicians "to dispense with mothers as ... necessary informants on fetal status and lifestyle" (Oakley 1986a:155) and which define the fetus as the primary patient have been a fundamental element in obstetrical "claims to expertise" (Oakley 1986a:183).

These authors have suggested that the idea of fetal personhood is a central element in contemporary North American and British discourses on reproduction. Each has shown that the idea of the fetus as a distinct and autonomous person within the mother's body is historically recent. Petchesky (1987, 1990) and Rothman (1982, 1987, 1989), in particular, have initiated a discussion of the social and cultural determinants of the idea of fetus as person.

Barbara Katz Rothman (1989) argues that contemporary American ideas about the fetus and motherhood derive from the ideologies of patriarchy, technology and capitalism. Within this ideological configuration, individuals are "autonomous, atomistic, isolated beings" (Rothman 1989:59). Thus, in American media and medical culture, including ultrasound images, the fetus is often represented "not as part of its mother, but as separate, a
little person lying in the womb" (Rothman 1989:114). Rothman argues further that this view of the individual is fundamental to the production model which dominates reproduction in America. In this model, pregnancy, fetuses, and women are rationalized, controlled and made more efficient. Women and fetuses are screened and monitored during pregnancy through prenatal diagnosis and regular prenatal visits in order to improve the "outcome" of pregnancy. Women then give birth in centralized places (hospitals) where they are closely watched and where their labours and deliveries are made more efficient using, for example, drugs, forceps or surgery (Rothman 1982, 1986, 1989).

Rosalind Petchesky, a political scientist, begins her framework for analysis with the premise that the fetal image is a symbol, "a kind of empty signifier that condenses within it many different meanings at once" (Petchesky 1990: xvi). Thus, ultrasound fetal images are meaningful for physicians as a form of diagnostic evidence (1987:66), a means of monitoring maternal and fetal behaviour (1987:69), and as a fantasy of scientific control over the human (female and fetal) body (1987:68-71). Petchesky (1990) also documents the meaning of fetal images in the American anti-abortion movement. She argues persuasively that photographic and ultrasound images of fetal bodies and scientific statements about human genotype have replaced notions of "ensoulment" as evidence of fetal personhood.
According to Petchesky, fetal images are used by anti-abortion
groups not only as evidence of fetal personhood; but they also have a
symbolic function in affirming the values of religious fundamentalism, neo-
conservative politics, and other "New Right" movements in the United
States. In support of this claim Petchesky shows how anti-abortion images
of the fetus are used to evoke for the viewer a "mythic secure past," a time
of sexual innocence, of "good" mothers and the "traditional" family
(Petchesky 1990:xiv). Within Petchesky's framework, the meaning of fetal
images and the cultural contests over meaning must be understood within
their particular historical and social contexts.

Unlike Rothman and Petchesky, two anthropologists (Martin 1987;
Rapp 1988a, 1988b, 1990, 1991) have addressed social variability in
discourses on reproduction and reproductive technology by deconstructing
the category "women." Martin and Rapp argue that social circumstances
such as class, religion, and occupation are important determinants of the
meaning that women give to American medical discourses on reproduction
and the body. Martin's (1987) interviews with American women about
birthing, menstruation, and menopause suggest that middle class women
accept dominant medical metaphors of the body, while working class women
are more likely to resist these metaphors of economy and production. Rapp
(1988a; 1990; 1991) refuses to take for granted the usual categories of
"Hispanic", "Afro-American", and "white middle-class" and probes how social
class, religion and personal experiences, shape the meaning of abortion, amniocentesis, and disability among women in New York City. In one of her articles, Rapp (1990) briefly describes how women may or may not invoke ultrasound images in their descriptions of the fetus.

Several native Spanish-speaking women (both poor and middle class) described their fetuses in non-technical imagery: "it's like a liquid baby, it won't become solid baby until the seventh month"; "it's like a little lizard in there, I think it has a tail"; "it's a cauliflower, a bunch of lumps growing inside me". Their relative autonomy from technological imagery may be due as much to having recently emigrated from countries and regions where hospital-based prenatal care is both less common and less authoritative, as to anything inherently Hispanic. ... Most women born in the United States, whatever their ethnic and class background invoked the visual language of sonography and its popular interpretation in response to my query, "Tell me what the pregnancy feels and looks like to you now?" For one it was a "little space creature," for another it was a "creature, a tiny formed creature, but because its eyes are closed, it is only a half baby. Another woman told me that as her pregnancy progressed, she felt the fetus' image becoming more finely tuned, like a television picture coming into better focus (Rapp 1990:34).

Rapp (1990:30) describes her work as "tuned to the tension between the universal abstract language of reproductive medicine and the personal experiences pregnant women articulate in telling their amniocentesis stories."

I return to the analyses of Arney, Oakley, Petchesky, Rapp, and Rothman in Chapter Eight. Here, I explain how their work offers a theoretical framework for studying reproductive technology as a form of historically determined and culturally meaningful knowledge about social relations. Like Petchesky, I begin my dissertation with the premise that
ultrasound fetal images are "cultural objects' with historical meanings" (1987:66). Like Rothman, I believe that the meanings of ultrasound fetal images are determined by cultural assumptions about the nature of society and individuals and by the relationships among certain groups in society. Like these authors, I also believe that fetal images are interpreted by some individuals and groups as meaningful representations of fetal selfhood. These representations of fetal selves are used to support particular claims about others, usually about the legal rights and moral responsibilities of physicians and pregnant women. For example, ultrasound images are used by physicians to support their claims of expertise in managing reproduction (Arney 1982; Oakley 1986a; Rothman 1986) and by anti-abortion groups seeking to establish the legal rights of the fetus (Petchesky 1990).

The anthropological and sociological research discussed here on ultrasound and other reproductive technologies has focused on the effects of this technology on social relationships. Oakley, Petchesky, and Rothman, in particular, have argued that the discourse of the fetus as person is an important element in explaining how reproductive technology is influencing social relationships. They have concluded, for example, that representations of the fetus as a person (e.g., as a patient or a claimant in court) lead to a distrust of women to protect the fetus, to an opposition of fetal and women's rights, and ultimately, undermine women's control over their own and fetal bodies and over decisions during reproduction. Questions are now raised
about whether or not a woman has the right to terminate a pregnancy or to refuse a medically indicated procedure, such as prenatal diagnosis, fetal surgery, or cesarean delivery. However, the persuasiveness of these authors' accounts is limited because they have focussed on the effects of a discourse of fetal personhood often without identifying how these effects are reached. In short, they have not identified how fetal images become representations of selves.

I suggest that there are four reasons for this omission. First, much of the research on the discourse of fetal selfhood is anecdotal rather than empirical, consisting of commentaries on general social or medical trends rather than conclusions derived from systematically collected interview- and observation-based data. Second, concepts of the self and how it is constituted are left implicit. In fact, their analyses have dealt almost exclusively with one aspect of selves — the "person" or humans as bearers of rights, obligations and roles. Thus, these authors lack a clear conceptual framework with which to identify how a fetal image is interpreted as a representation of a fetal self. Third, with the exception of Rapp and Martin, the authors tend to treat both the women and the medical professionals they are writing about as undifferentiated groups. Consequently, they do not identify the ways in which representations of fetal selfhood may differ. Fourth, some of these authors have tended to ascribe the persuasiveness of fetal images to the authority of medical scientific evidence.
I agree that medical science generally does have a culturally recognized authority in Western societies and that this authority is an important element in explaining why ultrasound fetal images are taken seriously as representations of selves. Further, I agree with these authors that reproductive technology can be studied in order to identify what relationships of power, authority, and control are implicated in this technology and in the concept of fetal personhood. However, the authority of medical knowledge alone does not explain why or how fetal images are representations of fetal selves. Furthermore, before claims about the implications of reproductive technology and the discourse of fetal personhood can be made, the details of that discourse must be clarified.

What is the fetal self in medical science? Is there one or are there several medical scientific representations of the fetal self? How does an image of the fetus come to represent the fetal self? Are there circumstances in which fetal images do not represent fetal selves? By asking these questions I am able to examine an issue which has been neglected until now: the nature and sources of variation in medical discourse on the self.

I begin my analysis of ultrasound fetal images by deconstructing the medical scientific discourse on the fetal self. Here, in the spirit of anthropologists like Gaines and Kondo (discussed earlier in this chapter), I identify the cultural assumptions and social arrangements which determine how the fetal self is represented. In order to deconstruct the fetal self in
ultrasound imaging I make three assumptions. First, the self is not only culturally and historically variable, but also it is constantly being produced and reproduced differently by and for different categories of people within societies. As people are divided by gender, religion, kinship, disability, ethnicity, and occupation, so are selves differently constructed. Second, representations of fetal selfhood are determined not simply by evidence about biology, but by the technologies and social arrangements through which beliefs about the fetus are distributed and communicated in practices, pictures and words. Third, people's cognitive, affective, and behavioral responses to fetal images are determined not only by idiosyncratic attitudes and beliefs, but also by people's cultural and social locations including, gender, reproductive history, family relations, and ethnicity. Those responses are also shaped by how fetal images are presented to the viewer, how sonographers interpret the image for pregnant women. Only after the fetal self is understood as a cultural representation with different meanings in different social and historical circumstances can the implications of these representations for other selves (e.g., women, physician) be understood.

My analysis of ultrasound fetal imaging proceeds with three propositions which make it distinctive from other analyses of reproductive technology and of fetal representations. First, dimensions of selfhood are used by physicians and ultrasound technicians and by parents in order to make sense of the ultrasound images. Although the researchers discussed
above have argued that "images by themselves lack 'objective' meanings" (Petchesky 1987:78), they do not establish empirically how images becomes meaningful. In this project I focus on the specific technique of ultrasound imaging and observe its use in clinical practice in order to identify empirically how medical knowledge materialized in the fetal image becomes meaningful. Through observations of ultrasound imaging and interviews with sonographers and pregnant women, I describe how conceptions of selfhood are used by sonographers and by women to interpret the fetal image.

Second, I propose that there are variations in the ways in which the fetal image is interpreted by sonographers (obstetricians, radiologists, ultrasound technicians) and by women. I compare and contrast the presentation and interpretation of ultrasound fetal imaging between ultrasound technicians and obstetricians. I demonstrate that there are differences in how the fetal image is represented to women of different biological-reproductive (e.g., fertility histories, indications for ultrasound) and social (e.g., ethnicity, gender, religion) circumstances. I examine how ultrasound's "facts" are interpreted and acted upon by women in some of these different circumstances.

Third, recent changes in social relations and in notions of self (e.g., changes in the identity, social status, and legal rights of women and cultural groups) and the continuing controversy over abortion have shaped the ways in ultrasound is conducted and the ways in which fetal images are
interpreted by sonographers and by pregnant women in Montréal. In the studies I have reviewed, knowledge about reproductive technology and the fetus are only loosely tied to the social and cultural circumstances of their production. In my research I have attempted to redress that situation by examining interpretations of fetal imaging within the context of (1) cultural assumptions about selfhood and (2) relationships among pregnant women, technicians, physicians, and the fetus at a Montréal ultrasound clinic.

V. Other Approaches to Studying Ultrasound

The theoretical approach I outlined above differs from other ways in which ultrasound fetal imaging has been studied. Much has been written about reproductive technology, but relatively little attention has been given to ultrasound. In the following pages, I review published studies on ultrasound, including scientific studies of its biological effects, the clinical literature, psycho-social studies, and feminist perspectives.

V.A. Scientific Assessments of Ultrasound's Biological Effects

In light of the well-established teratogenic effects of X-ray radiation, there is concern about the possible risk of fetal or maternal harm from diagnostic ultrasound. However, there are only a handful of studies on the effects of ultrasound's non-ionizing radiation on human and nonhuman tissue (e.g., Abdulla et al. 1971; Tarnatal and Hendrickx 1989). More
numerous than the studies themselves are their reviews. Some reviewers conclude that there is little or no danger to humans from obstetrical ultrasound (e.g. Baker and Dalrymple 1978; Kremkau 1984). Other reviewers maintain it is still too early to label ultrasound as safe (e.g. Stratmeyer and Christman 1983; Meire 1987).

V.B. Clinical Literature

Clinical descriptions and evaluations of ultrasound imaging begin with its introduction into obstetrical use during the 1960s. The majority of these publications deal with ultrasonographic techniques, measurement protocols, the effect of the operator on the accuracy of the scan, and the changing indications for its use (Dunne and Cunat 1983; Hansman et al. 1986; Kurtz and Goldberg 1988; Pretorius and Mahoney 1990; Toi 1990). There are several clinical trials intended to assess the effect of routine and selective ultrasound on the management and outcome of pregnancy (Bennett et al. 1982; Bakketeig et al. 1984; Eik-Nes 1984.; Neilson et al. 1984; Proud and Grant 1987; Secher et al. 1986). The many reviewers of these studies have debated whether ultrasound should be used routinely as a screening tool (Youngblood 1989) or selectively in pregnancies with a specific indication (Ewigman 1989; Neilson and Grant 1989). There are a few medical journal editorials and commentaries on the medical, legal and ethical questions raised by the use of reproductive technology (The Lancet 1985; Fletcher
V.C. Psycho-social Studies of Ultrasound

Over the last decade, there have been several studies of women's knowledge about and attitudes toward ultrasound. These studies are generally limited to eliciting from women undergoing this procedure the negative and positive aspects of their own experiences with ultrasound. Most women in these studies are at low risk for fetal or maternal problems and they tend to describe ultrasound as a "positive" emotional experience (Kohn et al. 1980; Hyde 1986; Villeneuve et al. 1988). Women tend to report anxiety about or dissatisfaction with ultrasound when they have negative perceptions of the sonographer's attitude or when they believe that the procedure is not routine (Hyde 1986; Villeneuve et al. 1988). Women report diminished anxiety during pregnancy when the procedure and fetal image are explained to them (Cox et al. 1987; Field et al. 1985; Michelacci et al. 1988; Reading et al. 1982; Reading et al. 1988). There is some evidence that the ultrasound initially increases anxiety which is then reduced by the explanation of the image (Reading and Cox 1982). At least two studies have found reduced anxiety among women undergoing ultrasound at the time of amniocentesis to detect maternal age-related fetal disorders (Cox et al. 1987; Goldman 1989). The role of conversation, small talk, errors, and non-verbal communication which occur during ultrasound scans has
been suggested as influential, but not yet researched (Lumley 1990; Reading et al. 1988).

Some physicians (Reading et al. 1982) hypothesize that ultrasound improves maternal-fetal bonding but this consequence remains to be confirmed. Several studies support physicians’ impressions that ultrasound imaging has a positive impact on women’s feelings toward the fetus (Garel and Franc 1980; Kohn et al. 1980; Milne and Rich 1981; Villeneuve et al. 1988) but other studies do not support these findings (Cranley 1985; Grace 1983; Kemp and Page 1987; Sparling et al. 1988). One study suggests the positive effects may be neither long lasting nor particularly important to women (Reading et al. 1984). In another study women said fetal movement or "quickening" was a more important source of "bonding" for them than seeing the fetal image through ultrasound (Villeneuve et al. 1988).

These psychosocial studies also indicate that, in general, women value the information they get from ultrasound. Women, in one study, said they would be willing to pay an average of $706 for the information, primarily about fetal and maternal normality, from an ultrasound examination (Berwick and Weinstein 1985). Although physicians may assume otherwise, women may not be willing to pay much to determine the fetal sex, to see the moving fetal image or to have a photo to take home (Berwick and Weinstein 1985:888).

Research on the psycho-social impact of ultrasound is based on two
distinctive assumptions. First, the researchers assume ultrasound is a passive technology, a window through which the clinician glimpses the fetus. The images are blurry and ambiguous and this ambiguity is presumed to be an artifact of the technology rather than an artifact of the indefinite and changing cultural criteria for interpreting those images. Second, researchers and clinicians assume that variation in women’s experiences of ultrasound are the result of an individual’s beliefs, attitudes and psychology. The historical, social and cultural determinants of the women’s experiences with this technology, by and large, are ignored.

V.D. Feminist Perspectives

There are a large number of studies, commentaries, and critiques of reproductive technology which share, in their own words, a “feminist perspective.” Given the plurality of theoretical approaches and conclusions, it is more accurate to speak of feminist perspectives on reproductive technology. They begin, however, from a shared viewpoint. As Overall (1989:15) writes,

Issues in reproduction are pre-eminently women’s issues; so whether we discuss prenatal diagnosis or contract motherhood, contraceptive devices or the place of birth, it is always essential to examine women’s experiences, beliefs, needs, and activities in connection with these topics.

My review of feminist perspectives on reproductive technology is not meant to be exhaustive. There are "radical" critiques of reproductive
technology by authors, including Corea (1985, 1987) and Spallone (1989) and others (e.g., Arditte et al. 1984; Tait 1985:40). A common theme in their critiques is that although these reproductive techniques are represented in the clinical literature as solutions to childbearing problems, they are really instruments through which men (as scientists, physicians, husbands) can control reproduction and exploit women.

In recent years, many feminist authors have begun to articulate less totalizing explanations and more complex critiques of reproductive technology. This shift from non-totalizing theories to refined theorizing has also occurred in women’s history and the debate concerning women and the state (Silverblatt 1991). The authors in the volumes edited by Overall (1989), Stanworth (1987), Whiteford and Poland (1989) among others, provide analyses of reproductive technology which have as their starting point the following concern:

on the one hand, medical and scientific advances have offered women a greater chance to decide if, when and under what conditions to mother, while on the other, they have increased the potential for others to exercise an even greater control over women’s lives (Stanworth 1987:4).

A number of themes distinguish this recent scholarship. For example, whereas some early critiques assigned women to the role of victim, more recent works have considered how reproductive technologies may empower women as "agents of their reproductive destinies" (Petchesky 1987:72). In addition, as Stanworth writes, "reproductive technologies need to be put
firmly in their place, as one dimension — but not necessarily the most important — of the forces that shape reproduction and the lives of women, men and children today." In place of technological determinism are sophisticated and complex analyses of the political and legal issues, as well as the social circumstance and cultural meanings surrounding reproduction, sexuality, and the family. Many of these feminist analyses have focused on technologies such as in vitro fertilization, artificial insemination, and amniocentesis. Aside from the works of Oakley, Petchesky, Rothman, and Rapp, which I discussed earlier, relatively little systematic study has been given to ultrasound.

VI. Outline of Dissertation Chapters

In this chapter I discussed the theoretical framework and the broad ethnographic context of my study of how fetal images are used and interpreted by pregnant women and by sonographers in a Montréal hospital. In the next chapter I describe the research methodology and participants. In Chapter Three, I examine the history of ultrasound fetal imaging in order to show how that technique has become taken for granted as a window on the fetus. In Chapter Four I discuss how sonographers interpret fetal images. Chapter Five sets the stage for women's accounts of the fetus. In that chapter I describe the beliefs about pregnancy and assumptions about maternal and fetal selves contained in some of the guides to pregnancy
read by many of the women I interviewed. Chapter Six deals with women's accounts of the fetus prior to ultrasound and Chapter Seven deals with their post-scan descriptions of the fetus. In Chapter Eight, the concluding chapter, I situate my findings in the context of other studies on the fetal self in reproductive technology.
CHAPTER TWO: THE RESEARCH PLANS AND PARTICIPANTS

This chapter describes the research process and the people who participated. I begin by clarifying the boundaries of my research; establishing what questions the research is not intended to answer. The second section of the chapter describes the aims, methods, and implementation of each of the three foci of my research. I describe the women I interviewed and deconstruct the category "women" along lines of language, ethnicity, social class, religion, and reproductive history. In the final section of the chapter I outline my approach to analysing the data.

I. Introduction to the Research Methodology

Although this study is intended to deconstruct the discourse on fetal selfhood as it is shaped and produced through ultrasound imaging, I need to specify what I did not do.

First, my research is not an attempt to provide a definition of fetal selfhood. By this I mean two things. One, since I take the concept of selfhood as problematic, as contingent rather than inherent, I am not trying to answer the question, "Is the fetus a person?" I am not even trying to
answer this question within the context of late 20th century Canada. As an anthropologist, my interest rests not in identifying what is true or false about the existence of fetal selfhood but in determining the historical, social, and cultural conditions and circumstances that make one or more interpretations of fetal selfhood more convincing for some groups than others. Two, although I argue that the notion of fetal self is central to interpretations of ultrasound imaging, I cannot say that my conclusions about ultrasound and fetal selfhood apply everywhere or even to all obstetrical units or to all women in Montréal. However, based on my research in a particular setting, I can show that institutional arrangements, social relationships, and reproductive histories do shape interpretations of selfhood.

Second, this is a study of fetal selfhood, a cultural construct that has a particular political and social currency at this moment in Canada. For many Canadians, talk about the fetus is strongly associated with talk about abortion. When I used the word "fetus" or asked questions about the fetal development and behaviour to my informants, they would often respond with references to abortion: "What's a fetus? That's what all the abortion issue is about, right?" Or, "I don't like the word "fetus." It makes me think of abortion." To a certain extent I was interested in the connection between women's ideas about the fetus and their ideas about abortion. Abortion and the rights of the fetus is a widely publicized issue in Canada and I wondered if and how this issue entered into women's statements about fetal selfhood.
However, I viewed the issue of abortion and fetal rights as parts of a context; they are not the focus of this dissertation.

Third, I began this research with both a theoretical approach (discussed in Chapter One) and an opinion about ultrasound. Specifically, I was sceptical of the clinical necessity or benefit of using this procedure routinely. I believed that ultrasound rendered irrelevant women's own statements, beliefs and sensations of the fetus and of pregnancy. Nonetheless, it was not my intention to provide a critique of ultrasound fetal imaging; in designing and conducting this research I had no interest in demystifying this technology or uncovering its hidden purposes. I do not possess a privileged gaze with which to see "what is really going on" in ultrasound. Although I did not always agree with the practices I observed in the ultrasound clinic, with how women were sometimes treated or with the ways in which the images were sometimes interpreted, I have no interest in criticizing either the culture of biomedicine or individual practitioners. When I describe errors, negative stereotypes, and purposeful withholding of information by physicians and technicians it is not to lay blame on individuals but rather to illustrate the contradictions, inconsistencies, and ambiguities in the discourse on fetal selfhood which informs the medical practice of ultrasound fetal imaging.

Fourth, although I conducted some of this research in a language different from my own, I was doing research in what I assumed to be my
"own culture." During the interviews with the women and at the ultrasound clinic much of what I heard and saw about the fetus, pregnancy, and obstetrical care was familiar to me. Moreover, I learned to interpret fetal images and to "see the baby" in a hospital clinic under the tutelage of ultrasound technicians and obstetricians. For myself and for many other North Americans much of what we take for granted about human bodies derives from, is legitimized by, and is elaborated through medical scientific knowledge. For example, when I try to explain to my young son how and where a baby grows, I use a book of scientific photographs of fetal development and a simplified version of the medical scientific model of reproduction. Thus, at one level it is easy for me to view ultrasound images, fetal photographs, and medical scientific descriptions of the fetus as an accurate rendition of nature rather than as an historical product of particular social relations. The anthropological work of deconstructing those images, thus, becomes particularly challenging. The anthropologist tries to determine how and why a certain event (like, fetal imaging) becomes a meaningful cultural construct. One part of this process is to show how the meaning of these constructs is elaborated through the different circumstances of people's lives. As Martin points out, the more difficult task is to explicate what else ordinary people or medical specialists are talking about when they describe hormones, the uterus, or [the fetus]. What cultural assumptions are they making about the nature of women, of
men, of the purpose of existence? (Martin 1987:13).

The cultural assumptions about selfhood which I sought to identify in the practices of ultrasound fetal imaging often seemed commonsensical to me. I would look at an ultrasound image, hear the technician say "Hello baby" and, think to myself, "Yes, there is a baby." The work of this research lay in asking myself why and how that image constituted a "baby." What cultural assumptions about selves - maternal, fetal, and medical selves-made it commonsensical for the technician to talk to the image? What were the implications of that communication for pregnant women and physicians?

II. Research Foci

In this research I sought to understand how fetal images become meaningful as representations of selfhood. I also wanted to determine the sources of variation in these meanings. To accomplish these goals I investigated: (1) the development and organization of ultrasound fetal imaging in Canada, particularly in Québec; (2) how fetal imaging is interpreted and used in hospital obstetrical practice; (3) how clinical interpretations affect women's ideas about the fetus. These three research foci are elaborated in the following sections and summarized in Table 1.

II.A. Research Focus One: The History of Ultrasound Fetal Imaging

My first aim was to provide an historical account of the circumstances
Table 1. Summary of Project Foci and Methods

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<td>1. An historical account of ultrasound imaging in Québec</td>
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<td>(a) the historical origins of ultrasound</td>
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<tr>
<td>2. A clinic-centred ethnographic account of clinical interpretations and uses of fetal imaging</td>
<td>Observations &amp; interviews with staff at a hospital ultrasound clinic in order to determine:</td>
</tr>
<tr>
<td></td>
<td>(a) institutional history &amp; structure (e.g., social, technical, cultural factors)</td>
</tr>
<tr>
<td></td>
<td>(b) the clinical meaning of fetal imaging</td>
</tr>
<tr>
<td></td>
<td>(c) the interpretation of the fetal image for parents.</td>
</tr>
<tr>
<td></td>
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<tr>
<td>3. Ethnographic accounts of how ultrasound imaging in the hospital and in popular discourse affects women’s knowledge of the fetus and their decisions about prenatal care and behaviour.</td>
<td>Interviews with pregnant women observations of their ultrasounds in order to:</td>
</tr>
<tr>
<td></td>
<td>(a) compare their notions of fetal self before and after ultrasound;</td>
</tr>
<tr>
<td></td>
<td>(b) identify how women’s notions of fetal selfhood are linked to their decisions about prenatal care and behaviour;</td>
</tr>
<tr>
<td></td>
<td>(c) identify and explain variation in women’s knowledge and behaviour;</td>
</tr>
<tr>
<td></td>
<td>(d) examine women’s ideas about fetus in relation to conceptions and images of the fetus outside the clinic (e.g., books, films).</td>
</tr>
</tbody>
</table>
and events leading up to the adoption, organization, and routinization of ultrasound fetal imaging in the Canadian, and especially the Québec, health service. In particular, I wanted to know what decisions led to the preference for "real-time" ultrasound, what clinical trials and safety assessments had been carried out, how ultrasound services were introduced and diffused in Canada and Québec, how those services came to be covered by provincial health care plans, and what kinds of training requirements and credentials exist for sonographers.

Unfortunately, I am able to offer a very limited account of the historical origins of ultrasound and its organization in Canadian health services. The investigative effort required to track down documents on health care administration and organization in each province outside of Québec would be substantial. My account of the development and organization of ultrasound fetal imaging in Québec is also incomplete. My searches at le Regie de l’assurance maladie du Québec, le Ministre du Santé et Services Sociaux (Québec), Health and Welfare Canada, and hospital archives to find documents on safety assessments of ultrasound, its adoption by the provincial health care plan and other related topics were not as fruitful as I had hoped. It appears that the history of ultrasound fetal imaging (probably of most medical technology) in Canada is not only unwritten, but it is not systematically documented. Instead, the history exists in the budgets and policies of individual institutions and organizations.
(hospitals, ministries, professional associations) and in the discussions, meetings and practices of individual physicians. I had some access to this history through conversations with sonographers. In the dissertation I use published and anecdotal descriptions of ultrasound's development and use in obstetrics to provide a general historical context for medical interpretations of fetal ultrasound images.

II.B. Research Focus Two: The Ultrasound Clinic

My second research aim was to provide an ethnographic account of the clinical interpretations and use of fetal imaging in order to identify and explain variation in clinical representations of the fetus. My original plan was to do the fieldwork in ultrasound clinics at two hospitals which differed in ways that anthropologists (e.g., Gaines 1979; Hahn and Gaines 1985; Young 1981) have argued lead to variation in medical practices. Thus I hoped to select hospitals which differed in terms of some potentially significant factor such as, primary language of treatment (English or French), ultrasound facilities, religious affiliation, teaching or non-teaching hospital, philosophies of obstetrical patient care, and the linguistic, ethnic, and economic characteristics of patients. I would then determine if these factors influenced the interpretation and use of fetal imaging.
II.B.1. Negotiating the Research

As an English-speaking Canadian and one unfamiliar with Montréal, my entrée to ultrasound fetal imaging in Montréal was through other anglophones. Thus the hospital where I did my fieldwork is regarded as an "English" hospital and historically has had a large English-speaking patient population. Once I had begun recruiting women to the study, I realized that a comparison of two groups of women from different hospitals was beyond my resources as a researcher working alone.¹

Therefore this study is based primarily on fieldwork carried out by myself from December 1989 through February 1991 in the obstetrical ultrasound unit of one Montréal hospital. The Metropolitan Hospital is a 600 bed acute care and teaching hospital. The Metropolitan was founded during the early part of this century and, by the late 1980s, was providing services annually for about 20,000 in-patients and over 60,000 outpatients. Obstetrics has long accounted for a large portion of admissions to the hospital. Following the passage of Bill 65, the Metropolitan was designated by the Québec Minister of Health as a regional centre of expertise in obstetrics and neonatology. As such the hospital is a tertiary care referral centre providing care for high-risk obstetrical and neonatal patients from

¹. For short periods of time I observed ultrasounds and talked with sonographers at two other hospitals. That material is not included in the dissertation.
throughout Montréal and Québec, as well as from communities in northern Québec and the Northwest Territories. The number of deliveries at the Metropolitan has risen steadily during the 1980s and numbered about 4000 in 1990-91.

When I began the research the Obstetrics Department of this hospital had just opened its own ultrasound unit. Prior to the opening of this clinic, obstetrical, gynecological and abdominal ultrasounds were conducted by radiological staff in the Radiology Department. Two mornings a week, obstetricians did amniocenteses and conducted scans among high-risk patients in the radiology ultrasound clinic. Since late 1989, most obstetrical ultrasounds at the Metropolitan have been conducted in a separate clinic administered by the Department of Obstetrics and located in a different part of the hospital. In its first year of operation, the new clinic did about 6000 obstetrical scans. Some obstetrical scans continue to be done in radiology as are all gynecological and abdominal scans. (Echocardiography is in a separate clinic.) Moving the obstetrical scans from Radiology into Obstetrics was described to me by two obstetricians as a "turf battle". In fact, the details of the negotiations between the two Departments that led to the opening of the Obstetrical Unit were never made available to me. My entrée to the hospital was through Obstetrics and I received permission to carry out the research only in that department's ultrasound unit. I was able to watch some obstetrical scans in Radiology but I did not interview the radiologists or
ultrasound technicians in that department.

II.B.2. Methods

From December 1989 through December 1990, I watched ultrasounds whenever the obstetrical clinic was open (about 20 hours each week). During the early months of 1991, I spent only a few hours a week at the clinic. I was free to watch all of the ultrasounds being done, to ask questions of the staff and to take notes.

My fieldwork in the hospital was guided by the following three objectives:

First, I explored how the institutional history and structure of the hospital affects the clinical interpretation and use of fetal imaging. Through participant observation of clinic activities and conversations with sonographers, my investigation examined changes in technical and social factors at the hospital, including (1) technical factors: available equipment and facilities; technical procedure of ultrasound; including methods of conducting the scan, information gathered during the scan, preparation and dissemination of results; the routine division of activities among clinic staff; and (2) social factors: relationships of trust, dependency, power, competition, etc. among the clinic staff; styles of patient care, including clinical protocols, assumptions about professional responsibility.

Second, I observed clinic activities and conducted interviews with the
sonographers (ultrasound technicians and obstetricians) at the ultrasound clinic in order to determine the clinical meaning of the fetal image. My observations and interviews focused on: (1) each actor's perception of the instrumental value and impact of obstetrical ultrasound imaging, for example, I investigated how ultrasound imaging works, indications for its use, types of information it can provide, the interpretation of imaging for prenatal, labour, delivery, and post-partum care; and (2) the dimensions of fetal selfhood which are elaborated in clinical interpretations of fetal images including, social rights, obligations, morality, onset of self, fetal subjectivity and propensity.

Third, during ultrasound sessions and conversations with clinic staff, I observed how the fetal image is provided and interpreted for patients through the statements and actions of sonographers about fetal physical status (e.g., anatomy, normality, sex), fetal movement (e.g., thumb sucking, heartbeat), and fetal selfhood (e.g., attributing a personality, likes and dislikes to the fetus, commenting on the fetus' awareness of surroundings, etc.). I paid particular attention to whether the clinical interpretation of the fetal image differed for different categories of parents (e.g., differences in gender, ethnicity, stage of pregnancy, indication for ultrasound).

My research at the Metropolitan involved between 12 and 15 sonographers, including obstetricians, technicians, and radiology and obstetrics residents. However, this dissertation describes and analyses the
detailed observations and conversations with eight sonographers: two technicians and six obstetricians.

II.B.3. Doing Research in the Ultrasound Clinic

Throughout the research, the clinic staff knew that I was comparing maternal and clinical perceptions of ultrasound and the fetal image and they were aware that I was studying them as much as I was studying the women. I did not discuss any findings of the research with the technicians and physicians until the fieldwork was near completion. (There is one exception: after several months, I mentioned to the sonographers that some women told me they found the ultrasound appearance of the 16 to 18 week fetal face disturbing.) Nor did the staff know which women were in the interview portion of my study, unless the woman herself disclosed it.

I did formal interviews with the sonographers, but much of the "data gathering" was conducted on an informal basis — conversations while we readied the clinic for the first patient or between scans and more leisurely talks over coffee or lunch. Although we had different backgrounds and perspectives, the physicians, technicians and I were each intrigued by what these ultrasound images were all about, how to interpret them, and what the images meant to pregnant women. The physicians and technicians explained for me the anatomical details of the image, the techniques of scanning and the clinical indications and potential benefits of scanning.
Most of my time was spent with the technicians, since they did the bulk of the routine scans. We often talked about the stressful aspects of their work. They would complain to me about the pressures of working with a heavy case load and with anxious, uncomfortable, and sometimes impatient women. They confided their fears of "missing" an anomaly during a scan and the sense of helplessness they felt when detecting fetal anomalies and miscarriages for which there was no treatment. I never came to know the professional or personal worlds of the physicians as well as I did those of the technicians. In part this was due to the fact that each physician was at the clinic but once a week and was constantly moving from place to place and task to task in the clinic. The technicians tend to remain in one place and to have one task at least for the duration of each scan so it was easy for me to stand and talk with them. In contrast, the clinic physicians frequently change location and task: they go back and forth between the two cubicles to assist technicians and residents with the scanning, they sit briefly at the doctors' desk to write ultrasound reports, they consult with other physicians by phone, and they often have to run up to the delivery room.²

Throughout the research I tried to minimize the effect of my presence on

² Barley (1988) has written about the temporal organization of ultrasound work among radiologists and radiology technicians.
the process and interpretation of the scans. When I began my research, the unit had been in operation for less than a month and the two technicians were still being trained. I was thus able to learn a lot about doing ultrasounds and interpreting the images just by listening to the obstetricians teach the technicians. I tried not to talk during the ultrasounds. In the early months of research, I would ask my questions of the physicians and technicians only after a scan was completed. However, once I had become a regular fixture at the clinic, the technicians would often relieve the monotony and pressure of their work by chatting with me while they scanned and patients would sometimes join in our conversation. I avoided the temptation to explain the image to patients. This was difficult when I knew that women had misunderstood the technician's explanation or were discouraged that they couldn't understand the image.

II.C. Research Focus Three: The Women

My third research aim was to provide an ethnographic account of how ultrasound imaging defines, limits, and affirms women's ideas about fetal selfhood and their behaviour toward the fetus.

I hypothesized that women's cognitive, affective, and behavioral responses to ultrasound would be determined by (1) women's beliefs and attitudes originating in their cultural logic, past experiences, and perceptions of other representations of the fetus; (2) how the fetal image is represented
to women in the clinic; and (3) women's reproductive and social circumstances (Petchesky 1987:73). I focused on three issues. One, I wanted to know how women's notions of fetal selfhood are linked to their reproductive histories (e.g., past abortion or miscarriage), social circumstances (e.g. religion, education, familial relations), and culture-specific notions of pregnancy, fetal development, and selfhood. Here, I investigated women's statements, ideas and descriptions of the fetus as well as their decisions, reports and intentions about prenatal care (e.g., diet, preparing for parenthood by purchasing baby clothes, attending childbirth classes). Two, I investigated whether or not and in what sense women's notions of the fetus differ before and after their ultrasounds. Three, I examined how women's knowledge of fetal selfhood and their prenatal behaviour are linked to conceptions and images of the fetus from outside the clinic. I tried to identify and explain how women's accounts of pregnancy women were influenced by representations of the fetus they encountered in guides to pregnancy, in electronic and print media, and elsewhere.

These women-centred accounts were based on multiple interviews with pregnant women, sometimes joined by their partners, and on observations of their ultrasound sessions. I intended to include women from a variety of social and reproductive backgrounds and thus, initially, I had only two recruitment criteria: (1) that the women have had no previous
obstetrical ultrasound and (2) that they be either French or English speaking. As I describe below, in the process of getting the hospital's permission to do the research and putting the project into practice, my recruitment criteria had to be changed.

II.C.1. Recruitment

I originally intended to obtain simple independent random samples of 50 pregnant women at each of two study hospitals, for a total of 100 women. That proved impossible. As I explain in the following pages, recruitment was more difficult and time-consuming than anticipated. I soon realized that I would not be able to simultaneously recruit, interview, and observe ultrasounds at two hospitals. I decided to focus on one hospital, recruit 50 women, observe their scans, and do four interviews with each of them. I planned to interview each woman before and after her first routine ultrasound which is usually done when she is about 18 weeks pregnant. I would do a third interview after her second routine scan at about 32 weeks pregnant. A final fourth interview would be done several weeks after delivery.

I obtained permission from the hospital to recruit "low risk" women who met the following criteria:

(a) no objection from the woman's obstetrician regarding her participation in the study;
(b) primiparous (had not had a live born infant);

(c) no previous obstetrical ultrasound;

(d) no indication for prenatal genetic diagnosis or known family history of genetic disease;

(e) between 18 and 34 years of age at the time of recruitment;

(f) no past history or concurrent significant medical disease (e.g., hypertension, diabetes);

(g) singleton pregnancies (no twins or triplets);

(h) no history of three or more miscarriages;

(i) French or English speakers (but not limited to women whose maternal language is either French or English).

I began recruiting women three mornings a week at the hospital Test Centre where women come for blood and urine tests early in their pregnancies usually before their first routine ultrasound. Physicians who referred obstetrical patients to the Test Centre and to the Ultrasound Unit were notified by letter of the study and none declined participation of their patients. The physicians did not know which of their patients I contacted or who elected to participate. After two months, hoping to speed the rate of recruitment, I also recruited women at the office of four obstetricians.

During the five months of recruitment, I contacted approximately 275 pregnant women. Among those women, 118 met the recruitment criteria and were eligible to participate. In French or English, as she preferred, I briefly described the study to each woman, answered her questions,
discussed the consent form and the honorarium for participation, and then asked her if she wanted to participate. I explained that I was interested in what women knew and expected of the ultrasound and that I was trying to understand what it meant for women to see the fetal image. Each woman asked to participate filled in a brief anonymous questionnaire about basic demographic information and previous ultrasound experience. Three women who initially agreed to be interviewed took the questionnaire to complete at home and then withdrew from the study. Thus, out of 118 eligible women, 115 questionnaires were completed.

Fifty-nine women of the 118 eligible initially agreed to be interviewed; of these, forty-nine women were interviewed at least once (42% of the 118 who were eligible). I collected interview data through to post-partum for 44 women (37% of the 118 who were eligible).

More women than I had anticipated had had an ultrasound early in pregnancy because of bleeding or for confirmation of the pregnancy. Five women in the study had an early scan before 10 gestational weeks. Two women had this early ultrasound shortly after I recruited them; the other three women I included since the scans were done prior to 7 weeks gestation and the women said they saw "nothing." Four women, including one who had an early scan in this pregnancy, had had an ultrasound during a previous pregnancy.

I invited each woman's husband or partner to the interview since I
intended to investigate gender differences in ideas about the fetus.
Seventeen men did participate, most for only one or two interviews, and
their comments are discussed. Since men often attended the ultrasounds I
was able to see their reaction to the fetal image.

II.C.2. Hospital Obstetric Population

My research focused on a sample of primiparous French and English-
speaking women. Although, the hospital does not collect information about
patient social and cultural characteristics, I have two means of describing
the larger primiparous hospital population.

One, based on the 115 questionnaires I obtained while recruiting, I
can give some description of primiparous women who were eligible to
participate in the research. The majority of the eligible women indicated
English as their maternal language (64%); less than one-quarter (24%)
indicated French (see Table Two). Forty-two percent were Québec-born
and a further 30% were born elsewhere in Canada. Their average age was
26.6 years and most were married (84%). The majority were Catholic
(60%); 15% were Jewish. Most women were employed (77%) and working
full-time. Most were between three and four months pregnant at the time of
Table 2. Description of Women Eligible to Participate

<table>
<thead>
<tr>
<th></th>
<th>%</th>
<th>(N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age:</td>
<td>26.6 years</td>
<td>(115)</td>
</tr>
<tr>
<td>Preferred Language:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>64%</td>
<td>(74)</td>
</tr>
<tr>
<td>French</td>
<td>24%</td>
<td>(28)</td>
</tr>
<tr>
<td>Other</td>
<td>11%</td>
<td>(13)</td>
</tr>
<tr>
<td>Birthplace:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Québec</td>
<td>42%</td>
<td>(48)</td>
</tr>
<tr>
<td>Elsewhere in Canada</td>
<td>30%</td>
<td>(34)</td>
</tr>
<tr>
<td>Outside Canada</td>
<td>29%</td>
<td>(33)</td>
</tr>
<tr>
<td>Marital Status:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>84%</td>
<td>(96)</td>
</tr>
<tr>
<td>Co-habiting, unmarried</td>
<td>13%</td>
<td>(15)</td>
</tr>
<tr>
<td>Not co-habiting, unmarried</td>
<td>4%</td>
<td>(4)</td>
</tr>
<tr>
<td>Religion:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catholic</td>
<td>60%</td>
<td>(69)</td>
</tr>
<tr>
<td>Jewish</td>
<td>15%</td>
<td>(17)</td>
</tr>
<tr>
<td>Greek Orthodox</td>
<td>7%</td>
<td>(8)</td>
</tr>
<tr>
<td>Protestant</td>
<td>7%</td>
<td>(8)</td>
</tr>
<tr>
<td>Other</td>
<td>11%</td>
<td>(13)</td>
</tr>
<tr>
<td>Education:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some high school</td>
<td>9%</td>
<td>(10)</td>
</tr>
<tr>
<td>High school graduate</td>
<td>37%</td>
<td>(43)</td>
</tr>
<tr>
<td>CEGEP(^2)/vocational graduate</td>
<td>25%</td>
<td>(29)</td>
</tr>
<tr>
<td>University graduate</td>
<td>29%</td>
<td>(33)</td>
</tr>
<tr>
<td>Education:</td>
<td>Women (115)</td>
<td>Partner (114)</td>
</tr>
<tr>
<td>Some high school</td>
<td>9%</td>
<td>11% (12)</td>
</tr>
<tr>
<td>High school graduate</td>
<td>37%</td>
<td>(43)</td>
</tr>
<tr>
<td>CEGEP(^2)/vocational graduate</td>
<td>25%</td>
<td>(29)</td>
</tr>
<tr>
<td>University graduate</td>
<td>29%</td>
<td>(33)</td>
</tr>
<tr>
<td>Employment Status:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed outside the home</td>
<td>77%</td>
<td>(89)</td>
</tr>
<tr>
<td>Not employed outside the home</td>
<td>23%</td>
<td>(26)</td>
</tr>
</tbody>
</table>

3. CEGEPs, or Collèges Enseignement Générale et Professionale, are attended by Québec students for vocational training or prior to university.
recruitment (average LMP=14.8 weeks). 4

Among the eligible women, the study participants were not randomly selected. The women are self-selected to the extent that they could decline to participate in the research. I did not ask women why they did not wish to participate; some explained that they were too busy with work or family responsibilities. Analysis of the recruitment questionnaires (see Table Three), indicates that women were more likely to participate in this project (at least to first interview) if they were Jewish, Québec-born, and held a university degree. Thus I was able to include a higher proportion of the women from these sub-groups in my research. Participants also tended to be slightly older and to work fewer hours than eligible non-participants. Only place of birth was statistically significant; 5 women who were born in Québec and whose husband and parents were Québec-born were more likely to participate than women born elsewhere (p<0.00005).

4. A note on terminology: "gestational age," "menstrual weeks," or "LMP" (last menstrual period) are synonymous terms commonly used by physicians to "date" the pregnancy. These terms refer to the number of weeks since the first day of the woman's last "normal" menstruation. Fetal age, less commonly employed, refers to "the age of the fetus from the presumed day of conception (approximately two weeks less than the menstrual or gestational age)" (Callen 1968:45).

5. Nominal and ordinal variables tested with chi-square and interval variables tested with T-tests were determined significant at p<0.05.
Table 3. Description of the Non-Participating and Participating Women

<table>
<thead>
<tr>
<th></th>
<th>Non-Participants (N=66)</th>
<th>Participants (N=49)</th>
<th>Participants as % of Eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age:</td>
<td>26.2 yrs</td>
<td>27.3 yrs</td>
<td>---</td>
</tr>
<tr>
<td>Median age:</td>
<td>25.5 yrs</td>
<td>27.0 yrs</td>
<td>---</td>
</tr>
<tr>
<td>Preferred Language:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>68% (45)</td>
<td>59% (29)</td>
<td>39%</td>
</tr>
<tr>
<td>French</td>
<td>27% (18)</td>
<td>20% (10)</td>
<td>36%</td>
</tr>
<tr>
<td>Other</td>
<td>5% (3)</td>
<td>20% (10)</td>
<td>77%</td>
</tr>
<tr>
<td>Birthplace:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Québec</td>
<td>21% (14)</td>
<td>69% (34)</td>
<td>71%</td>
</tr>
<tr>
<td>Elsewhere in Canada</td>
<td>46% (30)</td>
<td>8% (4)</td>
<td>12%</td>
</tr>
<tr>
<td>Outside Canada</td>
<td>33% (22)</td>
<td>22% (11)</td>
<td>33%</td>
</tr>
<tr>
<td>Mid East/N.Africa</td>
<td>3% (2)</td>
<td>8% (4)</td>
<td>67%</td>
</tr>
<tr>
<td>South Europe</td>
<td>9% (6)</td>
<td>4% (2)</td>
<td>25%</td>
</tr>
<tr>
<td>Northwest Europe</td>
<td>3% (2)</td>
<td>0% (0)</td>
<td>0%</td>
</tr>
<tr>
<td>South America</td>
<td>0% (0)</td>
<td>4% (2)</td>
<td>100%</td>
</tr>
<tr>
<td>Other</td>
<td>18% (12)</td>
<td>6% (3)</td>
<td>20%</td>
</tr>
<tr>
<td>Birthplace, Male Partner: N=65</td>
<td>N=49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Québec</td>
<td>14% (9)</td>
<td>61% (30)</td>
<td>77%</td>
</tr>
<tr>
<td>Elsewhere in Canada</td>
<td>49% (32)</td>
<td>14% (7)</td>
<td>18%</td>
</tr>
<tr>
<td>Outside Canada</td>
<td>37% (24)</td>
<td>25% (12)</td>
<td>33%</td>
</tr>
<tr>
<td>Mid East/N.Africa</td>
<td>5% (3)</td>
<td>12% (6)</td>
<td>67%</td>
</tr>
<tr>
<td>South Europe</td>
<td>14% (9)</td>
<td>6% (3)</td>
<td>25%</td>
</tr>
<tr>
<td>South America</td>
<td>3% (2)</td>
<td>2% (1)</td>
<td>33%</td>
</tr>
<tr>
<td>Other</td>
<td>15% (10)</td>
<td>4% (2)</td>
<td>17%</td>
</tr>
<tr>
<td>Religion:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catholic</td>
<td>64% (42)</td>
<td>55% (27)</td>
<td>39%</td>
</tr>
<tr>
<td>Jewish</td>
<td>9% (6)</td>
<td>23% (11)</td>
<td>65%</td>
</tr>
<tr>
<td>Greek Orthodox</td>
<td>6% (4)</td>
<td>8% (4)</td>
<td>50%</td>
</tr>
<tr>
<td>Protestant</td>
<td>9% (6)</td>
<td>4% (2)</td>
<td>25%</td>
</tr>
<tr>
<td>Other</td>
<td>12% (8)</td>
<td>10% (5)</td>
<td>39%</td>
</tr>
<tr>
<td>Education:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some high school</td>
<td>9% (6)</td>
<td>8% (4)</td>
<td>40%</td>
</tr>
<tr>
<td>High school graduate</td>
<td>38% (25)</td>
<td>37% (18)</td>
<td>42%</td>
</tr>
<tr>
<td>CEGEP/vocation grad</td>
<td>32% (21)</td>
<td>16% (8)</td>
<td>28%</td>
</tr>
<tr>
<td>University graduate</td>
<td>22% (14)</td>
<td>39% (19)</td>
<td>58%</td>
</tr>
</tbody>
</table>
Table 3. Description of the Non-Participating and Participating Women, contd.

<table>
<thead>
<tr>
<th></th>
<th>Non-Participants (N=66)</th>
<th>Participants (N=49)</th>
<th>Participants as % of Eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Partner's Education:</strong> (N=65)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some high school</td>
<td>11% (7)</td>
<td>10% (5)</td>
<td>42%</td>
</tr>
<tr>
<td>High school graduate</td>
<td>28% (18)</td>
<td>31% (15)</td>
<td>46%</td>
</tr>
<tr>
<td>CEGEP/vocation grad</td>
<td>23% (15)</td>
<td>20% (10)</td>
<td>40%</td>
</tr>
<tr>
<td>University graduate</td>
<td>39% (25)</td>
<td>39% (19)</td>
<td>43%</td>
</tr>
<tr>
<td><strong>Employment:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outside the home</td>
<td>79% (52)</td>
<td>76% (37)</td>
<td>42%</td>
</tr>
<tr>
<td>Inside the home</td>
<td>21% (14)</td>
<td>25% (12)</td>
<td>46%</td>
</tr>
<tr>
<td><strong>Occupation:</strong> (N=65)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working class</td>
<td>57% (37)</td>
<td>41% (20)</td>
<td>54%</td>
</tr>
<tr>
<td>Middle class</td>
<td>29% (19)</td>
<td>41% (20)</td>
<td>51%</td>
</tr>
<tr>
<td>Student</td>
<td>8% (5)</td>
<td>12% (6)</td>
<td>55%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>6% (4)</td>
<td>6% (3)</td>
<td>43%</td>
</tr>
<tr>
<td><strong>Mean weekly hours employment:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>39.2 (51)</td>
<td>37.5 (35)</td>
<td>—</td>
</tr>
<tr>
<td><strong>Marital Status:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>80% (53)</td>
<td>88% (43)</td>
<td>45%</td>
</tr>
<tr>
<td>Other</td>
<td>20% (13)</td>
<td>12% (6)</td>
<td>32%</td>
</tr>
<tr>
<td><strong>Number of Pregnancies (including current pregnancy):</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>85% (56)</td>
<td>69% (34)</td>
<td>38%</td>
</tr>
<tr>
<td>Two</td>
<td>15% (10)</td>
<td>25% (12)</td>
<td>55%</td>
</tr>
<tr>
<td>Three, Four</td>
<td>0% (0)</td>
<td>6% (3)</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Mean number of pregnancies:</strong></td>
<td>1.2</td>
<td>1.4</td>
<td>—</td>
</tr>
<tr>
<td><strong>Mean number of gestational weeks at recruitment</strong></td>
<td>14.8</td>
<td>14.8</td>
<td>—</td>
</tr>
</tbody>
</table>

6. Women's answers were divided into "middle class" or "working class" following Martin (1987) and Ehrenreich (1989)
Two, based on my observations at the clinic, I am aware that my interviews do not include primiparous women from several groups who have ultrasound scans at this hospital. There are a large number of Spanish-speaking women at this ultrasound clinic from Central and South American countries. I was unable to include these women since I chose to work without an interpreter. I did not reach "late attenders," women who do not come for prenatal care until the third trimester of pregnancy. I did not include women who, because of their past reproductive or medical history or because they are 35 years or older, are labelled as "high risk." Although including "high risk" women might have provided an interesting basis of comparison, I chose to focus on the largest group of women who have ultrasounds — "low risk" women.

II.C.3. Description of the Interviewed Women

In this section I summarize the information I collected on birthplace, language, religion, socio-economic status and reproductive histories of the women I interviewed.

II.C.3.a) Birthplace and Language

The forty-nine women I interviewed form a single generation, born between 1956 and 1967. The majority (88%) are Canadian citizens, most of whom (79%) are Montréal-born; three women (7%) were born and raised in
other Canadian provinces and six women (14%) immigrated to Montréal as young children from other countries (see Table 4). The remaining six women (12%) grew up outside of Canada and moved to Montréal recently, as adults. Thus, many of the women I interviewed share a place and a common period of history in which they were born and educated, and in which they matured, and are now working and having children. Most call themselves "Canadian." However, the label "Canadian" is not necessarily useful as an analytic category since the people of Canada, like the women in this study, represent a variety of ethnic backgrounds and languages. The women I interviewed cannot be neatly characterised in terms of one or even two or three "cultural traditions" or "ethnic groups." They include, and here I use their own labels, women who are "Armenian", "Lebanese," Montréal-born "Greek" or "Italian", "Québécoise", "food Jews", "WASPs," and "just Canadian", among others.

Within this diversity of cultural identities and traditions, about 43% of the women have ties to the cultures of the Mediterranean and Middle East. For example, six of the 12 women born outside of Canada come from Lebanon, Israel, Morocco, Italy or southern France. Two other women are from countries— Colombia and Guyana — with historical and linguistic ties to the Mediterranean. Among the 34 women who were born and raised in Québec, over one-third (38%) had one or both parents from the Circum-Mediterranean region, particularly Italy, Greece, or Morocco.
Table 4. Religion, Birthplace, and Linguistic Group of Interviewed Women

<table>
<thead>
<tr>
<th>Birthplace</th>
<th>Anglophone</th>
<th>Francophone</th>
<th>Allophone</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Québec</td>
<td>12</td>
<td>6</td>
<td>2</td>
<td>20 (41%)</td>
</tr>
<tr>
<td>Other Canadian</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>USA</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Italy</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Colombia</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Guyana</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

**CATHOLIC WOMEN (55%, N=27)**

<table>
<thead>
<tr>
<th>Birthplace</th>
<th>Anglophone</th>
<th>Francophone</th>
<th>Allophone</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Québec</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>8 (16%)</td>
</tr>
<tr>
<td>Israel</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>France</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Morocco</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

**JEWISH WOMEN (23%, N=11)**

<table>
<thead>
<tr>
<th>Birthplace</th>
<th>Anglophone</th>
<th>Francophone</th>
<th>Allophone</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Québec</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Australia</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

**GREEK ORTHODOX WOMEN (8%, N=4)**

<table>
<thead>
<tr>
<th>Birthplace</th>
<th>Anglophone</th>
<th>Francophone</th>
<th>Allophone</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Québec</td>
<td>1 (Anglican)</td>
<td>0</td>
<td>0</td>
<td>3 (6%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Birthplace</th>
<th>Anglophone</th>
<th>Francophone</th>
<th>Allophone</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Canadian</td>
<td>1 (Protestant)</td>
<td>0</td>
<td>0</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Lebanon</td>
<td>0</td>
<td>0</td>
<td>1 (Muslim)</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>0</td>
<td>0</td>
<td>1 (Armenian Orthodox)</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

**WOMEN OF OTHER RELIGIONS (14%, N=7)**

<table>
<thead>
<tr>
<th>Total</th>
<th>Anglophone</th>
<th>Francophone</th>
<th>Allophone</th>
</tr>
</thead>
<tbody>
<tr>
<td>29 (59%)</td>
<td>10 (20%)</td>
<td>10 (20%)</td>
<td></td>
</tr>
</tbody>
</table>
These ties of identity to the Circum-Mediterranean were articulated by some of the women. The links also began to look increasingly significant the harder I looked for some means of classifying and characterising these women. Nevertheless, only four of the women with ties to the Middle East and Mediterranean came to Canada as adults, the rest grew up in Canada, attending Canadian schools and becoming "Canadians," difficult though that identity may be to define. Moreover, as I discovered, their links to the Middle East and Mediterranean were not particularly important for distinguishing these women's accounts of pregnancy, the fetus, and ultrasound.

As I described in Chapter One, linguistic designation in Québec has a powerful social and political meaning. It is conventional to talk of anglophones, francophones, and allophones, and those labels have come to imply certain social positions. Based on these linguistic categories and according to each woman's preferred language, 60% of the group are English-speakers, 20% are French-speakers, and 20% are allophones (i.e., most comfortable in a language other than French or English). However, these conventional categories lose their meaning in view of the fact that over 80% of the women spoke more than one language in their daily lives and several women had been raised in bilingual or trilingual families. Among the 29 women who described themselves as English-speakers, less than one-third (28%) were unilingual. The majority (55%) spoke French at
work and over one-third (38%) spoke a third language with their parents. None of the ten women whose first and primary language was French were unilingual. Each used some English at work and three of the women spoke more English than French with their partners. The ten allophone women include seven languages and six countries of origin. Six of these women were born and lived outside of Canada in their native countries until they were young adults and four women who, although born in Montréal, spend most of their working and family life speaking Greek or Italian, rather than French or English.

II.C.3.b) Religion

As might be expected in Québec, Catholicism was the most common religion among the women I interviewed. Fifty-five percent of the women were raised as Catholics and had attended Catholic-run schools. Over half (56%) of all the Catholic women I interviewed described themselves as "non-practising." About 25% of the total number of Catholic women said they went to Mass at least once a week and observed other Catholic traditions, including regular confession and eating fish on Friday.

Twenty-three percent of the women I interviewed were Jewish. Except for one woman who had recently converted to Judaism, all of the Jewish women described their faith as a central and important part of their lives. All but two of the Jewish women observe kosher dietary rules, some
had husbands who went to synagogue regularly, and each woman intended
to send her children to a Jewish school. None are ultra-orthodox Jews.

There were six other religions represented among the women. Five
women are Greek Orthodox, two are Anglican and two are Protestant
women. There is also a non-practicing Lebanese Muslim woman, a
Lebanese Armenian Orthodox woman, and a Sri Lankan Tamil Hindu
woman who is being converted to Catholicism.

II.C.3.c) Social and Economic Dimensions

Nor are the women clearly demarcated along social or economic
lines. Using each woman's occupation, it was possible to divide the women
into "working class" (primarily, service jobs and office clerks) and "middle
class" (professionals, managers, administrators) (Ehrenreich 1989; Martin
1987). Although nearly all the women referred to themselves as "middle
class," some other indices support the division into two classes. For
example, about three-quarters (72%) of the middle class couples earned
over $55,000 annually in gross combined income; five couples earned
considerably more. Ninety percent of the working class couples earn a
gross combined income of less than $55,000 per year. Fifty-five per cent of
the working class couples earn less than $35,000 per year. Two women live

7. Students and unemployed women were assigned to a group based on their
previous or intended occupation or their income level.

I did not find the degree and range of class-based differences in household, family and resource characteristics which others have described for families in the United States (Martin 1987; Rapp 1982). The lack of class-based differences are due, in part, to differences in the American and Canadian systems of social welfare and assistance. Although the group of women I interviewed does include some poor and some wealthy women, the social and economic conditions of the majority were not as polarized as has been described for the United States.

II.C.3.d) Reproductive History

The women in this study can also be described in terms of their reproductive histories, their experiences of miscarriage, abortion, and fertility. There are three points to make here. First, because of the selection criteria, none of the women in this study have previously borne a child and all are fairly similar in terms of age, state of health, and unproblematic pregnancy. At the time of recruitment the youngest women were 22 years old, the oldest were 33. The median age at delivery for these women is 27 years, comparable to the median age of 26.1 years for first-time Canadian mothers in 1989 (Statistics Canada 1989 cited in A. Mitchell 1991). Because of their relatively young age and their general good
health, these women are considered by obstetricians to be at "low-risk" for problems during pregnancy and childbirth.

Second, this was the second pregnancy for 30% of the women. Five women had miscarried during an earlier pregnancy. Twelve women, or about one-quarter of the group, said that they had once had an abortion. None of these abortions was carried out because of fetal anomaly. Most explained their decision to have an abortion by saying "it wasn't the right time" or the "right man." Eleven of the twelve women underwent a first trimester abortion prior to feeling fetal movement. Only one of the twelve women recalled having an ultrasound during the pregnancy which was terminated, however, this woman didn't remember seeing the screen.

Third, 37% of the women said they not had intended to become pregnant when they did; eighteen women described the pregnancy as "accidental," including four women who qualified this by saying they became pregnant "earlier" than intended. The ease and rapidity with which they conceived was a source of pride to the women. Four women had found it difficult to get pregnant; they had been trying for a year or more and were intensely relieved to have conceived. Each of the women interviewed became pregnant through sexual intercourse and not by in vitro fertilization or any of the other new reproductive technologies. Although their experiences of their own fertility varied, as did their initial reactions to news of the pregnancy, all of the women had decided to continue the pregnancy
by the time I interviewed them.

II.C.4. Methods

In total I did 188 interviews with the women; the first conducted in January 1990 and the last post-partum interviews one year later. Of the 49 women with whom I conducted a first interview, 44 were seen through to post-partum. Two women left the study without explanation, one woman changed hospitals, one woman miscarried and a fifth woman dropped out after a potentially serious fetal anomaly was diagnosed. Most women were interviewed at least three or four times. The first interview was conducted usually 3 or 4 days before a woman's first routine ultrasound (at about 16 to 18 gestational weeks). The women were interviewed again several days after that ultrasound. The third interview was done after their second routine ultrasound (at about 32 weeks). I conducted final follow-up interviews at a few weeks post-partum. I also did brief interviews with women after they had any additional non-routine scans. The timing of the interviews varied; not all women had their routine ultrasounds at exactly 18 weeks and 32 weeks gestation and some women could not be interviewed until one or two weeks after their scans. In addition, since women were often having their first scan at about the same time that I contacted them, it was sometimes difficult to conduct the first interview prior to the first routine scan. With four of the women in the study, I had to forgo a "pre-ultrasound" interview and do
the first two interviews together as soon as possible after their ultrasound. All the interviews were done by myself and most were conducted in the women's homes. Interviews were done in French or English (or a mix of the two languages), depending upon the participant's preference and were tape-recorded only with permission.

The interviews with women and observations of their ultrasound sessions were designed to provide information about their particular social and reproductive circumstances, the experience of the clinical interpretation of the ultrasound, and the impact of the fetal image on women's knowledge of fetal selfhood and on their behaviour during pregnancy. I asked questions about the concrete circumstances from which women viewed the fetal image. We talked about their reproductive histories, about their miscarriages, abortions, relative ease or difficulty in getting pregnant. I asked questions about the social characteristics of women's lives, their education, job, ethnicity, relationships with their husbands, families and friends. Most of my questions were intended to encourage women to talk about their beliefs about conception, pregnancy, fetal development, and the etiology of fetal disorders.

By observing the women's ultrasound sessions I was able to witness their initial reactions to the fetal image. I was also able to determine how the fetal image was interpreted for them by physicians and technicians at the clinic. By interviewing women before and after ultrasound, I tried to
identify changes in their knowledge of the fetus and especially fetal selfhood. By doing multiple interviews through the pregnancy to post-partum, I explored how the fetal image in clinical discourse, conveyed to women during the scan and in conversation with their physicians is linked to women’s decisions about behaviour during pregnancy (including, changes in activities, diet, alcohol intake).

II.C.5. Interviewing the Women

In general, the women I interviewed welcomed me into their homes and into their pregnancies. They would show me, often proudly, their growing bellies and items purchased in anticipation of the baby. At other times they were subdued and exhausted by the weight and changes of their bodies and lives. But the women were always eager to talk about it all. Many women complained that everyone they knew had advice, telling them what to do, what not to do, and what to feel, or not feel. As one woman described,

My friends all act like Eve, they were the first to conceive, first ones ever to have a baby. [They’re telling me] ”you’re not doing anything right.” All this stuff!

I believe the interviews provided women an opportunity to talk without being told and to have someone who was interested more in how they felt than in how they should be feeling.

Throughout their pregnancies I kept in touch with the women by
phone, confirming ultrasound and interview times and chatting about how they were feeling, their visits to the doctor, and the prenatal classes. With several women I developed friendships that have lasted past the end of the research. For two women I acted as labour support during the birth of their babies. Although the women saw me writing and taping during the interviews, I believe they were frank about their lives. They told me about abortions, their decisions to stop using contraception against a husband’s wishes, the shock of unplanned pregnancy, the resentment of having to put careers on hold and of “feeling fat,” and the frustration with husbands who lost sexual desire for them as their bodies grew. Women talked of their experiences and often said, “Well, you know what I mean,” establishing that as women we shared common kinds of bodies and common challenges to our sense of selves as women, wives, and workers.

In keeping with anthropological tradition, the interview questions were open-ended to encourage the exploration of topics which reflect the respondent’s rather than the researcher’s logic and sources of meaning. The interviews were problematic for several reasons. First is the issue of language. The majority of the women spoke English as their first language and our conversations were in English. Although I came to feel more confident speaking and listening in French I know that the data from my interviews in French lacked the detail and nuance of the English interviews.

The second issue is my influence on the interview. I know that the
interviews raised questions in the women's minds (e.g., about fetal
development, about the safety of ultrasound) and may have led them to ask
these questions of their physicians or to be more reflective of their own
feelings and experiences. Most women assumed that I knew more about
pregnancy, fetal development and ultrasound than they did and sometimes
they preferred not to answer than give what they felt was a wrong answer.

Third, although I was interested in women's behaviour toward the
fetus as well as their talk about it, most of my data refer to their talk. The
reliance on what is said rather than what is done is a limitation of doing
occasional interviews rather than prolonged daily observations. Talk and
behaviour are certainly not equivalent, but they are constructed of the same
cultural assumptions. For example, among the women who were smokers I
was not particularly interested in whether or not they actually quit smoking
during pregnancy. I was interested in whether or not they felt they should
quit, why they felt that way, and why they so often felt concerned to explain
their decisions to me in some detail.

III. The Analysis

As is customary in anthropology, I began my ethnographic analysis
with the first field notes and through the process of enquiry, discovery, and
refinement of questioning continued the analysis for the duration of the
fieldwork. I transcribed tape recordings of all but the post-partum interviews.
Once my computer files of field notes and transcripts had begun to swell, I began detailed comparisons, collating and cross-indexing with key words and themes. My approach was processual and non-evaluative (Young 1981): the context of observations, statements and practices informed my analysis of those data and I tried not to assess the rationality of statements or behaviours. I did not, for example, compare medical and women's statements about the fetus in order to suggest why women's "beliefs" were not the same as medical "facts". Nor did I try to explain either medical or women's knowledge and practices in terms of some internally consistent model of cognition and behaviour. I organized and interpreted the data in order to identify and explain what facts about the fetal self were produced through ultrasound imaging, how these facts were made meaningful to different actors, and their multiple interpretations and uses.

While the analysis is primarily ethnographic and qualitative, I did some quantitative analysis. For example, I used chi-square and t-tests with data gathered through sampling questionnaires to indicate sample bias in the self-selected interview sample. I also used summary and descriptive statistics to annotate the ethnographic analysis by indicating, for example, the average duration of ultrasound session, elements of fetal anatomy most often pointed out by the technician, questions most frequently asked by parents. Quantitative analysis was done with the SPSS/PC+ Studentware package.
CHAPTER THREE: THE HISTORY OF ULTRASOUND
FETAL IMAGING

First of all, you have to figure out what you're looking at.
(Obstetrician, interview)

This book is dedicated to every sonographer who has ever looked at an ultrasonic image and wondered what was going on.
(Powis 1984)

In this chapter I discuss the history of ultrasound imaging in order to show how ultrasound has come be taken for granted as a window on the fetus. My intention is to show, along the lines of argument employed in Pasveer's (1989;1990) history of X-ray, that ultrasound images were not immediately meaningful as representations of the fetus. Instead, ultrasound images become representations of the fetus only as a context and consensus emerged by which to make sense of them. Ultrasound images, originally interpreted to approximate the fetus known by other diagnostic means, now create the fetus as a complex, behaving and infinitely diagnosable individual. Creating the fetus as an individual, as a patient, has engendered a moral imperative to use ultrasound in order not to miss anything.

I begin this chapter with a discussion of how the fetus was known
prior to ultrasound and of the events which led to the first ultrasound fetal imaging. I discuss the process through which the unknowns of the ultrasound image were made knowable and convincing to obstetricians. This process included changes in ultrasound technology and in diagnostic criteria, as well as the institutionalization of ultrasound fetal imaging in obstetrical practice. The historical process by which ultrasound images have become a window on the fetus is intimately connected to the construction of the fetus as a patient.

I. The Fetus Within and the Physician Without

I.A. The Unseen Fetus

Ultrasound images are a relatively recent means of producing facts about the fetus but they have come to occupy a central position in medicine’s claims to specialized knowledge about pregnancy and the fetus. During the first half of this century, American and Canadian physicians were particularly successful in establishing that they, and not midwives, were the appropriate practitioners for childbirth and that the hospital, rather than the home, was the safest place for labour and delivery (e.g., Arnup et al. 1990; Ehrenreich and English 1973; Oakley 1986a; Rothman 1982; Summey and Hurst 1986; Tew 1990). By mid-century, the majority of women in Québec and other Canadian provinces were giving birth in hospital attended by physicians (Laurendeau 1987:129; Mitchison 1991a, 1991b). At the time,
obstetrical claims to have made childbirth safe and relatively painless were unchallenged. In fact, statistics often did not support physicians’ claims that their hospitalization decreased maternal and infant mortality and morbidity.¹ A 1933 Ontario study found no significant decline in maternal mortality in the previous 25 years and found the rate of maternal deaths in hospital to be higher than at home (Oppenheimer 1990:67). Obstetricians responded by arguing that hospitalization during delivery was not enough; a woman should be in the care of a physician throughout the duration of her pregnancy and birth (Mitchison 1991b; Oppenheimer 1990). In particular, obstetricians advocated frequent prenatal examinations.

Until about twenty years ago, physicians and midwives relied primarily on auscultation, palpation, analysis of maternal blood and urine and the woman’s own accounts of the pregnancy as the routine means of acquiring information about the fetus in utero (Eastman and Hellman 1961; Tew 1990). Reports of hearing the fetal heart appeared in the early 1880s, but according to Oakley (1986a:26), ”regular monitoring of the condition of the fetus by this means did not become accepted practice for many decades.” Palpating the woman’s abdomen to feel the size and firmness of the uterus,

¹ A more recent interpretation suggests that "improvements in sanitation, prenatal care, pasteurization of milk, refrigeration, and ... immunization" rather than hospitalization, were the key factors responsible for more mothers and infants surviving (Pierson et al. 1990: xvii; see also Oakley 1984a; Strong-Boag and McPherson 1990; Tew 1990).
to assess the growth, size and position of the fetus has been part of medical prenatal care since the late 1880s (Oakley 1986a:26). Charting a woman's blood pressure and studying her urine could alert physicians to the potentially fatal problem of maternal toxaemia. However, during the 1940s and 1950s, it became clear to physicians that perinatal and neonatal mortality, or the number of fetal deaths at 28 weeks or more gestation plus the number of deaths within the first week of life, were still a major contributor to infant mortality within the first year of life (Oakley 1986a:147). History taking, auscultation and palpation conveyed little information about the obstetrical "disasters" which happened within the womb: gross malformations, developmental retardation, stillbirths, placental anomalies. In the words of Dick Berkowitz, one of the first specialists in fetal medicine, "we knew virtually nothing of what was happening in the uterus until it was emptied at delivery. I thought of the uterus as being a black box" (cited in Kolata 1990:136).

With the discovery of X-rays, obstetricians thought that they might have their window into this black box. As early as 1898, only two years after Röntgen publicized his discovery, X-rays were being used in difficult obstetric cases to establish fetal head size (Leavitt 1986:267). By the 1930s, X-rays were in general obstetrical use in North America and Great Britain as a means of confirming pregnancy, determining the cephalopelvic index (the ratio of fetal head size to maternal pelvic diameter) prior to
labour, and searching for fetal skeletal anomalies (Hiddinga and Blume 1992; Oakley 1986a). The first concerns about the effects of irradiation on human health were published in the 1920s, but they had little impact on what had by then become a routine pre-natal procedure (Oakley 1986a). In 1956, the publication of a statistically significant association between childhood cancer and exposure to x-ray in utero prompted some hospitals to decrease their number of obstetrical radiological exams (Oakley 1986a). Even though X-rays remained part of prenatal practice for many years, their value as a means of acquiring specialized knowledge about the fetus was tarnished.

I.B. Sonar, Submarines and the Fetus

In the late 1950s, an obstetrician-gynecologist in Glasgow named Ian Donald was faced with what he has called the "clinical frustration [of the] ... problematical female abdomen" (Donald 1980:8). He was searching for a way to distinguish abdominal, uterine, or ovarian tumours among his patients many of whom were poorly nourished, sometimes obese, and often lacking regular medical care. Donald borrowed ultrasound equipment used for metal flaw detection from a Glasgow foundry and began to experiment. While he was trying to distinguish tumours, Marjorie Marr, an obstetrical nurse at his hospital was secretly using the apparatus to determine fetal position among women (Donald 1980:9). When he learned of Marr's
method, Donald had no hesitation about moving his experiments to obstetrical patients. As he explained, "[t]he pregnant uterus offers considerable scope for this kind of work because it is a cystic cavity containing a solid fetus" (1958:1192).

Ian Donald is now regarded as the father of obstetrical ultrasound imaging; Marjorie Marr appears to have received little or no credit. Donald has attributed his interest in ultrasound to various influences: his secret desire to be an engineer, to practicing in the industrial city of Glasgow, and to the fact that he had daughters and no sons (Donald 1980; Oakley 1986a:157). One source of his attraction to ultrasound, or "sonar" as he preferred to call it, is clear. For Donald, using ultrasound to detect the fetus was a natural outcome of its earlier military use.

[The same principle [of sonar] ... had been developed in the 1914-1918 war for the detection of German U-boats lurking within the depths of the ocean. ... There is not so much difference after all between a fetus in utero and a submarine at sea. It is simply a question of refinement (Donald 1969:610,618).

When Ian Donald began to experiment in the late 1950s, ultrasound was already in use in medicine as a therapeutic tool employed by psychiatrists, neurologists and ophthalmologists (Goldberg and Kimmelman 1980).

2. Ultrasound has had many names in its short history: hyperphonography (Dussik), somagrams or somoscope (Howry), sonar (Donald), sonography, ultrasonography, and echography.

3. Psychiatrists were practitioners of "physical medicine" (White 1990:33), a medical speciality based on the curing of disease by physical therapy, including
1988; White 1990; Yoxen 1987:283). There were a few researchers trying to develop ultrasound as a diagnostic tool (I will detail the history of ultrasound technology in later sections of this chapter.) However, the patterns which resulted from directing sound waves at anatomical specimens lacked a clear one-to-one correspondence with those specimens. There was no consensus among the early researchers about what ultrasound images could or did represent. More importantly, physicians were not convinced that ultrasound images held any diagnostic value (Leopold 1990).

I.C. Pasveer's Approach to the History of X-ray Images

In the remainder of this chapter I argue that ultrasound images were not immediately or self-evidently meaningful since they lacked an agreed upon content and a context by which to determine their clinical significance. My argument is based on the work of Dutch sociologist Bernike Pasveer. Pasveer studied the introduction of X-ray imaging in medicine (1989; 1990). Her argument is that X-ray images did not initially convey the sense which they do today "as precise, objective representations of disease" (Pasveer 1990:3). Instead, [röntgenologists and physicians ... had to determine, shape, construct the precise content of the images" so that X-rays could be

exercise, heat, cold, massage, and ultrasound (Taber's Cyclopedia Medical Dictionary 1981).
clinically meaningful (Pasveer 1990:2). Pasveer rejects the conventional
histories of radiography in which X-rays were problematic only until
radiographers learned to decode or interpret the shadowy plates and thus
release the diagnostic information. Most histories of ultrasound imaging are
similarly described: ultrasound images are assumed to be views, albeit
blurry ones, of reality which require only a learned skill to decipher.

Pasveer's claim that X-ray images were shaped into representations
of reality also goes beyond the argument that the deciphering of the images
was a matter of professional interest. Sociologist Ann Oakley's (1986a:183)
history of ultrasound provides an example of this argument:

The obstetrical pursuit of more and more knowledge about the fetal
condition and life-style in utero is integral to the obstetrical claim to
expertise in general. The desire for knowledge preceded the
antenatal care revolution; as necessity is the mother of invention, so it
has been only the technical capacity for knowledge that is truly new.

Oakley's recognition of the importance of fetal imaging for obstetrical
authority is noteworthy. My point here is that she begins with the basic
assumption that obstetrical ultrasound images have always contained
information about the fetus.

Pasveer argues that after X-rays were discovered in 1895 radiologists
readily assumed that the resulting images could represent reality. However,
the interior of the living human body was still unfamiliar and there was no
way to know what that interior would "look like when represented as two-
dimensional black and white shadows ... or [how] were the shadows to be
clinically relevant?" (Pasveer 1989:367). She argues that in order for the X-ray images "to become 'true' -- to [have them] represent health and disease in a knowledgeable and useful way, the images needed a context and an intelligible content" (Pasveer 1989:362).

Pasveer describes four ways in which the X-ray images were made to correspond with the known world of human anatomy. First, experiments with the technology, the images and the things being imaged gave a sense of familiarity with the inside of the body as shadows. Second, the appearance of the normal and the pathological was created by comparing X-ray images to tissues at autopsy or X-rays of those tissues. Third, X-ray images were compared to the results of traditional methods of diagnosis. Fourth, the images from one patient were compared with those of others.

Pasveer (1989) also points out that as X-ray images were being shaped to become accurate representations of the anatomy and pathology of the interior of the human body, so also was radiology acquiring recognition as a legitimate medical specialty, capable of regulating the production and interpretation of images and of making those images relevant for physicians.

In the following pages I show how Pasveer's approach is relevant to the history of ultrasound imaging.

II. Learning to See: Redescribing Ultrasound Images as Reality
II.A. Physical Principles

When Ian Donald first borrowed ultrasound equipment from a Glaswegian foundry in order to examine his patients, the apparatus, procedure, and the resulting ultrasound image were very different than they are today. However, the basic echo principle of ultrasound imaging is unchanged⁴. In contrast, X-rays, fluoroscopy, and computed tomography provide images by transmitting energy into one side of the patient and recording that energy on film on the other side of the patient (Sarti and Kimme-Smith 1987:1). In ultrasound, energy in the form of inaudible high frequency sound waves⁵ are sent into the human body from a transducer or probe. The transducer is both a transmitter and a receiver of sound waves. The sound waves leave the transducer, pass through the body, strike internal structures, and are reflected back to the transducer. A piezoelectric crystal in the transducer converts the reflected wave into an electric signal.

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4. As I describe in this chapter, the earliest diagnostic attempts were with transmitted, rather than reflected, ultrasound energy. Contemporary obstetrical ultrasound employs only reflected energy.

5. Ultrasound's output of energy is conventionally described in terms of pulses, cycles or Hertz per second. Obstetrical ultrasound equipment generally employs between 1 million and 10 million Hertz (megahertz) per second (Health and Welfare 1989). Although ultrasound can be described in terms of cycles per second, the "intensity, duration, and repetition rate of these pulses varies enormously from one machine to another" (Meire 1987:1121). It is impossible to calculate an individual's dose or exposure to ultrasound since there is no way to determine how much energy was absorbed (Meire 1987; Stratmeyer and Christman 1983).
which is then displayed as a line or a dot on a screen.

II.B. Men and machines: experimenting with the technology

Ultrasound's earliest practical application began shortly after the sinking of the Titanic in 1912. After that tragedy, researchers developed a means to detect icebergs with pulsed beams of high frequency sound waves (Kratochvil 1980:111). During World War I, these beams were renamed "sonar," an acronym for "sound navigation and ranging," and were used to detect German submarines off the coasts of Great Britain and France (Donald 1980). By the Second World War, ultrasound was also employed to scan construction metal for potentially dangerous flaws.

Although these maritime, military and industrial applications employed reflected or echoed ultrasound, the first attempts to use sound waves as a medical diagnostic tool used a transmission or shadow technique like X-ray. During the late 1930s, an Austrian neurologist, Karl Theo Dussik, and his brother Friedrich, a physicist, were the first to claim that "[ultrasound] energy transmitted through an organ could be used to create a pattern [on a photographic plate] that would represent that organ" (Yoxen 1987:284). The American Navy became interested in their experiments with brain tissues. By 1950 the Navy was funding several ultrasound projects at the Massachusetts Institute of Technology (MIT) Acoustics Laboratory and the Massachusetts General Hospital (Yoxen 1987). One year later the projects
were terminated following a published account of the researchers' inability to "distinguish the information in the transmitted signal from the 'noise' introduced by medically irrelevant variations in skull thickness" (Yoxen 1987:288).

While the MIT group was still in existence, a surgeon in Minneapolis obtained military radar equipment in order to experiment with reflected ultrasound. Jack Wild hoped that a stationary ultrasonic beam directed at a specimen of intestinal wall would indicate thickening due to cancerous tumours. The reflections from the beam of sound waves were directed back onto a cathode ray tube and converted into a single line signal. These A-mode or amplitude ultrasounds resemble the spikes and dips of an electrocardiograph reading. Vertical blips represent the strength of the signal and the horizontal baseline is a measure of the distance from the ultrasound probe.

Wild showed that an echo could be produced from human tissue and that abnormal and normal tissue might be distinguished by means of echoes (Goldberg and Kimmelman 1988:8). However, the echo pattern of blips and valleys was meaningless without some means of comparing the object studied and the echoes. Wild's (1950) attempts to make the echo tracings meaningful were not successful in large part because he was comparing a photograph of the exterior of an intestine with an electronically rendered image of its interior. Four years later, Wild and his colleague, an electronic
engineer named John Reid, were still searching for a way to show that "some 'meaning' has been obtained from the echo-patterns which appeared confusing to other workers" (Wild and Reid 1954:278). They tried cross-sectional diagrams as well as ratios of the distances between and the heights of the echoes, but the A-mode images remained essentially meaningless without the original specimen for direct examination. A 1955 report for the United States Atomic Energy Commission was not optimistic about the future for diagnostic ultrasound.

Probably the most difficult aspect of the problem is to interpret the data yielded by the echo-ranging systems. The familiar A-scope presentation ... is quite seriously limited in its information. It is necessary to integrate or scan a whole series of probe positions in order to consolidate the data so that any analysis can be performed on it. The reflection patterns are so complex that only a comparative analysis against a normal pattern can be interpreted. The problem is so difficult because we are not used to mentally interpreting data which shows not only the exterior details but all the internal configurations of an opaque solid presented in three dimensions (USAEC 1955:23 as cited in Yoxen 1987:294).

In Denver, Colorado, a physician and electronic engineer team modified the standard A-mode ultrasound equipment to produce the first cross-sectional pattern of echoes, B-mode. By sweeping a beam of ultrasound energy across a specimen, Douglass Howry and Rod Bliss constructed a cross-sectional slice of that specimen. In B-mode, instead of a line, the reflected echoes appear as dots of light. The image displayed whatever features reflected the sound waves. Moreover, ultrasound could only be used on organ specimens or on a patient extremities, since within
the complex interior of the body there was virtually no way to know which surfaces were being reflected. As with A-scans, the problem still remained that "one needs to know what should be where, and one needs to be able to visualize how any given slice will appear" (Yoxen 1987:293-294). So, the resulting images could be made to correspond to a known view of the interior of the human body only with an accompanying reference diagram. The structural interior of the human body was relatively well known by this time. Cross-sectional diagrams used in teaching anatomy were available for comparison with ultrasound images, but "only surgeons used them in daily practice" (Leopold 1990:24). Most physicians were unaccustomed to seeing the interior of the body in cross-section, as a series of planes. Even the ultrasound experimenters were not convinced that the "dramatically direct" or "pictorial" B-scan representations were more useful than the blips and valleys of A-scans. (Wild and Reid 1954:281, 282).

Eventually the researchers made another modification to their ultrasound apparatus which changed the resulting images. Howry and Wild noticed that the strongest reflections occurred at the interface between tissues of different densities and when the beam of ultrasound hit the interface at a right angle. The resulting image displayed the echoes from the outlines of internal structures. Ian Donald (Donald et al. 1958:1190) later described these compound scans as "composed of a large number of overlapping sector scans, [in which] each potential reflecting surface is
"seen" by the probe from a great number of angles.” However, “seeing” the interior of the body as a series of reflections from the interfaces of anatomical structures was difficult. Because they depicted the outlines of anatomical structures, compound images seemed very much like the cross-sectional diagrams used to interpret them. But because of the multiple reflections, compound images lost a great deal in terms of resolution or clarity. Donald explains the problem as follows.

Although very much more pictorial information can be obtained from a two-dimensional B-scan picture than from an A-scan, nevertheless any sectional view may miss the main point of interest. ... The limitations of two-dimensional scanning therefore must be to some extent compensated by multiple scans and at least some knowledge of the likely pathology to be encountered (1976b:562-563).

Not only did compound images still rely heavily on knowing what was been scanned, their production demanded a detailed understanding of the technical workings of the equipment. One of the major limitations of ultrasound noted by the Yearbook of Obstetrics and Gynecology (1966) was that it required the "presence not only of the physician performing the experiment but also of a physicist or at least a physician who knows a great deal about physics (Greenhill 1966:49). As a consequence, articles on ultrasound until well into the 1960s are filled with discussions, calculations, and diagrams intended to familiarize physicians with the technical principles of producing images from within the human body so that they might be able to interpret the images.
To this point the changes in ultrasound technology were intended to make the images conform to a known, usually cross-sectional, representation of the body. Each researcher did whatever he could by way of modifying the equipment and the scanning procedure to make the ultrasound images appear like that familiar representation. This individualistic method of producing the images severely limited their diagnostic potential.

Inherent in the experimental biological method is the concept of controlling systems in such a manner that all variables except one are held constant. Thus a second echogram ... is recorded through normal breast tissue without alteration of the controls of the echograph [the apparatus]. Since there is a case to case alteration of the controls, it is not valid to compare echograms from case to case (Wild and Reid 1954:280, my emphasis).

In 1955, when Ian Donald began to use ultrasound, there was still no consensus that human tissue could be differentiated by ultrasound. He and his colleagues began by comparing the A-scan images from specimens of ovarian cysts and uterine fibroids and a control piece of steak. Encouraged by his ability to produce images which differed among the cysts, fibroids and the steak, Donald brought the equipment to his hospital and by about 1957 he was scanning obstetrical patients (Donald 1980). He was, however, unable to make sense of the A-scan images beyond those from "the simplest reflecting surfaces" such as the full maternal bladder or the margins and midline of the fetal skull (Donald 1958:1189). Hoping to see more, the Glasgow group turned to the more complex apparatus of B-mode scanning.
Years later, Donald (1980:10) recalled

"[t]he object [in B-scanning] was, of course, to position the echo dots geometrically in accordance with the attitude of the exploring crystal on the patients body surface and to relate them to their points of origin within the body. This all sounds remarkably obvious today but, believe me, we hardly knew at that time how or where to look and were like the blind leading the blind.

In 1958, The Lancet published Donald's findings in a paper entitled "Investigation of Abdominal Masses by Pulsed Ultrasound." Included in the paper are photographs of the B-mode cross-sectional images of ovarian cysts, uterine fibroids, and the healthy abdomen of one of the authors. Most of the photographs, however, are of ultrasound fetal images: a fetal skull, twins, and a 14-week fetus (Donald et al. 1958). Based on his successes and failures in diagnosing abdominal tumours, Donald concluded:

Our experience of 78 cases in which diagnosis was quickly verified by laparotomy and subsequent histology indicates that ultrasonic diagnosis is still very crude, and that the preoperative diagnosis of histological structure is still far off, although such a possibility in the future is an exciting prospect. The fact that recordable echoes can be obtained at all has both surprised and encouraged us, but our findings are still of more academic interest than practical importance and we do not feel that our clinical judgement should be influenced by our ultrasound findings. ... [I]t is only fair to point out that the illustrations shown herewith are among the very best we have been able to produce out of about 450. They do however, encourage great efforts to refine our technique (Donald et al. 1958:1190).

What is striking about Donald's early descriptions of ultrasound images is that while he admits his surprise at being able to produce an image, he does not doubt the accuracy of the image. Nor did the editor of the 1959-1960 Yearbook of Obstetrics and Gynecology: "I was astonished at
the accuracy with which the apparatus could differentiate between ovarian
cysts, fibromyomas of the uterus and pregnancy" (Greenhill 1960:304).
Within a very short period of time after the ultrasound images were rendered
into cross-sections, there was no longer a debate about whether or not
ultrasound could produce an accurate representation. Although Donald was
cautious about the diagnostic role of ultrasound, he assumed that the
images contained diagnostic information. All he had to do was improve the
technology and learn how to read the images so as to display their
diagnostic significance.

Pasveer argues that during the early years of X-ray "the act of
visualizing [the interior of the body] itself, and not merely diagnosing, was at
stake" (1989:369). Ultrasound researchers faced the same problem. They
had to show, first, that echoes could be produced from within the interior of
the living human body. Then they had to provide the means for making
those echoes into a meaningful representation of that interior. In contrast to
X-ray, however, ultrasound was introduced into a medicine that was already
familiar with visual representations of the structures and activities inside the
human body: X-rays, photographs, electrocardiographs. By the time Ian
Donald was publishing his fetal images, visual representations from
photography and television were accepted as part of the taken for granted
world. Thus much of the cultural groundwork for representing visually the
interior of the living body had been accomplished. Indeed Donald did not
provide reference diagrams in his articles, he assumed his ultrasound images would be understood with only explanatory descriptions and the occasional indicating arrow. He also used a polaroid camera, rather than a photographic plate, to have an immediate record of the images. In Pasveer's terms, ultrasound images, like X-rays, came to be equated with photographs which "suggest hardly any interference, hardly any constructive activities" (1990:1).

The next two major technological modifications, grey-scaling and realtime imaging, made the images seem even less constructed and more like photographs or films.

In both A-and B-types of scanning, only the strongest echoes were recorded and all echoes appeared in the same colour (presumably white) and intensity (Leopold 1990). In later B-scans, the brightness or intensity of the dot varied slightly. Detecting often subtle differences in the intensity of light is not easy for the human eye and only certain intensities could be distinguished. Dramatic differences in brightness (such as the dark of amniotic fluid and the white of fetal cranial bone), uniformly bright reflecting surfaces (again, like the circular outline of fetal skull or the bright outline of the gestational sac in early pregnancy) or surfaces which reflected in a characteristic pattern (like the placenta) were the first echoes to be given significance.

In the early 1970s, a standard film grey-scale was applied to the
process in order to differentiate among the tissues (Donald 1980; Kratochwil: 1978). "Each dot [in the ultrasound image] represents an echo-producing surface within the body" (Health Services Directorate 1985:22) and each surface has a different reflectivity so that with a grey scale, different reflective ratios automatically appear as shades of black, grey and white. Dense surfaces, like bone and the lens of the eye which reflect rather than absorb most of the ultrasound energy, are translated into white dots. Gases and fluids are highly absorbent, so in conventional ultrasounds, urine-filled bladders and full stomachs appear nearly black. Soft tissues of organs such as the liver or kidney appear in varying shades of grey.

With grey-scaling, a technique borrowed from photography and television, ultrasound images became even more securely "pictorial" since they become more complexly patterned and more like the world as we see it. With grey scaling, physicians no longer needed to learn how echoes were produced and reflected within the body in order to differentiate among anatomical structures. They needed only to become familiar with the appearance of the interior of the body in varying shades of grey. In the same way that we make sense of a black and white photograph or motion picture, grey-scaled ultrasound images are made meaningful. Articles about

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6. MacKay (1984:235) remarks that some practitioners had come to regard black and white images as normal and did not immediately accept the more complex grey scaled images as an improvement.
ultrasound imaging from the early 1970s contain less and less information about the equipment, physical principles, and procedures of ultrasound. Instead they are increasingly devoted to descriptions and to photographs of what had been seen by ultrasound.

In the mid-1970s, the earliest "dynamic" scanners were developed. In the same way that a movie film is composed of individual stills, "dynamic" or, as it is now called "real-time," scanning occurs when dozens of complete images are displayed per second, much faster than the human eye can distinguish among them (MacKay 1984:117). The resulting image appears to move. An ultrasound could now be conducted more rapidly since the operator no longer had to build up an image of the fetus with successive sweeps of the probe. It was also suggested that the new methods improved the reproducibility of the scans, so even an inexperienced operator could obtain a clinically useful image of the fetus (e.g., Pitkin and Zlatnick 1979:197-198). As the resulting pattern of echoes continued to lose its constructed nature, ultrasound became "real-time" and the convincing nature of the image grew.

II.C. Ultrasound Unknowns and Anatomical Knowns

Looking today at reproductions of ultrasound images — particularly if one has been studying similar images for a year or two — does not suggest a constructive process. The photographs are labelled and described
concretely without qualification. Once the viewer has become familiar with
the circle that is always labelled as the fetal head, it is impossible to see
that particular configuration of echoes as anything else. It becomes a "fact"
(Pasveer 1990). The historical process of assigning meaning to those
echoes is masked. I have been arguing that the sense of the images
depended on making them conform to a known representation of anatomy.
The way to make sense of A-mode ultrasound images depended on
knowing beforehand, by palpating the fetal head or histological analysis of
an excised tumour, what was being scanned. B-mode scans were
constructed to look like the cross-sectional diagrams which were, in turn
used to make sense of the ultrasound images. In 1968, Donald (1968b:248-
249) described the process of making diagnoses with ultrasound as follows:

The pictures, or ultrasonograms, are very easy to take and require no
particular skill. ...[However,] the diagnosis is based more upon
inference than full pictorial representation and herein lie the major
difficulties of the subject, since only those with some knowledge of
anatomy and pathology are likely to be able to make some sense of
the results obtained.

In large part what was first seen with ultrasound had been known by
a different representation. From 1958, with the publication of the first
obstetrical ultrasound images through the mid-1970s the photographs
included in Donald's articles signal the importance of prior knowledge in
making these images meaningful. The images labelled "normal fetus" in fact
show only the fetal head, a part of the fetus which had been visualized by
X-ray and can usually be palpated by the physician. Since more than one crania could be identified, a photograph of twin fetuses was often included. As late as 1976, the only two fetal anomalies which could be "diagnosed with certainty" by ultrasound were both anomalies in the size and gross appearance of the cranium (hydrocephalus and anencephaly) (Donald 1976b:568).

Clinical significance for the fetal head was elaborated by comparing its dimensions (specifically the ear to ear, or biparietal, diameter) throughout pregnancy to the results of existing hormonal tests of fetal maturity (Donald 1968b:251) and to the measurement and examination of the baby following delivery (Campbell 1971). In this way, ultrasound measurements of the fetal head and later the fetal abdomen, legs and arms were rendered diagnostically significant. Growth charts of fetal head diameter, femoral length, and abdominal circumference were constructed and became the normal values against which images are interpreted.

Autopsies or examination of the outcome of pregnancy were also important in creating, what Pasveer termed for X-rays, "the boundaries between the normal and pathological" (1989:370). With compound scanning and grey-scaling, the ultrasound images became increasingly differentiated and complexly patterned. Initially there was no diagnostic significance for that detail; diagnoses of normality and pathology were constructed primarily by the position, size and shape of fetal and maternal parts. A significance
had to be constructed for the increasingly differentiated images.
Determining that significance was often not possible until after the end of the
pregnancy. Variations in the outcome of pregnancy (blighted ovum, fetal
death), in the position of the fetus and placenta, and the variety of fetal
anomalies which might occur during pregnancy meant that the clinical
significance of the images was uncertain. A tentative diagnosis could be
made from the ultrasound, and then after delivery or autopsy, the diagnosis
confirmed or the ultrasound images reviewed to see what should have been
seen (Pasveer 1989:370). This is the reflexive process implicit in Donald's
(1976b:559) statement that “diagnostic expertise ... has been built up quickly
by the instruction afforded by mistakes and the declared outcome of the
case.”

Real-time ultrasound has led to the systematic observation and
normalization of "fetal behaviour." Consequently the notion of fetal well-
being has changed from a primarily morphological state to include functional
and behavioral indices. Fetal breathing, gross body movements (e.g., rolling
from side to side), fetal tone (flexion of arms, legs, head, hand), heart rate,
and amniotic fluid volume are now rated and standardized as a routine index
of developmental normality and fetal well-being in the Fetal Biophysical
Profile (Manning et al 1980; ACOG 1987). Fetal swallowing and excreting
are monitored as an indicator of fetal digestive and renal function Patterns
of fetal movement have been redescribed as sleep and rest periods and
investigated as an index of immediate well-being and post-partum behavioral normality. As the obstetricians in my study assured me, even eye movements can be assessed as a sign of cerebral function (see also, Birnholz 1988, Krasnegor 1988).

Ultrasound has also been used to establish and monitor normative maternal behaviour in the form of "prenatal bonding." There is a maternal-fetal attachment standardized scale intended to assess the extent to which "the woman engages in behaviors that represent affiliation and interaction with her unborn fetus" (Kemp and Page 1987:179). Numerous studies have been carried out to test whether or not visualizing the fetus through ultrasound influences maternal-fetal bonding; the results have been inconsistent (Kemp and Page 1987; Lerum and LoBiondo-Wood 1989; Sparling et al. 1988). Some physicians advocate the use of ultrasound not only to foster this bonding, but to encourage compliance in pregnant women (Bralow 1983; Reading et al., 1982).

II.D. Ultrasound and Other Prenatal Diagnostic Methods

Ascribing clinical significance to ultrasound technology was not only a matter of convincing physicians that the echo patterns enabled them to distinguish normal from pathological; there had to be a reason for physicians to need to use ultrasound.

Pasveer explains that a similar condition of need was created for the
integration of X-ray technology into routine diagnostic practice. Physicians were not particularly interested in X-ray technology since their traditional methods of diagnosis were assumed to be adequate. Thus they had to be convinced of two things: that X-rays contained diagnostically relevant information and that unlike other diagnostic methods "the rays revealed specific diseases better, or earlier, or more of them" (Pasveer 1989:374). The same had to be accomplished for ultrasound images.

In the first descriptions of its diagnostic capacity, obstetrical ultrasound was often contrasted with X-ray. In the 1965-66 Yearbook of Obstetrics and Gynecology, the editor noted two major improvements of ultrasound over X-rays. First, ultrasound images were "immediately available to the clinician" since they could be visualised on-screen (Greenhill 1966:49). Second, ultrasound was presented as technically more sensitive to the internal anatomy and therefore "capable of visualizing structure not readily demonstrable by X-ray" (Greenhill 1966:49). Third, it appeared to be "safe for the patient and the baby and can be repeated as often as desired" (Greenhill 1966:49). Even so, in the late 1960s, Donald did not suggest that ultrasound was an alternative or replacement for X-ray. Instead, it was "an adjuvant technique which may yield additional information of value to the clinician" (1968a:74).

There were two areas in which ultrasound appeared to be diagnostically superior to several other methods: visualising early pregnancy
and detecting anomalies. X-ray was not particularly useful before the fetal skeleton had developed enough to be radiographed. Hormonal tests and palpation could indicate only the presence of pregnancy. What happened after that by way of developmental variation or fetal anomaly was known only after miscarriage or delivery. Seeing the stages of early pregnancy was a turning point in the convincing power of ultrasound images.

I will never forget the excitement which attended the first recording of an early gestational sac. ... At first we did not recognize the significance of the white ring which is now such a commonplace finding, but when we did, and observed its growth at repeated examination, our excitement became boundless (Donald 1969:623). Once that white ring was made significant its variations in shape, location, and development were diagnostically elaborated. Pregnancy became diagnosable at an earlier stage, sometimes even before a positive hormonal test was obtained and long before the enlarging uterus could be felt. A woman might think she was pregnant, an hormonal test might indicate pregnancy, but ultrasound could confirm that pregnancy. Through ultrasound, physicians also constructed and elaborated the criteria which now define the failure of the pregnancy to progress before ether palpation or "the urine tests indicate that the pregnancy is doomed" (Donald and Abdulla 1967:605).

The other area in which ultrasound had no diagnostic equal was in the determination of fetal anomalies. X-rays had been used to search for fetal skeletal anomalies, but prior to ultrasound, there was no way to detect
in utero any malformations in soft tissue. Ultrasound was readily recognized as a means of screening for known fetal anomalies and also a means of identifying new disorders. Variations in fetal development were noted, classified and their outcome determined by post-partum examination.\(^7\) In this way fetal anomalies and diseases and their natural histories have been constructed. Michael Harrison, one of fetal medicine's leaders, has written that "the fetus could not be taken seriously as a patient until his ailments could be diagnosed" (1982:22). Harrison (cited in Kolata 1990:87) is well aware of ultrasound's significance in diagnosing the fetus:

No one had any idea when we started out what the natural history of a urinary tract obstruction in a fetus was. Or hydrocephalus. All the diseases. I mean, just think about this. In this last decade and a half or so, we ... were able to define diseases that no one had seen before because you couldn't see the fetus. It's like medicine started all over again.

Today, the fetus is viewed as potentially abnormal in thousands of ways. There are numerous volumes on fetal pathology (e.g., Keeling 1987; Persaud 1979; Wigglesworth and Singer 1991) and prenatal diagnosis is

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\(^{7}\) I think there is a tendency to ascribe clinical significance to deviations from known normality before that significance is determined. I saw an example of this tendency during the field research. Choroid plexus cysts are defined as "echo-free spaces in the choroid plexus of the lateral [cerebral] ventricles [and t]hey occur in 3% of pregnancies" (Toi 1990:127). Their clinical significance is unknown; most occur in what are otherwise described as "normal" fetuses. However, when these cysts are seen on ultrasound, they are carefully measured and followed with additional ultrasounds until the cysts disappear. Two of the clinic doctors routinely reassured patients that they had never seen choroid plexus cysts which did not disappear, but they requested the women return for follow-up scans.
applied to an increasing number of women in the attempt to "catch" or "screen for anomalies." On the one hand, prenatal tests such as ultrasound are offered to women to reassure them of the normality of the fetus. On the other hand, physicians are counselled to limit their use of the term "normal." A recent article in the *Canadian Journal of Ob/Gyn* cautioned physicians not to tell patients that the fetus is "normal" but to say that "none of the problems which can be seen by ultrasound were detected" (Toi 1990:125). The majority of anomalies, including those seen by ultrasound, have no corresponding therapy. Usually all that can be done is an abortion to terminate the pregnancy or multiple ultrasound examinations to further identify and classify the anomaly.

Despite its large impact on obstetrical diagnosis, ultrasound has not entirely obviated the use of other prenatal tests which predated it. Women still go for hormonal tests at the start of pregnancy. The validity of those tests however has been changed by ultrasound. Pregnancy indicated by an hormonal test or a woman's own bodily changes must increasingly be "confirmed by ultrasound." As the pregnancy progresses, it can not be considered "normal" until placental and fetal anomalies in morphology, function and development have been ruled out by ultrasounds. Fetal life, although indicated by auscultation, must be "reliably confirm[ed]" with real-time imaging of the fetal heart, respiration, and movement (AIUM guidelines cited in Pretorius and Mahoney 1990:14). Ultrasounds enable physicians,
as they explained to me, "to see what is really going." Pregnancy assessed
by palpation and auscultation has been replaced by viewing the "real" fetus.
With ultrasound, as had occurred for X-rays some four decades earlier, "the
tables gradually turned: the relation between the unknown and the known
world partly reversed" (Pasveer 1990:2). Patterns of echoes which had
once been described to approximate a known reality — the fetus described
by auscultation, palpation, and hormonal assay — became the means of
creating a new reality — the fetus as a complex, behaving, infinitely
diagnosable and increasingly treatable individual. In short, ultrasound
imaging has been fundamental to the creation of the fetus as a patient.

The concept that the fetus may be a patient ... is alarmingly modern.
The fetus could not be taken seriously as long as he remained a
medical recluse in an opaque womb; and it was not until the last half
of this century that the prying eye of the ultrasonogram rendered the
once opaque womb transparent, stripping the veil of mystery from the
dark inner sanctum, and letting the light of scientific observation fall
on the shy and secretive fetus (Harrison 1982:19).

Within a relatively short period, ultrasound has opened the "black
box" of pregnancy (Kolata 1990:29,137) and become a routine prenatal
procedure throughout much of North American and Europe. In the next
section I examine how this routinization occurred; at the chapter's end I will
have more to say about the fetus as a patient.

III. The Institutionalization of Obstetrical Ultrasound
In this section of the chapter I discuss three issues concerning the integration of ultrasound fetal imaging within the organization of medical practice. First, I suggest how the establishment of sonographers' professional associations, division of labour, and the routinization of norms for practice contributed to the credibility of the images. Second, I discuss how ultrasound fetal imaging has become, between radiology and obstetrics, a contested domain of medical expertise. Third, I describe the legitimization of ultrasound as a standard of obstetrical competence despite questions about its safety and efficacy. Wherever possible in each of these sections I provide details of ultrasound's history in Canada and in Québec.

III.A. Normalizing the Images: Professional Associations, Division of Labour and Guidelines for Practice

Ultrasonography, although it is a diagnostic imaging technique like X-ray, fluoroscopy, and computed tomography, did not originate as did those techniques within the control of radiologists. Many of the major developments in ultrasound imaging were not made by radiologists, but by physicians working in specialties like cardiology, neurology, ophthalmology, and obstetrics (Goldberg and Kimmelman 1988). Groups of these medical specialists began to organize scientific meetings to discuss their attempts to use ultrasound as a diagnostic tool. National and international associations soon were established to represent the scientific and professional interests
of sonographers (White 1990:341). Regular conferences and scientific journals devoted to diagnostic ultrasound imaging flourished during the 1970s (White 1990). Obstetrician gynecologists were involved in these early activities (White 1990), but they did not have their own major association until recently with the formation of the International Society of Ultrasound in Obstetrics and Gynecology. The first World Congress of that society was held in January 1991 at which time the journal, *Ultrasound in Obstetrics and Gynecology*, was launched. As far as I am aware, there is no similar association in Canada. There is, however, a Diagnostic Imaging Committee within the Society of Obstetricians and Gynaecologists of Canada.

Scientific meetings, associations, and journals did more than simply serve as forums for sonographers "to exchange information about their practices" (White 1990:342). They served as visible signs within medicine of the legitimacy of ultrasound as a form of diagnostic imaging. They also served to disseminate ultrasound images and the techniques of their production and interpretation. Ultrasound images, reproduced in journals, began to seem familiar, readily understandable and compelling, and their production commonplace. A rapidly expanding literature on what had been seen by ultrasound — fetal position, number, size, and in particular, fetal anomalies — contributed to the growing sense that ultrasound was indispensable to obstetrical practice. "Medline," a computerized indexing of medical literature, contains only about 90 listings on fetal diagnostic
ultrasound imaging during the entire decade of the 1970s. During the second half of the 1980s, there are over 250 entries each year.

Conferences, associations, and journals were also the means to negotiate norms of ultrasound practice. As Pasveer (1989:365) describes for X-rays, "[r]ules, which initially were formulated to urge individual workers to work along the same lines, later became part of the tacit knowledge and practices possessed by competent Röntgenologists." Canadian and American guidelines for obstetrical ultrasounds have been in existence since the early 1980s (American College of Obstetricians and Gynecologists 1981; Society of Obstetricians and Gynaecologists of Canada 1981). These recommendations and their later revisions constitute the development and recognition of standardized procedures, landmarks, and measurements for obstetrical scanning. Norms for doing a scan by producing a series of images (of the fetal head, of the fetal spine, etc.) helped to transform ultrasound imaging from an experimental procedure to a reproducible method of acquiring diagnostic information about the fetus (Pasveer 1989:365).

Standardized practices and norms of imaging also meant that the production of ultrasound fetal images became increasingly task-oriented. Each ultrasound scan followed a general pattern of producing the diagnostic information through a series of measurements and images. The information recorded in measurements and photographic reproductions of the images
could be compared to growth charts and to the viewer's knowledge of normal fetal appearance. In ambiguous cases, the ultrasound images could be compared directly with photographs or other ultrasound images of anomalous and normal fetuses. Establishing norms of ultrasound practice meant that the processes of producing the images and their interpretation could be separated slightly. A physician could look at a photograph or radiographic film of the image and determine the normality of the fetus without being involved in the production of that image. In some hospitals, routine procedures of conducting fetal measurements, localizing the placenta, and screening for anomalies became the tasks of nurses, or more commonly in Québec, of radiology technicians.

In the history of X-rays, Pasveer (1989:364) notes

The institutionalisation and professionalisation of radiology was an important aspect of the convincing power of the images. It consisted of two "problems," the first being the professionalisation of radiology, of those medical men competent to interpret X-ray images, the second being the status of the radiographers: the "assistants" who were in charge of the actual making of the images.

Although non-physicians have assumed more and more of the job of making ultrasound images, the final interpretation of those images and the diagnosis of anomalies has remained the responsibility of physicians. Historically, the physicians who have interpreted ultrasound fetal images are radiologists and obstetricians, both of whom already possess professional status. The debate over controlling the production and interpretation of ultrasound
images has occurred among physicians, rather than between physicians and non-physicians. This is certainly true in Québec.

III.B. Establishing Control over the Production and Interpretation of Ultrasound Images

Ultrasound developed as a form of diagnostic imaging after radiology had become an established medical speciality in North America and Great Britain. The basis of that specialty status was the control by radiologists over the production and interpretation of medical diagnostic images, X-rays in particular (Barley 1988). As I noted earlier, the development of ultrasound imaging as a diagnostic technique involved many non-radiologists working within their own medical specialties. Furthermore, ultrasound scientific associations in most cases did not emerge from within radiological societies but were established separately and included non-radiologists among their members. It would be false, however, to claim that radiologists were peripheral to ultrasound fetal imaging. Most of the early work in obstetrical ultrasound was carried out within radiology departments; this appears to have been true in Canada, as well as in the United States and Great Britain. The expertise of radiologists "with their accustomed skills in visual diagnostic techniques" was considered valuable for fetal imaging (Donald 1967 and Abdulla:609). When fetal imaging became standardized, it was radiology technicians who were trained to do the routine work (Donald
1974). It also seems that much of the non-obstetrical diagnostic ultrasounds in North America are carried out and interpreted by radiologists.

By the mid-1970s, even Ian Donald who had long maintained that ultrasound "should be properly centralised in X-ray departments" (1967:609), had changed his mind and began to speak against what he termed "market cornering" (1976:324).

The day is fast approaching when sonar should be regarded as a discipline in its own right. Of course radiologists must understand it, and the Royal College of Radiologists has made a knowledge of the subject a part of its requirements for the Fellowship Examination in England. Of course, obstetricians should know and understand it, and in fact a couple of years ago the first question in the paper for the M.R.C.O.G. [Member of the Royal College of Obstetricians and Gynecologists] Diploma was on the subject of sonar. ... I would disagree most strongly with the view, which I have already encountered, that sonar should be treated as an integral part of radiology only. There is already great danger of a conflict of interests of established departments (Donald 1976:326).

At issue then, and today, is the question of control over the resources which surround the production and interpretation of ultrasound images; resources like patients, fees, equipment, clinic space, and scientific prestige. Obstetricians who have sought to separate or exclude ultrasound from radiology continue to argue that the complete interpretation of ultrasound images necessitates a detailed understanding of obstetrical

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8. There is a financial incentive in the United States for physicians and for hospitals to use ultrasound routinely (Ratcliff 1989; Steinberg 1985). In Canada, hospitals can bill directly for reimbursement of ultrasound as an outpatient service.
pathology and its significance for obstetrical care. Perhaps radiologists were easier to teach (Donald 1974), but obstetricians continue to claim that only obstetricians possess the required specialized knowledge.⁹

Today, in North America and Europe there is considerable variation in both the site of fetal imaging and in the professional affiliation of the persons conducting and interpreting ultrasounds (Horger and Tsai 1989; National Institutes of Health 1984). In Canada, scans are conducted within hospital departments of radiology or obstetrics, alongside or separated from other diagnostic imaging procedures, and by radiologists, obstetricians, general practitioners, nurses, and/or radiology technicians. In 1989, eighty percent of fifteen maternal-fetal medicine centres in Canada provided routine fetal imaging (Mohide 1990:25). In some Canadian hospitals, obstetrical ultrasound is located, administered, funded, and staffed from within the department of radiology; obstetricians are called in only on a consultative basis. In some hospitals, the scans are carried out within the radiology department by obstetricians. In some, radiology does the routine, non-problematic scans while obstetrics handles anomalous or difficult cases. Added to this variety of hospital practices is the growing use of ultrasound imaging in private clinics and in physicians' offices. In Ontario, Canada's

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⁹ Dr. Louise Acheson has also pointed out to me that in the United States contests over the control of the production and interpretation of obstetrical ultrasound images includes not only obstetricians and radiologists, but also family practitioners.
most populous province, the majority (61%) of prenatal ultrasounds are now conducted in non-hospital settings (Anderson 1992).

Although these variations are not well-documented, there are other local traditions of ultrasound practice in Canada. In Ontario, for example, most pregnant women have 2.2 ultrasounds, but in British Columbia, most women have less than 2 scans during pregnancy (Anderson 1992). The Québec Medical Association "has no objection to ultrasonographic screening between the 16th and 20th weeks of pregnancy, even in a woman whose pregnancy appears to be evolving normally" (Corporation Professionnelle des Médecins du Québec 1987:24). On the matter of a second scan, the Association says "it may be justified" but notes "there is no clear consensus as to the optimal timing of this test" (Corporation Professionnelle des Médecins du Québec 1987:24). One estimate places the actual Québec utilization rate at 1.52 scans per pregnancy (Renaud et al. 1991:40). Considerable regional differences in utilization exist; Metropolitan Montréal is higher than elsewhere (Corporation Professionnelle des Médecins du Québec 1987:32). Conversations with physicians in this study indicate differences in utilization between anglophone and francophone obstetricians. The Montréal hospitals associated with the English medical school generally refer women for two ultrasounds, while women at the French teaching hospitals often have only one scan. In addition, one study (Renaud et al. 1991:41) found that francophone physicians in Québec tend to recommend
one (just under 60%) rather than two routine scans (about 40%). In comparison, over fifty per cent of anglophone physicians in Québec recommend two scans and about forty-five per cent prefer one routine scan (Renaud et al. 1991:41). Local traditions across Canada vary not simply in terms of the frequency of scans but also in their content (e.g., whether or not fetal sex is disclosed).

Just over twenty years after Ian Donald published the first fetal images, ultrasound had become a routine part of prenatal care for many North American and European women. The credibility of fetal imaging was supported through their dissemination and discussion in meetings and journals of several professional associations. The process of standardizing the ways of seeing and evaluating the fetus through ultrasound had begun as various organizations issued guidelines for conducting scans. Ultrasound was beginning to appear in the training programmes of obstetricians and radiologists. Fetal imaging had become so commonplace by the early 1980s, that the task of scanning was being turned over to non-physicians and the equipment was being purchased by physicians for use in their own offices. As the significance of fetal imaging grew among obstetricians, they began to extend their professional control over the procedure. Despite its status as a relative newcomer to obstetrics and the variety of ultrasound practices and practitioners, fetal imaging withstood a period of controversy during the early 1980s and has gone on to become a standard of obstetrical
practice.

III.C. From Controversy to Standard Practice

Around 1980, a number of American and British consumer protection and public interest groups became aware of studies questioning the safety of ultrasound energy. In 1978, 1979 and again in 1983, the United States Food and Drug Administration cautioned that "it is much too early to assume that ultrasound is perfectly safe in pregnancy" (Thompson 1983:11). In 1982, an American news network aired a report on the "Fetal Effects of Ultrasound" which called attention to evidence of in vitro chromosomal damage and anomalies in animals exposed to ultrasound. The reporter summarized this evidence as "the signs of danger, warning signs that in the past predicted medical disaster" (CNN Transcript 1982:2).

Motivated by growing concerns, several national and international bodies published statements on obstetrical ultrasound imaging. Most, but not all, of these statements concluded that routine fetal imaging was not warranted based on the evidence concerning ultrasound's safety and clinical benefit.¹⁰ Nevertheless, these statements appear to have had little impact.

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on the routinization of obstetrical imaging. In Canada, as elsewhere, the rate of fetal imaging has risen dramatically during this period of controversy. In Ontario and British Columbia, the rate of ultrasound use doubled between 1981-1982 and 1989-1990 (Anderson 1992). In both provinces, just over 10% of the increase is due to a rise in the number of pregnancies (Anderson 1992). In Québec the situation is even more striking. From 1978 to 1982, the number of prenatal ultrasounds more than tripled (Braun et Valentini 1984:7). Between 1980 and 1988, the average number of scans per pregnancy in Québec rose from 0.86 to 1.52 (Renaud et al. 1991:40). Although birthrates declined in Québec during the 1980s, the number of ultrasounds increased.

I do not attempt to give a complete analysis of each of the reviews of obstetrical ultrasound imaging (see the commentaries by Beech et al 1985; Gold 1984; Haire 1984; Shearer 1984). Instead, I have focussed on the National Institutes of Health Consensus Development Conference report. Among North American obstetricians, including those I interviewed in Montréal, the NIH statement is commonly cited when discussing the controversy about ultrasound.

recommend routine scanning, but their reviews are not particularly critical of ultrasound. The British Ministry of Health advised physicians not to advocate routine screening (The Lancet 1984b:995). However both the Medical Ultrasound Society and the Royal College of Obstetricians and Gynaecologists in Britain (1984) disagreed with the Ministry and stated that there was no reason not to continue routine scanning (Jackson 1985).
The NIH panel reached the following general conclusion about ultrasound: "The data on clinical efficacy and safety do not allow a recommendation for routine screening at this time" (NIH 1984:238). They concluded further that their information "allowed no consensus that routine ultrasound examinations for all pregnancies improved perinatal outcome or decreased morbidity or mortality" (NIH 1984:237). However, the report lists 28 indications for which "ultrasound can be of benefit" (NIH 1984:236). These indications are estimated to implicate between 30% and 45% of all pregnancies (Gold 1984:24; Jackson 1985:149). They are stated so generally stated that they could potentially include an even higher percentage of pregnancies. For example, the first indication on the list, "estimation of gestational age for patients with uncertain clinical dates," could include those women who do not know the date of conception — possibly the majority of women (Gold 1984: Haire 1984).

I offer several suggestions for why the routinization of fetal imaging has continued despite the unwillingness of organizations like the NIH to support routine scans.

One, it should be made clear that ultrasound fetal imaging is not the only, nor the first prenatal procedure which has become routine despite controversy surrounding its use (Oakley 1986b). Electronic fetal heart monitoring (another form of ultrasound) and cesarean section each provide
examples of this point. Two, the fact that there was no clear evidence of physical harm from ultrasound, neither gross fetal anomalies nor injury to women, was important. This differs from the established link between X-rays and childhood cancer which dramatically diminished the use of routine radiography. Three, the fact that no clear improvement to either maternal or fetal outcome due to routine scanning could be shown was not interpreted by the panels to mean that there was no benefit, rather that adequate study had not been undertaken.

Four, by the time it came under scrutiny during the early 1980s, ultrasound fetal imaging had already gained widespread practical acceptance as a routine procedure. The broad range of indications the NIH reported for its use bears testimony to that fact. It also suggests that ultrasound imaging, for many physicians, had already become not just a compelling, but an indispensable diagnostic tool. In the words of one panel member, the NIH report represents, "a standard of care for obstetrical ultrasound use" (Hohler as cited in Shearer 1984:33). The NIH was careful to specify that the list of indications "should not be considered circumstances in which diagnostic ultrasound imaging is mandatory." Thus individual obstetricians were free to decide for themselves when and how to use ultrasound. Some authors have suggested that fetal imaging already

11. See the articles and references in Diony Young (1982), as well as Marieskind (1989).
was too deeply entrenched within obstetrical practice to permit any objective
evaluation of either its safety or benefits. For example, from a commentary
in the British Journal of Obstetrics and Gynecology:

Because the technique has revolutionized our ability to study the
entire conceptus there was an early acceptance of the hypothesis
that the additional information obtained from an ultrasound
investigation must necessarily be of benefit to the patient. Few
investigators have actually attempted to confirm this hypothesis. ... 
[!]s it not reasonable to expect some sort of proof that the wholesale
exposure of populations to often quite significant doses of ultrasound
energy is actually of some direct benefit to them? Regrettably the
question will probably now not be answered since a properly
controlled scientific study can no longer be undertaken as few, if any,
obstetricians would agree to forego the early routine ultrasound
examination of their obstetric patients (Meire 1987:1122).

There was also evidence that many physicians were dependent on
ultrasound. In a randomized blind London study on the efficacy of
ultrasound, ”30 percent of clinicians were so uncertain of their own
judgements they broke the code to obtain the information provided by
ultrasound for women in the control group” (Discussion in Neilson 1986:15).

Since the period of controversy, obstetricians in Canada and the
United States are still unwilling in their published guidelines to recommend
that all pregnant women undergo ultrasound. At least one recent study
reports negative effects of ultrasound (Angles et al 1990), but another
reached the opposite finding (Salvesen et al 1992). The major obstetrical
associations continue to argue that ”there is no evidence ..[of] harm"
(American College of Obstetricians and Gynecologists 1991:np) and ”the
overwhelming benefits of an indicated obstetric ultrasound examination far outweigh any theoretical risk of subtle effects on the fetus" (American College of Obstetricians and Gynecologists 1988:1). Recent studies have found some clinical benefits for routine scanning (Belfrage et al. 1987; Saari-Kemppaninen et al. 1990; Waldenstrom et al. 1988; Warsof et al. 1986); others describe recurring problems in conducting scans (Sarmandal et al 1989) and low rates of detecting anomalies during routine scans (Lys et al 1989).\textsuperscript{12} In general, the public and professional controversy about the safety and benefit of ultrasound scanning has dwindled (see for example, Ewigman 1989; Reece 1990; Youngblood 1989). The following passage in a letter from a group of British obstetricians to The Lancet suggests just how routine this procedure has become.

We continue ultrasound screening in our unit, despite its marginal benefits, and believe that mother and physician expect ultrasound as essential in the antenatal care package (Shafi et al. 1988).

Guidelines for conducting scans have been issued by several organizations outside of Canada (American College of Obstetricians-Gynecologists 1981,1988; American College of Radiology 1984; American Institute of Ultrasound in Medicine 1986) and widely reprinted in medical texts and journals. However, as recently as 1990, anyone performing scans

\textsuperscript{12} Newspapers recently reported on a study presented at the 1992 meeting of the Radiological Society of North America. The study found that 37% the fetal ultrasounds at 96 American facilities "don't meet quality assurance standards" (Elias 1992: 4D).
was simply "urged to implement them in their daily practice" (Pretorius and Mahoney 1990:4; Bundy and Jones 1985). The extent to which British and North American obstetricians have either didactic or hands-on training in the use and interpretation of fetal images appears to depend on the inclination of the residency programme (Bundy and Jones 1985; Meire 1987). Voluntary certification and some specialized training programmes are available for ultrasound technicians.

Obstetrical ultrasound has not been subjected to the same scrutiny in Canada as in Great Britain and the United States. There are guidelines, but no regulations, for the safe use of diagnostic ultrasound equipment and for acceptable exposure levels (National Health and Welfare 1980a, 1989:37). The extent to which those guidelines are followed is unknown.

The Society of Obstetricians and Gynaecologists of Canada issued guidelines for ultrasound use in 1981. The SOGC felt that without cost-benefit data, routine ultrasounds "cannot be recommended" (1981:2). At that time, as the SOGC Guidelines pointed out, "no Canadian standards exist for those permitted to perform ultrasound examinations and interpret the findings" (1981:2). Ten years later, although physician candidates for Canadian board certification in radiology and obstetrics are expected to have some experience with ultrasound during their residency, as far as I am aware, there is no regulation that they be examined on their ability to conduct or interpret an examination. The SOGC (1990) guidelines for
obstetricians who want to perform ultrasound in clinical practice

recommends a three month training period and a minimum of 300 scans.

Nowhere in Canada are training programmes or examinations compulsory for ultrasound technicians. A one year training programme is recommended (National Health and Welfare 1989:41). Some Québec radiology technicians have taken correspondence courses in ultrasound, but the majority have learned ultrasonography on the job. The American Ultrasound Technician Board examinations are recognized in Canada. According to some technicians, board certification is important for employment outside of Québec. Within Québec, technicians who are "American Board certified" are rewarded with a slight pay rise, but few consider it worth the trouble of preparing and writing the English only exams. The Canadian Society of Diagnostic and Medical Sonographers organizes conferences for ultrasound technicians, but its membership in Québec is low. A regional director of the society explained that since Québec technicians must belong to the professional association, Ordre des techniciens en radiologie du Québec, there is less demand for membership in the Canadian Society. She suggested that the societies are divided by language; the ORTQ is perceived by many English-speaking technicians as "really French," while the national association encourages the development

13. The increase in 1991 was worth about $25 or $30 a week (Interview September 1991).
of professional ties throughout English Canada.

V. Fetal Patients

In this chapter I discussed the historical process through which ultrasound has become taken for granted as a window on the fetus. This process has involved technical changes to make the image like known representations of the fetus, the creation of a need for physicians to use ultrasound, and the establishment within recognized forums (journals, conferences, professional associations) of norms of practice. Today ultrasound images are meaningful in that they represent agreed upon interpretations and conventions of seeing. We "see" a fetus because that is what the image is understood to show.

Obstetricians regard fetal images as a compelling and convincing means of knowing the fetus. They argue that ultrasounds provide clinically significant information unobtainable by other clinical means. At least one publication suggests that an ultrasound examination "will answer approximately 90% of all questions concerning pregnancy" (Perone 1984:1). Physicians use ultrasounds to confirm the results of other tests. They base some of their clinical decisions on what they have seen by ultrasound. Indeed they recognize that this technology has "revolutionized the care of the pregnant women and her fetus" (American College of Obstetrics and Gynecology 1988:1). Ultrasounds comprise an essential part of obstetrical
claims to authority in the management of pregnancy and childbirth, and more recently, in caring for the fetus. Ultrasound, perhaps more than any other technology, has made the fetus into a patient, diagnosable and treatable.

When ultrasound was first used in obstetrics the fetus was not a focus of attention in obstetrics. There were, for example, virtually no references to the fetus among the chapter headings of textbooks or in annuals such as the Yearbook of Obstetrics and Gynecology. The 1971 edition of Williams Obstetrics has a paragraph on the fetus; five years later there is a separate chapter (discussed in Renaud et al. 1987). Hahn points out that by 1981, Williams Obstetrics, a standard textbook in Canada and the United States, refers to the fetus as "the second patient" (1987:231). Paralleling this change in the status of the fetus are changes in how ultrasound imaging is viewed. At first, ultrasound was discussed as a means of identifying the "physiology of pregnancy" (Greenhill 1969) or as an aide to pregnancy management (Browne 1978). Today ultrasound is seen as a form of "prenatal diagnosis" and a means of "antepartum fetal surveillance" (Morrison 1990).

What has been called a "fetocentric" trend in obstetrics is evident as well in the growing number of journals, conferences, and subspecialty

14. See Renaud et al. (1987) for a good discussion of the changes in obstetrics' vision of pregnancy during this century.
training programmes devoted to the fetus."15 The field of obstetrics appears, in many ways, to be redefining itself as "maternal and fetal medicine" or "perinatal medicine." As noted by the authors of a text on fetal well-being, ultrasound and other "developments [have] changed the role of an obstetrician from being primarily the mother's doctor to a fetal physician as well" (Katz et al 1990:np).

At the same time that fetal images have become convincing within medicine they have become persuasive in other domains. Within Canadian and American anti-abortion movements, ultrasound images have become emblematic of the fetal rights cause. Ultrasound fetal images have been used, amidst controversy, to advertise Volvo automobiles. In law, issues in fetal or reproductive rights are argued with evidence from ultrasounds. Lawsuits related to physicians' failing to refer for fetal ultrasound or erroneously interpreting the scans are increasing in the United States (Horger and Tsai 1989). Obstetricians, in particular, are uneasy about the non-clinical interpretations of ultrasound fetal images. An editorial in the Journal of Ultrasound Medicine on the need for professional unity and scanning standards began with the statement: "It should be apparent that the recent surge of lawsuits involving ultrasonography must be met by aggressive defensive action" (Bundy and Jones 1985:483; Saunders 1983:).

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15. In 1992 the International Society of the Fetus as a Patient held its eighth international congress.
A recent textbook describes "the avoidance of medicolegal criticism as ...[a] goal" in obstetrics and attempts to prepare obstetricians to defend themselves in the event of a lawsuit (Eden et al. 1990:xvii).

In 1988, 43% of Canada's practicing obstetricians responded to a survey on the impact of liability issues on their practices. The survey concluded:

There has been a very substantial increase during the past 5 years in the number of diagnostic tests [particularly ultrasound] used in the antenatal management of obstetric patients, and litigation concerns figure prominently as a reason for this increased use (Hannah 1990:22).

The technological modifications, institutionalized policies, and local traditions which have supported the routinization of ultrasound imaging and the overall creation of the fetus as a patient are based on the day to day, commonplace acts of seeing and thinking of the fetus as a patient. Those everyday acts are the subject of the next chapter.
CHAPTER FOUR: SONOGRAPHERS' ACCOUNTS OF FETAL IMAGES

In this chapter I describe the accounts of fetal imaging by sonographers at the ultrasound clinic. My intention in this chapter is twofold. One, I want to convey a sense of the place, actors and process of routine ultrasound fetal imaging at the Metropolitan Hospital. To that end I begin the chapter with an ethnographic narrative of the ultrasound clinic. The narrative is a composite constructed from my observations at the clinic and recounting scans of some of the women I interviewed. I have not tried to construct a "typical" scan (an impossible task), but neither did I include scans which included a fetal anomaly, lengthy clinical discussion among sonographers, or women who have already borne a child.

Two, building upon this narrative, I discuss how the obstetricians and technicians describe and explicate fetal images among themselves and to pregnant women. In particular, I show how the dimensions of selfhood outlined in Chapter One are a recurring element in clinical interpretations of the image for expectant couples. Throughout most of this chapter I limit my discussion to routine scans. Routine scans are those which sonographers believe, at least initially, involve only one fetus, no history of three or more miscarriages or of a previous fetal anomaly, and no amniocentesis.

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I. The Metropolitan Hospital Ultrasound Clinic

Outside the hospital, the February morning is clear and cold. As I walk down the corridor the air of the hospital seems stale by comparison, heavy with the smells of institutional cooking, floors still moist from mopping, and some combination of medication, disinfectant, and sickness. The narrow halls in this part of the hospital are always crowded with slow moving men and women pushing wide laundry bins and tall carts from the kitchen. I pass an orderly pushing a wheelchair and catch a glimpse, far down the corridor, of the usual group of men standing around the door to the ultrasound clinic. The men watch the steady flow of people along the hallway while they wait to be summoned inside for a brief look at the ultrasound. I round the corner into the clinic and understand why the men have chosen to stand in the hall. It is barely 8:30 a.m. but the clinic’s waiting area is already full; women in various stages of pregnancy sit on the chairs, their hands clasped round extended bellies, talking with other women, some holding onto squirming toddlers. A few men lean against the walls reading their newspapers.

"Lavoie. Ginette Lavoie¹," the receptionist calls, hidden from the crowd behind a portable room divider. A woman gets up from her chair and walks behind the divider. I follow until I can wave "Good Morning" to the

１. I have used pseudonyms for the women and staff.
receptionist. A corner of her desk is covered with toys to divert impatient children in the waiting room. The nearby wall has the first of a growing collection of photographs of newborn babies sent by women who had their ultrasounds at this clinic. I turn back towards the examination cubicles and hear the receptionist asking for Madame Lavoie's health insurance card.

I push past the narrow curtained doorway which separates the reception area from the rest of the clinic. To my right are the two ultrasound cubicles. The curtains are drawn on each one, but as I pass, I can hear a technician talking to patient, "Lie on your back and raise your gown." I glance to my left at the row of women sitting in hospital gowns facing the closed curtains. One man passes the time looking at a poster explaining what can be visualised by ultrasound during each month of pregnancy. These women have another 15 to 30 minutes to wait before they will be scanned. I know their bladders are full with the required four glasses of water and they squirm uncomfortably. Many of the women in the outer reception area will wait an hour before their examination.

The clinic has been open only a few months and already the caseload has increased sharply. During the final months of 1989 while the technicians were being trained, the clinic handled about 125 scans a month. During 1990 they were doing over 550 scans each month, with a two month waiting list for routine scans. I know that the technicians, although they work here only 20 hours each week, are feeling exhausted and pressured
by the heavy caseload. And, from talking to women in my study and at the clinic I knew that they often waited over an hour, and sometimes two hours, to be scanned. Not until late 1990 would the clinic hours be extended.

Past the second ultrasound room is a physicians' station. There is a bench style desk built onto one side of the narrow cubicle, some shelves, and barely enough room for a chair. The obstetrician will sit here to consult with the technicians and write the reports. When an anomaly is detected, the obstetrician can consult several large texts of fetal pathology and telephone the referring physicians. Beyond the physicians' station is the large brightly lit area which holds an outpatient clinic. Several patients from that clinic sit in large reclining chairs and two elderly patients lie on beds. The nurse bustles around, checking charts, answering the phone, and monitoring the intravenous medications these patients come here to receive. After several months, this area is taken over by the obstetrics department for their non-stress clinic. Sometimes the sound of fetal heart beats from these non-stress tests is audible in the ultrasound clinic.

At the physicians’ desk, I take off my coat, fold it onto the shelf unit and pull my notebook and pen from my briefcase. I take lots of notes during the scans; the sonographers shake their heads in amazement that I can write so much about what seems ordinary and routine to them. I turn to a new page, enter the date and the name of the obstetrician who will be here soon. There are five obstetrician-gynecologists who come in on separate
days to supervise the technicians, complete the ultrasound reports, conduct
the "detailed scans" for abnormal or high-risk pregnancies, and do
amniocenteses. Over the course of the study, other obstetricians and
residents in radiology and obstetrics spent time at the clinic learning how to
do ultrasounds. I pause briefly outside the first ultrasound cubicle, part the
pale yellow curtains and go in.

Scan One

The narrow room is darkened, the overhead lights are off and the
window blinds closed. Light from the ultrasound monitor illuminates the
technician's face as she looks back over her shoulder at me and says,
"Hello." I take my usual place at the technician's back, standing near the
foot of the bed. From where I stand I face the ultrasound machine and the
monitor above it. On my left is a desk and supply shelves. I say "Hello" to
the woman lying on her back on the bed to my right. I have explained to
the women that the clinic staff will not be told who is in my study, so Tina
and I do not acknowledge that we know each other. She rests her head on
one arm crooked behind her head and, with the other hand holds her gown
away from the blue transducing gel spread over her abdomen. The
technician has started scanning. Her right hand holds the ultrasound probe
against Tina's abdomen and her left hand rests on the scanner keyboard.
The probe is shaped like a cylinder with a rounded end and is attached by a
heavy cord to the ultrasound machine. Another probe, narrower and operating at a higher frequency rests on a holder at the edge of the keyboard. The technicians use this second probe to examine fetal structures which are close to the woman's abdominal surface, rather than towards her back. On a lower shelf is the closed case which contains the endovaginal probe used for scans earlier than 12 weeks gestation. The technician moves the probe over Tina's belly, pressing deeply at times to get the right angle.

We all watch the television-like monitor in front of the technician. The image is shaped like a wedge of pie; the top narrow part of the wedge corresponds to the woman's abdominal surface and the lower wide edge to her back. Indistinct grey and black and white shapes seem to swirl around in this wedge, occasionally coalescing into shapes some of which I can now label – fetal head, leg, spine. About once a minute the technician freezes the image on the screen and then touches a button on the nearby printer. The small printer hums quietly and adds another black and white photo to a dangling strip of ultrasound images. The technician turns the probe, brings the white circle of the fetal cranium into view on the screen and touches a button. A small cross appears on the screen. She places the cross on one side of the fetal cranium and then rotates a small tracer ball on the keyboard to draw a line across to the other side of the cranium. Another button and numbers appear on the lower left of the screen indicating that the fetal
biparietal diameter is 37 millimetres. She pauses momentarily to consider this number, unfreezes the image and moves on to study the length of the fetal spine. I glance at the strip of photos and see that she has already located the placenta and checked that the cervix is closed. She has not yet measured the length of the fetal femur or the circumference of the fetal abdomen. At the end of the scan, after each measurement is done twice, she will call up a composite chart which compares these measurements with standardized charts of fetal size and growth. Based on the measurements, the computer will also estimate fetal age and date of delivery.

The technician pauses scanning and swivels her chair to look at the ultrasound report. Written at the bottom of the report is "G1P0" indicating that Tina is pregnant for the first time (Gestation 1) and has not yet had a live born child (Parity 0). Turning back to the woman, the technician asks in English² about the pregnancy.

Technician: How are things going?

Tina: Okay. So far, so good [she pauses]. I don't understand what I am seeing.

Technician: This is bladder, cervix. We see the length of that, so we need a full bladder. Can you see the top of the baby's head? [pause] The head. [The technician measures the fetal head diameter. Another photo emerges from the printer.] Now, we see the eyes, nose. [She continues her scan. Tina looks at the screen intently, but says nothing.] Cerebellum, the lower part of the brain. [pause] The two white lines is the spine of

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2. The technicians' first language is French; I have not corrected their English.
the baby.

Tina: It's moving. It's moving so much. Why don't I feel it?

Technician: It's too young. [long pause] Now we look inside the baby. The heart beating in the thorax. The stomach. [The technician is quiet for about one minute] Hmm.

Tina: [watching her] What?

Technician: I'm trying to measure the leg of the baby. The thigh. Inside the leg. [She continues the scan.] The bladder is here. We need to see that.

Tina: So it's got everything? It's okay?

Technician: Yes.

Tina: Good. I can't see anything.

Technician: Yeah, it's hard to see.

Obstetrician: [comes in and talks with the technician in French. The technician asks if he can tell the sex of the fetus. They study the image and talk quietly in French. Then he turns back to Tina.] Un beau bébé. Okay. Tout va bien. [He leaves the cubicle.]

Technician: Okay. I'm gonna ask your husband to come in now. [She returns in a few seconds with Jeff and resumes scanning. Initially the clinic admitted male partners, friends, and others in to see the ultrasound only after completing the diagnostic examination. After a few months, the staff began to admit observers with the woman to save time.]

Tina: Is that a hand?

Technician: No. Here is the heel, toes. [Tina and Jeff laugh. The technician names the arm, head, rump, spine, and heart on-screen.] Everything is fine. Okay. That's it. Your dates are good.

Woman: Seventeen weeks?
Technician: Yup. Everything look fine. Your doctor is gonna get the report in a few days. [She concludes the scan by giving them a photo: a side view of the fetal head, part of the spine and a leg are also visible. Tina and Jeff leave while the technician places the ultrasound photos and report on the physicians’ desk. During the morning the obstetrician will complete and sign the report before a copy is sent to Tina’s own physician.]

Scan Two

I go into the next ultrasound cubicle. The technician sits hunched over a folder of standardized growth charts. Unlike the large sophisticated ultrasound machine next door, the machine in this room is a small portable. The built-in screen is small, about six inches wide, and the machine does not have a programme to compare the entered measurements with standardized charts of fetal size and growth. Christina is having her second routine scan (at about 32 weeks) so I know that the technician has assessed the rate of fetal growth, manually comparing the measurements taken today with the gestational age estimated from the woman’s 18-week scan. The technician shuts the folder and goes past me to call the husband. The technician directs Marco to one side, across the bed from where she and I are positioned. Christina and Marco begin talking about whether or not to find out the fetal sex.

Christina: A friend of mine, she had her scan and they said, "We're 99% sure it's a girl, but don't buy pink." I guess that one per cent, they're not sure.

Technician: You don't want to know and he does?
Christina: Right. So we're both not gonna know.

Marco: No. You can tell me and you [Christina] can not know.

Technician: Can I tell him?

Christina: No.

Technician: Okay, you're both not gonna know.

Marco: Why can't I know? [laughing] Is that a provincial or federal law?

Technician: If she don't want you to know, I don't say. It's her body.

Marco: [laughing in exasperation] Okay. Okay. This time I give you a break, but the next kid I want to know.

Technician: Besides, it's in a breech. So I can't know. [She points to a separate screen at the foot of the bed.] This screen is for you. You're not gonna see like at the first one because the baby is bigger. So we only see parts. Here is the head. It's a breech.

Christina: Oh. But that's where I feel all the movement [up near her breasts]. When is the time for it to turn? 'Cause last month at the doctor's the head was down.

Technician: At 32 or 33 weeks.

Christina: Cause I'm starting my 33 weeks now. Is it gonna turn? What if it doesn't turn? They'll do a cesarean, right? Gosh! I hope it turns.

Technician: There's still time. Here's the head, the profile of the face.

Marco: Did you see the sex?

Technician: I look for that last. [The technician goes out.]

Marco: [to me] But I heard, that it's not 100% accurate, right? They can make mistakes, right?
Christina: I hope it's gonna turn. See my friends are the same stage as me and their babies have all turned.

Obstetrician: [comes in with the technician and starts scanning. After a few minutes] I'm just checking the head measurements.

Marco: Everything is okay?

Obstetrician: Yes. [He finishes the measurements and prints the images.] That's great. Everything is fine. [The technician scans for a few more seconds and then returns the probe to its place on the machine.] Okay. Everything look good. You can go now.

Scan Three

I stay in the same cubicle and unroll a clean sheet of paper over the bed while the technician calls the next patient. Nirmala comes in quietly.

The technician pats the bed and tells her to lie on her back.

Technician: Vous parlez anglais ou français?

Nirmala: [lying down] English.

Technician: It's your first baby? [Nirmala nods. I look at the ultrasound report and see that her last menstrual period was 17 weeks ago.] Is this your first ultrasound? [Nirmala nods and doesn't speak again until the end of the examination.] Here is the heart beat. Look over there. [She points to the monitor at the foot of the bed] The back, the baby's head. Ok. I'm gonna do my exam and then show you the baby after. [Aside from the clicking of the keyboard keys and the printer copying each frozen image, the room is quiet for several minutes.] Thighbone, the femur. [Pause.] The top of the head. Are your periods regular? [Nirmala nods.] You are only 15 weeks, not 17. Le bébé est plus petit. [After a few more minutes, the examination is finished.] Everything look nice. Everything look good. [Once Nirmala's husband has come in, the technician repeats part of her description of the fetal image, pointing to the head, legs, and an arm. The couple watch the screen intently but don't say anything. The technician hands them a photograph.] That's it. The report will go to your doctor.
Nirmala: Thank you.

**Scan Four**

I return to the other cubicle. Teresa is just climbing onto the bed.

The technician begins the scan with the routine questions.

Technician: You speak English? [Teresa nods.] Is this your first baby?

Teresa: Yes.

Technician: When was the date of your last period? [The receptionist has already written this information on the form, but the technicians often double check.]

Teresa: October 22.

Technician: [The technician calculates the number of weeks with a gestational calendar, enters the figure on the ultrasound report, and initials the form.] Okay. So you are about 16 weeks. [The technician swivels her chair to face the ultrasound machine and enters Teresa's identification number and date of last menstrual period. She asks Teresa to pull up her gown and then covers her thighs with a towel. She holds up the bottle of transducing gel.] It's gonna be cold. [She squirts several loops of the blue gel on Teresa's bare abdomen. Teresa gasps.] Cold, eh? [The technician begins to scan. We all look expectantly at the screen.] I will give you a quick look at the baby and then I will do my examination. [While she is talking, she has seen the beating heart and done a rapid evaluation of the fetal position.] Here is your bladder. It's very full. This is the "vaginé" [she uses the French word here] and cervix. We check that to see that it is closed. [The technician takes a photo.] Here is the baby's head.

Teresa: Where? [She touches the screen] I don't see.

Technician: Here, points to the screen. [She moves the probe and the fetal torso comes into view.] It's moving.

Teresa: Can you tell the sex of the baby?
Technician: Sometimes we can and sometimes we cannot. At the first ultrasound sometimes it's too early. But you don't want to know, eh? It's your first one. [As we watch the screen, shapes rotate and a flexing leg appears.] He move a lot. You're gonna be busy.

Teresa: So that's what it is. I was sitting on the Metro and I felt something pushing. Is that possible?

Technician: At the end of the fifth month you're gonna feel it. [The technician continues to stare at the screen while she asks if I have bought a car yet. Several minutes pass as she measures the circumference of the head, the length of the femur. She looks at the fetal brain, the spine, and the internal organs.] Everything look nice so far. ... All my heads are down this morning. [to Teresa] It makes it hard to get the measurement when they are like that. [to me] You know, they are all like that when it's cold outside. Like they are all in one corner. [After a few more minutes, she asks Teresa's husband to come in. Dino is smiling broadly, eager to see.]

Technician: Here is the top of the head ... the two hands, near the head [The technician places her own two hands at the side of her face and wiggles her hands. She speaks in a high voice and simulates the fetal voice.] "Allô Mama. Allô Papa." [Teresa and Dino laugh.] You see the two legs? The two knees here.

Teresa: The knees! [She laughs and looks at Dino. She touches his arm as he leans over the bed to see the screen.]

Technician: The head again and the hand, like this [she puts her hand near her forehead]. He's tired.

Teresa: He's had enough! ... Is that his hand there?

Technician: [nodding] Cute, eh? [She prints a copy of this image and places the photo in a little paper frame before handing it to Teresa.] See he's thinking [again she mimics the position, putting her hand to her forehead.] I'll just go show these [the long strip of photos which she has taken] to the doctor. [Dino and Teresa look at the photo and ask me why the sex cannot be seen. The technician returns.] That's fine. Everything look good. You can go.
Scan Five

As she begins the examination, the technician tells me they are now scanning about 30 women each day. She complains, "Sometimes I feel like I need to hide in here! It's too much. We're supposed to be finished at one and I don't leave until after two o'clock." Julie is about 34 weeks pregnant, she watches the screen with interest. The technician conducts the examination quickly, naming the fetal heart, head, legs, spine, stomach and bladder. With the measurements done, she calls in Julie’s husband, Tom.

Tom: So today's the day of the million dollar question.

Julie: Yeah, but I haven't got a million dollar answer.

Julie: Can you tell what it is?

Technician: Yes. Do you want to know?

Julie: Oh! Don't ask me. Wait. Wait! Tom! Help!

Tom: It's up to you.

Julie: Does it have all its parts?

Technician: Yes. Everything looks fine. Here are the legs.

Julie: Oh good. Last night I had a nightmare it didn't have any legs! Thank you! [After a few moments.] Oh! Okay. What is it?

Technician: A girl.

Julie: A girl? It's a girl. Oh my God! It's a girl. [She looks at Tom. He smiles and holds her hand.] Don't tell anyone!

Julie: [starting to cry] Oh, I'm such a suck!

Technician: That's it. Everything looks good.
Julie: Thank you.

Technician: Do you want a photograph?

Julie: Yes, please.

Technician: I don't know what you're gonna see. Can you see the face here?

Julie: [chuckling] Not really. But we'll take it anyway.

The routine of the clinic varied tremendously during the research period. The variation included the initial training of the technicians and their gradual increase in responsibility, as well as the dramatic increase in caseload. There were also differences in the scanning styles of each obstetrician and technician and times when the sonographers would not be very talkative with the women. No two ultrasound examinations were exactly alike; the stage of the pregnancy, twins, miscarriage, difficult fetal positions, amniocenteses, and talkative, nervous or excited women made each scan distinctive. The development of the clinic and the variability in interpretations of fetal images will be discussed in Chapter Eight. In the present chapter I focus on the commonalities, the recurring themes and patterns in descriptions of the fetal image by sonographers.

II. The Clinical Presentation of Fetal Imaging

In this section of the chapter, I begin to discuss how the obstetricians and the technicians explicate the fetal image. I start by describing the basic
ultrasound examination, the standardized process by which they conduct, organize, classify, compare, and talk about routine fetal images. I then describe how obstetricians and technicians talk about the fetal image to other clinical personnel.

II.A. The Ultrasound Process: A Basic Examination

Routine scans have a sameness to them, a series of actions which occur in all routine scans. Those actions include, recording the ultrasound data, finding anatomical landmarks, photographing certain structures, taking measurements, and determining their clinical significance. This series of actions has been formalized into what are called "basic," or "level one" ultrasound examinations (American College of Obstetricians and Gynecologists 1991; Society of Obstetricians and Gynaecologists of Canada 1981; Kurtz 1990). A "basic" scan is distinguished from a "detailed," "targeted" or "Level 2" scan which occurs when there is reason to suspect some fetal anomaly. At the Metropolitan, these two types of scans are called, respectively, "normals" and "high-risk." Most of the ultrasounds at the Metropolitan are considered "normals" and two are routine in an uncomplicated or "uneventful" pregnancy. Those two routine scans are further distinguished as an "18-week" conducted at about 16 to 18 weeks gestation and a "32-week" done at around 30 to 33 weeks.

These two routine scans are similar in terms of the measurements
taken, the anatomical structures examined, and how the fetal image is described to women. During both, the sonographers determine the presence of fetal life, assign a fetal age, and assess fetal growth, and check for fetal or maternal anomalies. In the following pages I describe a routine 18-week scan, noting how it differs from a routine 32-week scan. I describe the scan as if it were being completed by an ultrasound technician. Obstetricians do some routine scans, but the technicians do the majority.

A routine scan at the Metropolitan begins when the receptionist creates a computer record for the woman containing information for billing (her medical insurance number and the name of the referring physician) and the information from her "history" used to classify and interpret her ultrasound. The date of her last menstrual period is entered on a written form, as are the number of previous pregnancies, number of live born infants, and any specific indications for the ultrasound. These first questions to the woman are used to classify her ultrasound as routine or non-routine.

Once she is in the examination room, the technician asks the woman to raise her hospital gown or clothing to just below breast level and to lower her underwear to below the hips. A small towel is then used to cover the woman's upper thighs and pubic area and transducing gel is squirted onto

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3. The original clinic policy was to ask all women to change into a hospital gown. Now women are given a choice of wearing a gown or their street clothes; most choose to remain in their own clothes.
her exposed abdomen. The creation of a context for classifying and interpreting the ultrasound is continued as technicians study the contents of a woman's file. They note the number of pregnancies and live born infants, the woman's age, calculate her gestational age based on last menstrual period and may quickly look over the reports from any previous ultrasounds. The technicians often question the woman at this point in order to confirm or clarify the written record. At an early point in the scan, if the woman has not already indicated her preference, she is asked if she wishes to know the fetal sex.

During the first few seconds of the scan, the technician checks that the fetal heart is beating and that there is only one fetus. Once the pregnancy is determined to be a "live singleton," she proceeds by examining and photographing the maternal cervix and vagina and the placenta. Then the fetus is examined from the head downward, beginning with the cerebellum, cranium, and face, and moving down the fetal body to the spine (particularly the lumbar and sacral regions), arms, hands, legs and feet. Internally, the four chambers of the heart, the stomach, bladder, and kidneys are identified. The level of amniotic fluid is estimated; the site where the umbilical cord attaches to the fetal abdominal wall and the blood vessels of the umbilical cord are photographed. Towards the end of the examination, the technician may try to determine the fetal sex.

The technician progresses through the ultrasound by locating,
examining and photographing standard anatomical landmarks and structures, the parts of the image which signify to her that she has found the correct orientation, level and resolution for examining the fetus. If she cannot find the landmarks and structures which characterize a "normal" fetal appearance or if there is something in the image which she cannot account for as "normal" she continues her examination and then returns to "try again." Only if she is unable to determine the image as normal after several tries, does the technician ask for the obstetrician's assistance.

Certain landmarks are connected on-screen by means of dotted lines or "+" marks and become standard fetal measurements of the fetal biparietal diameter (ear to ear through the head), the length of the femur, and the abdominal circumference. Each measurement is repeated until the technician has two which do not differ by more than one or two millimetres. "Good measurements" are saved in the computer memory and photographed.

Once she has completed her series of measurements, the technician compares them, manually or by computer, with standardized charts of fetal growth. In this way, fetal landmarks, transformed into measurements, are transformed further into numeric estimates of fetal age and size and assessments of the symmetry of fetal long bone and cranial growth. Before the technician classifies the fetus as abnormal, she attempts to account for deviation between standardized charts, ultrasound measurements, and
menstrual age by attributing it to normal variation in fetal growth or measurement error. She may try to resolve discrepancies by re-doing measurements and getting them "to fit." If she has any doubts about the interpretation of the measurements or the image itself, the technician asks for assistance from the obstetrician.

At the conclusion of the examination, the woman is offered an ultrasound photograph and permitted to leave. The photograph for the woman is placed in a paper frame printed with a drawing of a baby in a crib. After several months of operation, the clinic began charging $5 for each photograph.

Once the obstetrician has checked the examination photographs and measurements, negative findings are summarized on the report as "No anomalies seen" (in French, "Rien à signaler"). Any "questionable" or "anomalous" findings are described and included on the report, as are recommendations for additional ultrasounds or separate tests. A copy of the report is then sent to the woman's own physician; another copy and the photographs remain on file at the ultrasound clinic.

A routine 32-week scan is conducted in the same manner as I have described above. However, this time the fetal measurements of the femur, head and abdomen are used to assess the rate and symmetry of fetal growth rather than to estimate the fetal age. The current fetal weight, and sometimes, the expected weight at delivery, is calculated. The fetal
position, placental and umbilical functioning, and amniotic fluid levels are noted.

This process constitutes a routine scan: maternal reproductive history is summarized in terms of pregnancy number and outcome, anatomical landmarks are visualized, structures measured, photographed and measured again, and then the image described in terms of normal, questionable, or abnormal findings. The process provides obstetricians and technicians with the means of comparing one fetus to another and of comparing fetal images taken at different times during one pregnancy. Completing the basic ultrasound examination also enables them to make statements about the fetus to other medical professionals and to parents.

II.B. The Clinical Rationale for Routine Fetal Imaging

In this section I describe the value and limitations which the sonographers assigned to routine fetal imaging. Each of the obstetricians and technicians regard fetal imaging as an essential part of prenatal care for all women. The words of one obstetrician convey the general opinion: "Ultrasound is a tool which lets us see what is really going on" during pregnancy. Physicians and technicians at the Metropolitan's ultrasound clinic held similar views about the benefits and limitations of ultrasound. However, the technicians were less willing to offer and to elaborate their opinions on this subject, deferring to the clinical expertise of the
obstetricians. For this reason, most of the following quotations are from the obstetricians.

II.B.1. The Value of Routine Fetal Imaging

The importance which the obstetricians at the Metropolitan clinic ascribe to ultrasound fetal imaging is rooted, first of all, in an historical perspective:

As obstetricians we had very crude windows to the uterus. We had the mother's perception, our hands, our stethoscope and sometimes, X-rays. Then came fetal monitoring and ultrasound. They provided a fantastic opportunity to be up-to-date with technology. With ultrasound we had a window that was non-invasive and didn't hurt, except for the full bladder policy. It was very exciting. (Obstetrician)

Ultrasound has really revolutionized how we practice obstetrics. Look. Before, we were groping around in the dark a lot. I mean we could only try to feel and hear what was going on. Now we can really see what's happening in there. (Obstetrician)

The benefits sonographers attribute to routine fetal imaging generally referred to three clinical issues: 1) determining the fetal age, 2) screening for maternal or fetal risk factors, 3) screening for fetal anomalies. For these three areas, ultrasound is considered superior to other methods of prenatal assessment. For example, although they acknowledge that fetal age can be inferred from the date of woman's last menstrual period and that many Québec women know that date, determining fetal maturity by ultrasound is considered necessary, if only to confirm the fetal age. And, as I was told many times, only ultrasound allows the sonographer to "look for anomalies"
in all women who come for prenatal care, regardless of maternal age or
history, and in a "non-invasive manner." By non-invasive, the obstetricians
draw attention to the fact that ultrasound, unlike prenatal genetic screening
such as amniocentesis, cordocentesis, and chorionic villus sampling, does
not involve the insertion of any instrument into the woman or the piercing of
her skin.⁴

The sonographers also describe what they call "psychological
benefits" of ultrasound. These benefits refer first, to reduced anxiety among
women about the health of the fetus, and second, to maternal and/or
paternal "bonding" with the fetus. Both reduced anxiety and the
development of an emotional attachment to the fetus are described as
clinically important since they result in a "better fetal environment" and
sometimes in maternal behavioral change.

When they [the women] see it on the ultrasound, they know they are
going to have a baby. Some studies have shown that the ultrasound
can change behaviour. It can decrease smoking or drinking.
(Obstetrician)

In addition to arguing that there are compelling reasons to use
ultrasound routinely, the sonographers maintain that there are no convincing
reasons not to do so. The only reason offered to explain why a woman

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⁴ The sound waves of ultrasound are not considered to be invasive.
"Endovaginal" or "transvaginal" scanning used primarily in early pregnancy
(prior to 12 weeks) could be considered invasive since the ultrasound probe
is inserted in the vagina.
might not want to have ultrasound was if she was "religious." The obstetricians dismiss the lack of studies showing maternal or infant benefit from routine scanning as a result of the newness of ultrasound and poor research design.

If you look at the literature, at the studies, you will find no benefit for routine scans. But most of them are retrospective studies and they have so many variables that I don't know how they can reach their conclusions. (Obstetrician)

The clinic staff maintain that ultrasound is safe and point out that "no good evidence" of harm has appeared during the twenty years of ultrasound's use.

Ultrasound has been around a long time. What? Umm, twenty years now. And all the studies have shown no reproducible effect. ... They have done some follow-up studies, but how can you follow when its only been around for 20 years. They've done some intergeneration studies with animals because the generations are shorter. But nothing has shown up. There is no hunch or suspicion. ... Another problem is, how would you get a comparable population who hadn't had ultrasound? It's so widely used now and can you imagine withholding ultrasound? (Obstetrician)

Finally, the costs of ultrasound are weighed favourably against the costs of other medical technologies and the costs of caring for handicapped infants.

I cost under $50,000 to run the [ultrasound] clinic last year [1990]. That's nothing! You know, and this really bothers me, you could scan all women five times during pregnancy for the cost of three heart transplants. ... So we find out that it's $10,000 to scan and intervene in a [fetal] growth retardation. That's just off the top of my head. Okay, so that $10,000 seems like a lot. But, I mean, here's the life of some poor little guy in there and what's that in comparison to the million dollars it costs to prolong the life of someone with heart
disease for three months! (Obstetrician)

Let's say for Québec, at $100 a scan we're talking about $10 million dollars just to do a 16-18 week scan for all pregnant women. And, I'm being conservative. Is it preventing malformed, handicapped, and bad babies from being born? What is the saving to health care if it is preventing all malformed, handicapped, and bad babies from being born? It's not just a matter of the here and now, it's the future savings as well. And we can't project that. (Obstetrician)

II.B.2. The Limitations of Fetal Imaging

Although these sonographers support the use of ultrasound in all pregnancies, they are careful to point out that the technique has limitations.

First, and foremost, ultrasounds are described as "operator dependent." In other words, the quality and accuracy of the scan depends on the skill and expertise of the individual conducting the scan. For this reason, the technicians say that they "have to take their time" doing an ultrasound and "can't let things bother [or distract] them." The importance of the operator for the quality of the ultrasound was an important factor in the obstetricians' decision to hire novice ultrasound technicians and supervise their training.

Second, there are instances when ultrasound does not provide a satisfactory image. Sonographers refer to the particularly indistinct images produced from about 11 and 14 weeks gestation as a "grey window." Women who are scanned during this stage are asked to come back for an additional examination. In addition, a patient maybe described as "a poor
scan" or, in French, as "pas ecogenic" if her fetal image seems especially grainy looking or unclear. Women who are obese or who have had several children and thus are thought to have diminished abdominal muscle tone are often described in this way.

Third, resources including time, equipment, and money are occasionally described as a limitation on ultrasounds. The Metropolitan's ultrasound clinic staff say that their heavy patient load does not permit them the time to scan the heart, palate or face adequately. Nor does their budget allow for the "special machines" needed to assess umbilical or cardiac blood flow. A lack of these resources are described as problems endemic to the Canadian health care system.

Obstetricians I interviewed at the Metropolitan Hospital are concerned that ultrasounds are being misunderstood and misused. Patients, in particular, are described as holding overly high expectations for ultrasound.

They think if we can see the baby then you can see that everything is normal. For example, we do an ultrasound and say that 'Everything is okay.' And then at birth we find an abnormality in the heart or the stomach and they are devastated and they sue. ... They expect medicine to be perfect. And if we don't see something they find it unbearable and then we get sued. (Obstetrician)

Some referring physicians are believed to rely too heavily on ultrasound and neglect other basic clinical skills, such as measuring fundal height, taking a
detailed medical history, and conducting simple physical examinations. Sonographers feel that some physicians outside the clinic are transferring the responsibility for good prenatal care onto the ultrasound staff.

Why two scans? Doctor reassurance. ... Sometimes in the office proper measurements aren't being done. Doctors aren't taking the time to measure the woman's tummy and then they are leaving it to be taken care of by others. (Obstetrician)

There is an overall trend to using ultrasound more and more. As well, in Montréal it seems to be an intense desire to have better outcomes and not miss things. ... Also in my opinion, part of it has to do with high-volume obstetrics and a desire to have a back-up method when you are doing 400 deliveries a year. You want, I don't like to call ultrasound a "fail-safe," but that sort of fail-safe method. (Obstetrician)

II.C. Sonographers' Accounts of the Fetal Image for Clinicians

The way in which sonographers interpret the ultrasound image for other clinicians was not a focus of my study. These accounts for other clinicians are described here as a useful comparison with the interpretations

5. One obstetrician recounted the following story as an example of over-reliance on ultrasound:

It [ultrasound] shouldn't be used because doctors don't have the time to do a proper examination, to do a manual exam, or to figure out what is wrong. My God! I'll give you an example. We had a woman sent here for gestational age. She was an hysterical pregnancy. Two or three months pregnant. She'd had her uterus removed! I called and gave the physician shit personally for that! There was nothing to see. We did a scan. An endovaginal scan. I was so upset because I couldn't see anything. There was nothing to see! No cervix! I put on my gloves and stuck my fingers up her vagina and then I realized.
for expectant parents. There is often a variety of clinical personnel present during a routine scan at the Metropolitan. In addition to the technician who conducts the ultrasound, the obstetrician is present usually for at least a portion of each examination. Other obstetricians and residents in radiology or obstetrics come to the clinic to learn how to conduct and interpret ultrasounds. Some technicians from the Radiology Department come during their coffee break to talk to the ultrasound technicians. Groups of medical students spend brief periods at the clinic, as do ultrasound technicians from other hospitals.

Sonographers' accounts of the fetal image include discussions at the bedside during the examination as well as the written and oral reports obstetricians make to other physicians following an ultrasound examination. My discussion of sonographers' accounts of the fetal image for other clinicians refers primarily to what was said during the scan.

When obstetricians and technicians describe the fetal image among themselves their accounts are often concerned with one or both of two kinds of problems: one, how to obtain the best ultrasound image and two, how to translate that image into diagnostic information about the fetus. The first kind of account usually involves instructions from obstetricians to technicians. This was certainly true at the Metropolitan during the first few months of the clinic's operation. During the last few months of the fieldwork, however, the technicians began instructing the residents how to conduct a
basic ultrasound examination. In their technical accounts, obstetricians and technicians give advice about how to use the equipment, distinguish between valid information and "artefacts" of the image, locate and recognize fetal and maternal anatomical landmarks, take measurements.

The second kind of account concerns diagnostic questions and usually occurs between obstetricians or consists of an obstetrician's explanation to a technician or resident. Diagnostic accounts refer to the process through which obstetricians and technicians describe the image in terms of its clinical significance. Here they decide on the normality of anatomical structures and function, analyse measurements of the fetus, determine whether the image is within normal variation, inaccurate, or indicates an anomaly, and assign diagnostic labels. In practice, instructional and diagnostic accounts of the ultrasound images often overlap. For example, after an obstetrician makes a diagnosis he or she then explains to the technician what is distinctive about the image so that she may recognize it in the future. Ultrasound protocols and the significance of the image are continually changing and obstetricians and technicians often discuss the "latest developments" by means of their accounts of the fetal image.

Sonographers' accounts of ultrasound for other clinicians tend to be instrumental, to refer directly to the fetal image rather than to the fetus, and to describe the fetal image in terms of its parts rather than as a whole entity. As I described earlier, accounts for clinicians are primarily instrumental in
the sense that, they are attempts to answer technical questions about the
equipment, the image, and the process of scanning and/or to answer
clinical, primarily diagnostic, questions. Sonographers describe the image in
technically and clinically specialized terms. They specify the precise
orientation and location of the image by standard scientific nomenclature,
"longitudinal" or "transverse," "dorsal," "anterior," "lateral," etc. Clinical and
scientific terminology is used to refer to fetal and maternal anatomy,
function, position, and pathology.

Accounts for other clinicians generally refer directly to the fetal image
rather than to the fetus. For example, sonographers say "What we see
here" or "What we can see with the ultrasound is —" rather than saying,
"This fetus has —" or "This baby is —." They generally do not link their
accounts of the fetal image to the pregnant women by saying "her baby" or
to assign the fetus gender specific pronouns, "he" or "she." Their accounts
also tend to describe the fetal image in terms of its measurements,
anatomical structures, and its clinical significance: "What we've got here is a
frank breech." The noun "fetus" is rarely used, although the adjective
"fetal" is common, as in "fetal bladder" or certain fetal pathologies. When
obstetricians and technicians do talk about "the fetus" or "the baby" it is
often to make a point about fetuses or babies in general, rather than to
describe the specific fetus. For example, "When we see numbers like this it
is usually in an IUGR [intra-uterine growth retarded] baby" or, "A nuchal fold
is one characteristic of a Trisomy 21 fetus."

When obstetricians and technicians present their accounts to other clinicians they generally focus on the fetal image and do not refer to the woman or her partner. Unless an anomaly is suspected, the sonographers direct their comments out loud, sometimes across the pregnant woman, to the other clinicians. Specialized and specific terminology are not explained for a woman unless she asks. Sonographers may use one language to describe the image to the woman and then switch to the other when describing the image among themselves. This is common when the patient is an English-speaker and the sonographers are French speaking.

If the sonographers notice that the woman is nervous, they may explain to her that their discussion is "nothing important," "just academic talk," or, more specifically, "This isn't about your baby. We're just talking generally." If they are, in fact, trying to reach a diagnosis, they may say to her, "We will explain all of this to you in a minute." Until those statements are made, it is often difficult, as in the following examples, for women to distinguish statements about anomalies or technical problems in general from particular accounts of their fetus.

**Scan One**

**Obstetrician:** [to the technician] Look at that! [Technician pauses.] Can you see?

**Technician:** It really looks like two, eh?

**Woman:** Is something the matter?
Obstetrician: It’s just an artifact. Something we see on the screen, but it’s not really there.

Woman: [shrugs] I thought you saw twins.

Obstetrician: No. It’s just like a double image, a shadow.

**Scan Two**

Obstetrician: [to the technician as she tries to measure the fetal femur] With a sector scanner, the femur is strange. It’s short.

Woman: What do you mean?

Obstetrician: No no, nothing. The machine.

Woman: Oh. Okay.

Obstetrician: [to the technician] You need it [the femur] horizontal.

To summarize, sonographers’ accounts for other clinicians tend to refer directly to the fetal image rather than to the fetus and to describe the fetal image in terms of its parts rather than as a whole entity. The fetal image is explicated primarily in terms of its technical elements (orientations, planes, grey scale and artifacts) and its diagnostic elements (anatomical structures, functions, and measurements). When sonographers’ describe the fetal image among themselves they rarely include references to fetal activity, consciousness, emotion, or intention. In the next section of this chapter, I show how the accounts of the fetal image for parents differ strikingly from the accounts for other clinicians.
III. Sonographers' Accounts of the Fetal Image for Parents

I begin this section with some general observations about clinical accounts of the fetal image for parents. One, sometimes ultrasounds are carried out in relative silence; the clinic is busy, there is a long line of patients and sonographers work quickly and quietly. But often, as they carry out their examination, sonographers engage the woman and her husband in conversation about the fetal image. Aside from a few words about the procedure and a brief summary of the findings, very little of what is said to women concerns technical or diagnostic information about the image. Instead, sonographers do what they call, "talking to patients." They describe the image, ask the woman question about this and other pregnancies, they answer parent's questions, and engage them in small talk. When sonographers describe the importance of "talking to patients" they say it reassures parents and minimizes anxiety. As I discuss further in Chapter Eight, the "talking" of ultrasound is also regarded by sonographers as a signature part of both the "distinctive care of obstetrics" and of "how things are done at the Metropolitan." The technicians, in particular, say that "talking to patients" is something that they enjoy and take pride in doing.

Two, ultrasounds at the Metropolitan are rarely conducted in only one language. Sonographers use French or English as indicated by the woman or, in the case of bilingual couples, both languages. With two exceptions, I did not find that sonographers' accounts of the fetal image for parents
varied according to the language used. First, accounts for women who understood little or no French or English were limited to pointing out some fetal parts (the beating heart, the head, the leg) and a final statement that "Everything is okay." During the research period, the technicians learned to describe the ultrasound image and to answer some questions in Spanish. Second, initially, the technicians' conversations with women in French were more elaborate than when they spoke in English. After about two months, however, the technicians felt more comfortable conversing in English.

Three, when the technicians began doing ultrasounds (the period which coincided with the start of the fieldwork), they said very little to the patients, no doubt reflecting the fact that they needed to concentrate on the process of scanning. They tended to confine their description of the image and their conversations with women to the beginning and end of the examination. As their confidence grew, the technicians' explanations became more detailed and, now, they tend to describe and discuss the image throughout the entire examination.

Four, the division of labour at the clinic means there are some differences in how technicians and obstetricians describe the fetal image for parents. Technicians conduct the majority of routine scans and call upon the obstetrician as needed. The sonographers at the Metropolitan describe their division of roles and responsibilities as follows. Technicians "look for and rule out" anomalies in morphology, function, and development but it is
up to obstetricians to confirm and label any anomalies and describe their clinical implications to women. Although the technicians say that they do not make diagnoses, they do make judgements about the normality of the fetal image. The technicians must be able to assess the normality of the fetal appearance, size, position, development and behaviour in order to decide when to call an obstetrician. Sometimes and for certain types of findings, the technicians do not call in the obstetrician but convey diagnostic information directly to the woman. For example, technicians sometimes inform the woman if she has uterine fibroids (non-cancerous tumours) or a "low-lying placenta" (near but not covering the cervix).

This division of labour means that technicians spend more time with parents and talk on a wider range of subjects, while obstetricians’ conversations with parents are often focussed on diagnostic matters. However, in terms of how obstetricians and technicians describe the fetal image for parents during routine scans, there are no marked differences. In part this probably reflects both the small number of sonographers and the fact that the technicians were trained by, and have drawn their explanations of the image from, these obstetricians.

As I’ve said, explanations of the fetal image to other clinicians (residents, referring physicians, etc.) are usually given by the clinic obstetricians, but explanations for parents are usually given by technicians. Thus the differences I observed between accounts for clinicians and for
parents may reflect differences in how obstetricians and technicians conceptualize and present the fetal image. Unfortunately, based on my data, I cannot determine conclusively if that is the case.

Five, sonographers' accounts of the fetal image for parents are different from the accounts for other clinicians. As I show in the following pages, the sonographers' accounts for parents: a) lack a detailed technical or diagnostic content; b) refer to the fetal image as if it were the fetus, or, in the sonographers' terms, "the baby;" c) describe the fetal image in terms of human social characteristics, including action, intention, consciousness, and emotion; and d) are tailored to different types of parents.

There are three main types of information given to parents during ultrasound, information about the technical process and equipment of ultrasound, diagnostic information, and information about the fetus as a social being.

III.A. The Technical Content

Sonographers' explanations about the equipment and the technical process of ultrasound influence how parents perceive the fetal image. On the one hand, sonographers suggest that the ultrasound is "a little camera" or a "little television to see the baby" or "take pictures." On the other hand, they know that ultrasound's greyish vision of fetal interior is confusing to parents. So, sonographers draw parents attention to the least ambiguous
elements: "the white we see is bone" and the "black is liquid." They point out that ultrasound allows them "to see inside the baby." The sectional view of ultrasound is described as follows: "With ultrasound we don't see the whole baby. We see in slices. It's like cutting the baby in slices." (The technicians told me that one of the obstetricians didn't like them to use the term "cutting." The term is a literal translation of the French "couper.") The orientation of the image is often left unspecified, although the technicians sometimes use their hands to clarify "transverse" and "longitudinal."

In their explanations to parents, the limitations of ultrasound vision of the fetus are attributed to either the woman or the fetus. Thus, during the 32-week scan, technicians customarily tell women, "You're not going to see like at the first scan, because the baby is bigger." When the woman is particularly obese, she may be told that the image is hard to see since there are "extra layers."

III.B. The Diagnostic Content

Descriptions of the fetal image during a routine scan for women and their partners include some diagnostic information. During a routine first scan most women are told the fetal age and at the second routine scan, they learn the fetal weight, position, and sometimes, the estimated weight at delivery. Clinical information given to women is characteristically non-specific. For example, since ultrasound examinations often do not result in
a change in estimated fetal age, many women are simply told, "Your dates are okay" or "Your dates are good." Where there is a difference of more than one week, obstetricians and technicians indicate the fetal age determined by ultrasound. Much of the ultrasound examination is intended to screen for anomalies in fetal growth, morphology, or function. If no anomalies are found, the results of this screening are conveyed to the woman by the single statement: "Everything looks fine" or "Tout va bien."

Sonographers' accounts of the image for women generally do not to contain references to specific pathologies, to the possibility of anomaly, or the term "normal." Sonographers sometimes describe why they are examining certain parts, saying, for example, "We see the bladder is full to know that the kidneys are working" and, "We look at the placenta to see if it is covering the cervix." They may mention that a particular observation, fetal breathing or a full fetal bladder, for example, is "un signe de bonne santé," a sign of good health. Only infrequently do sonographers name the specific pathology for which they are screening. They generally do not use the term "normal" during routine scans, preferring, instead, "fine," "good" or "okay." Sonographers include the term "normal" when they find no anomalies during a scan which was previously thought to be abnormal or, if anomalies were found during the woman's previous pregnancy. Thus they may say, "This time, everything looks normal."

The diagnostic limitations of ultrasound are usually not specified for
parents. Sonographers do not routinely explain that the fetal age and size determined by ultrasound are estimates nor specify the margin of error. In response to parents’ questions, sonographers do point out that "We cannot see everything" or "Ultrasound cannot tell us everything." Their explanations of ultrasound’s limitations generally refer to normal variation in appearance or behaviour. For example, "We cannot see the colour of the eyes or the hair" or "We cannot tell you if it will be a good baby and not cry all the time." Less commonly, their explanation refers to the inability to detect anomalies: "It will not tell us if the baby will be deaf or blind."

III.C. The Social Content

Despite the importance which obstetricians and technicians ascribe to the ability of ultrasound to detect anomalies and examine the health of the fetus, sonographers’ accounts of the image to parents contain relatively little about the results of that examination. The fact that parents do not receive much diagnostic information during the procedure is not unique to ultrasound. The results of many other medical tests including, blood and urine analysis, X-rays, and fetal heart monitoring may be sent first to the referring physician and then conveyed to patients.

What is intriguing is that sonographers’ accounts of the fetal image for parents describe the fetus as a social being, with a specific social identity, and possessing intention, consciousness, emotion and communicative
ability. Furthermore, sonographers often ask questions which are not diagnostically relevant: they may ask a woman about her preference for a boy or girl, what name has been selected, and what preparations have been made in the home for the new baby. These are questions which enable the sonographer to particularize and personalize their explanation of the fetal image. Within these clinical interpretations of routine fetal images are dimensions of selfhood which Canadians may take for granted. Those four dimensions of selfhood, as I outlined them in Chapter One are: a physical dimension, a social and moral dimension, a dimension of subjectivity and a dimension of potentiality.

III.C.1. The Physical Dimension to Fetal Selfhood

There is a physical dimension to selfhood, a set of assumptions about the human body, its functioning, normality and capacity. This dimension of selfhood also refers to locating the self in time (its onset) and in place (e.g., the brain, the heart). Sonographers begin their examination by determining that the heart is beating. Once they know that the fetus is "viable", they begin to describe the image for the woman and talk about "the baby."

III.C.1.a) Fetal Viability

The first objective of all obstetrical ultrasounds is to determines the "viability" of the fetus. At the start of an examination, viability refers to the
presence of a beating fetal heart. Although they may not tell parents that is what they were looking for, sonographers make a point of showing the heartbeat to parents, often describing it as "a beautiful sight."

During the first few minutes of a scan, sonographers try to determine that there are no major fetal anomalies, no parts of the fetal body missing, misshapen or out of place. So long as they can detect a heartbeat and no serious pathology, the sonographers continue to treat the scan as "routine" and to describe the image for parents.

III.C.1.b) Fetal Anatomy

Most of what obstetricians and technicians say to parents during a routine ultrasound refers to the physical fetus, to its shape and anatomy. The basic description of this anatomy is similar from scan to scan. The heart, head, legs, arms, and the spine, often in that order, are indicated to most parents. Other internal organs, such as the bladder, stomach, kidneys, and the brain may be noted. The facial features, hands and feet, and fetal genitalia are occasionally pointed out, although sonographers feel that parents have difficulty seeing them.

There are differences in the clinical accounts of the fetal anatomy at the 18-week and the 32-week ultrasound. At the first routine ultrasound, it is possible to see much of the fetal body shape at one time on the screen. The technicians adjust the grey scale and magnification of the image to
show the body outlined against the darker surrounding amniotic fluid. During this scan many of their comments refer to the whole fetal body, it’s movement and it’s position. The photograph for parents at the first scan is often a whole, or nearly whole, body image. At the later scan, the fetus is larger and the head, torso and limbs must be visualised in separate images. Clinical accounts of fetal anatomy at this second scan tend to describe the fetus in terms of the appealing nature of parts like the hand, cheeks, or nose or fetal resemblance to family members. Photographs for parents of this later scan may include the face, often in profile, the spine, the hand or the foot.

Fetal anatomical structures are usually referred to by non-specialized vocabulary, although, “femur,” “orbit” and “cerebellum” are used frequently. In each of these three cases, the technicians give a specific explanation for preferring the more technical term: the English word “thigh” is difficult for French speakers to pronounce and “femur” describes the part of the leg being measured; the ultrasound image of the fetal eye does not resemble our eye and the technicians prefer “orbit” so that parents will not be alarmed by what they see; “cerebellum,” like “femur” refers precisely to what is being examined.

Internal organs are described in terms of fetal behaviour or activity, excreting, breathing, and eating. For example, sonographers’ accounts of the fetal bladder include, “See there is pee in the bladder.” If they see that
the bladder is emptying, the technicians may say: "Your baby just peed!"
Although the lungs do not appear in the fetal image, clinic staff refer to
movement of the chest wall as "breathing." When the fetal stomach was
hard to visualize, sonographers ask women to return for an additional scan,
explaining to the women, "We have to wait until he has a full tummy so that
we can see the stomach. Maybe next time when you come back he will
have just eaten."

Sonographers believe that certain fetal parts, especially the beating
heart, face, feet and hands, are appealing to parents. The 16-18 week fetal
face, however, is thought to be "too weird" and strange-looking for parents.
One technician refers to a popular toy when she says the face during the
early scans is "too much like a Ninja Turtle." Some women do respond to
the fetal face at 18 weeks with surprise and slightly negative statements.
I should point out that I told the sonographers that several women I
interviewed had reacted strongly to a photograph of the early fetal face,
characterizing it as "creepy" and "like a skeleton." After my comment, the
sonographers were even more cautious in their accounts. In contrast, the
sonographers feel that the fetal face by 32 weeks is particularly appealing.
They like to show the face in profile, pointing out the rounded nose,
forehead, and cheeks and often including the face in photographs for
parents.

Sonographers also believe that the fetal hands and feet, and
especially the fingers, toes, and heel are appealing. When sonographers describe the fetal hand they use their own hand to demonstrate what they see in the image, fingers spread or thumb extended, and particularly, the hand near the fetal face or head. If the fetal hand is open and away from the body, the sonographers may wave to the image, saying "Hello baby" or giving a voice to the image, "Hello Mama." They may also stroke the part of the screen where the fetal hand is visible. When they touch the screen showing the fetal foot they may say that they are "tickling the baby." (I elaborate on this interaction with the fetal image in section III.C.3.). Certain very small structures including the lens of the eye, hair, lips, and ears are met with interest by sonographers and pointed out to parents.

When sonographers talk about the fetal anatomy, particularly those parts which they consider appealing, they may simply say "Here is a foot" or "This is an arm." More often they point out the fetal anatomy in a more descriptive and personalized manner: "Here is the baby's foot" or "your baby's foot." "What a cute little nose." "Can you see the tiny little fingers?" They often refer to the whole fetal image as "un beau bébé" [a beautiful baby] or as "such a cute baby." When the sonographers talk about a fetal image which they find particularly appealing, their posture, facial expressions, and voice changes. They lean closer to the screen, often tilting their heads, cooing and smiling. They use drawn out "aaah" and "chhh" sounds in their accounts, and speak slowly, emphasizing words and
rounding their lips. Clinical accounts of the fetal image for parents are often remarkably similar to how we might talk when admiring a baby in someone’s arms.

III.C.1.c) Fetal Sex and Genitalia

The question of whether the fetus is a boy or girl is part of nearly all routine ultrasounds. Technicians and obstetricians assume that women want to know the fetal sex and that many are eager to have the ultrasound for that reason. On the one hand, sonographers, especially the technicians, emphasize this aspect of the examination by asking most women if they want to know the fetal sex. In fact, they need only say, “Do you want to know what it is?” On the other hand, sonographers do not mention sex determination when they explain the purpose of ultrasounds to parents. Nor do they try to determine the fetal sex before the end of their examination. Women who ask repeatedly if the fetal sex has been visualized are often told, “That’s not the most important thing.” They may also be told, “That’s the last thing I look at” or “I check that after I make sure everything is alright”.

Sonographers are cautious about disclosing the fetal sex. They may ask several times, “Are you sure you want to know?” If the woman and her partner are both present the sonographers are careful to find out if both want to know. If the man does not want to know, but the woman does, the
technician will tell her privately. However, if the man wants to know but the
woman does not, the sonographers ask the woman for permission to tell
him. If she does not grant it, the sonographers will not reveal the fetal sex
to him. One obstetrician explained that there is a legal basis for this
practice.

If the sonographers are unsure of the fetal sex, they prefer to say
nothing rather than speculate. Only if parents are particularly insistent will
the technician offer her best guess and then only with repeated cautions that
she is not certain.

Sonographers do not directly pressure parents to learn the fetal sex.
However, if they detect that parents are curious but undecided they may tell
them, "If you want to know I will tell you." Or, some parents say, "Don't tell
us what it is, just tell us if you can see it." In many cases, once the
sonographer has told parents that she knows whether is a boy or girl,
parents decide that they want to be told. Although they don't pressure
women to know the fetal sex, the technicians sometimes attempt to
discourage women who do want to know. Women having their first child or
who already have a boy and a girl may be told, "You don't want to know" or
"You can always try again." In these circumstances, the technicians believe
that knowing the fetal sex is unimportant or should be a surprise. However,
if the woman is insistent, the technician will disclose the fetal sex.

Both technicians told me that once they know whether the fetus is a
boy or a girl, they have difficulty avoiding accidental disclosures of the fetal sex. Since the technicians customarily refer to the image as "he," accidental disclosure is hardest to avoid when they see that the fetus is a girl. The technicians are uncomfortable using the term "he" when they know it is a girl, and they do not like to refer to the fetus as "it."

In many instances, sonographers determine the fetal sex without explicitly referring to the genitalia in their accounts. They may say simply that it is a boy or a girl, without showing the fetal genitals, or they may refer to the screen saying, "You see, here. This is a boy." If parents want to know how the fetal sex is ascertained, the sonographer may point to or touch the screen and give the following kind of explanation, "This is a girl. A boy looks different." Female genitals are named much less often than the male "penis" and "testicles." The technicians refer to female genitals in French only — "les lèvres" (the labia).

III.C.1.d) Fetal Activity

Sonographers' accounts frequently refer to the fetal image in terms of some activity. The clinic uses only real-time ultrasound and sonographers often refer to movement in the image. The beating fetal heart, moving chest walls, and the emptying bladder are described as evidence of fetal normality. The bending and extending of fetal limbs and the larger whole body twists, rolls, and changes in position form an integral part of the
account for parents. This is especially true during the 18-week scan when most of the fetal body outline can be seen in one image and when many women have not yet felt fetal movement. Since the real-time image appears to move whenever the ultrasound probe is moved, the sonographer may momentarily still the probe in order to call attention to fetal movement.

Fetal movement seen during ultrasound may be referred to as "the baby moving"; often it is described as a particular kind of movement — as an activity. Thus, the fetus is described as "playing", "swimming", "dancing", "partying", and "waving." If the fetal movement appears to be upward, toward the woman's head, it may be called "climbing." If the movement is downward, the sonographers may joke that the "baby is trying to get out." Fetal body rolls are described as "trying to get comfortable" and extension of the limbs or arching the back are referred to as "stretching." When the fetus is not moving, the sonographers may tell parents, "He's sleeping" or "resting". A fetus with its hand near the head is described as "thinking" or sometimes as "tired." Technicians will often mimic the fetal motion or position while they describe it. If the fetal hand is near the mouth, parents may be told, "the baby is sucking his thumb." In conversation with me, the sonographers explained that it is rare to see the fetus sucking its thumb, but parents like to think that's what its doing.
III.C.2. A Social and Moral Dimension to Fetal Selfhood

There is a social or moral dimension, in which people talk about the self in terms of culturally specific identities each associated with sets of rights and obligations. During the ultrasound, the fetus is identified as "the baby," the woman and her partner are often referred to as "Maman" and "Papa," and linked to these identities are normative statements about fetal and parental behaviour.

III.C.2.a) The Fetal Image as "the Baby"

Throughout the process of having a routine ultrasound, the term "baby" rather than "fetus" is usually used by obstetricians and technicians when they talk about the pregnancy and the fetal image. There are two ways in which the term "baby" is employed.

One, the sonographers use the term "baby" when they are referring directly to the fetus or to the pregnancy. When a woman telephones the clinic to book her ultrasound appointment and when she arrives there the receptionist asks, "Is this your first baby?" In order to ascertain if the woman has had any miscarriages, abortions, or has any children, the clinic staff ask, "Is this your first pregnancy?" or "Have you ever been pregnant before?" The current pregnancy, however, is customarily referred to as "the baby." This use of the term "baby" is consistent with everyday usage: Canadians rarely use the term "fetus" when talking about pregnancy.
Two, the on-screen fetal image is described as "the baby." The sonographers may begin the scan or direct women's attention to the screen by saying, "There's the baby," or "Now we can see the baby." On the other hand, sonographers refer to the on-screen image as a "picture" when they are talking about how ultrasound works or about photographing the image. Obstetricians sometimes indicate to the technician that they want a photograph of a particularly clear or technically accurate image by saying, "That's a pretty picture," or, "I'll take that picture, please." Infrequently the image is referred to as "it;" that term is usually reserved for reference to a particular part of the image (e.g., the bladder).

There are two situations, both prompted by comments from the parents, in which the image is described as "the fetus." In the first, "fetus" is used when the clinic staff want to avoid referring to fetal gender. Technicians customarily use the pronoun "he," or the French "il," to refer to the image if they do not know the fetal sex. Curious parents may ask the technician if she is using that term because the fetus is a boy. The technician may then replace the pronoun referent with "the baby" or, sometimes, "the fetus." The second kind of situation involves the cultural ambiguity and current politicization of the terms "baby" and "fetus." In both circumstances, the word "fetus" is usually used with air of amusement or, even, ridicule. I include examples of both cases, avoiding reference to fetal gender and the cultural ambiguity of the two terms.
Scan One⁶
Technician: (pointing to the screen) Il bouge beaucoup. ["He's moving a lot."] Can you see that?

Husband: Is that a Freudian slip? [Technician looks at him blankly.] Est-ce que c'est un "Freudian slip?" Il bouge. ["He moves."]


Scan Two
Woman: [looking at the screen] Is that the baby? Oops! I shouldn't do that. It's the fetus, right?

Technician: Right. [emphasizing the word] Le fetus.

Woman: Yup. The fetus. Because it's not anything yet, right? [She and the technician laugh at this. The obstetrician comes in.]

Technician: [referring to the woman.] She calls it the fetus. It's not the baby.

Woman: Right.

Obstetrician: [frowning] No. It's the baby.

Other than these two types of circumstances, on only a handful of occasions did I hear a clinician refer to the image as "the fetus" when they were talking to parents. The technicians told me the word "fetus" was "too scientific sounding" and "too cold." Moreover, as the following example illustrates, parents are discouraged from using the term "fetus."

Husband: [looking at the ultrasound photograph which the technician has handed him] Great! Now I can put this on my desk and say, "This is my fetus."

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6. This couple is bilingual so the language of conversation changes throughout the explanation.
III.C.2.b) Parents in Sonographers' Accounts of the Fetal Image

Sonographers' accounts of the fetal image often include references to the pregnant woman and her partner as "Maman" and "Papa" and normative statements about parental behaviour. There are two main ways in which parents are included in the sonographers' accounts of the fetal image. In both cases, sonographers' accounts of the fetal image are determined by their knowledge and perceptions of the parents. One, sonographers ask questions of the parents in order to make their accounts more personal, linking the fetal image to the parents' world of family, friends and work. Two, sonographers' accounts are determined by their assumptions about the interests, emotions, and behaviour of the parents.

III.C.2.b)(i) Personalizing the Fetal Image

Sonographers often begin their ultrasound examination by asking women about their reproductive history, including questions about number of pregnancies, number of live born infants, and her health during this and any past pregnancy. In part, these questions are intended to confirm the information entered on the ultrasound report sheet by the receptionist. They also serve to alert the sonographer to diagnostically useful information. These kinds of questions are also used by sonographers to indicate if
women are particularly worried or apprehensive about the current pregnancy. If they sense that the woman is nervous, they may try to use the fetal image to reassure her.

Questions to women about their reproductive history often lead to other topics which are not diagnostically relevant but which the sonographers incorporate in their accounts of the fetal image. For example, the sonographers may ask about a woman's marital status, a woman's or her husband's preference for a boy or girl, whether or not a name has been selected or a room readied for the new baby. Technicians, in particular, use the information obtained from women in their accounts of the fetal image. They describe the fetal image in terms of it's social identity, "your baby" and sometimes referring to parents during the scan as "Maman" and "Papa." When they give instructions to the fetus it is often directed as a command to do something for the parents, "Say hello to Maman" or, "Don't move so much so Papa can see you." The voice sonographers create for the fetal image often speaks directly to the parents: "Hello Papa" or, "I'm tired, Maman." As I mentioned in the previous section, sonographers' accounts of fetal anatomy may include physical or behavioral resemblances of the fetal image to a parent.

When other family members are present during the ultrasound, the sonographers' accounts of the fetal image are highly particularized in this way. For example, several of the women I interviewed came to the clinic
with their mothers. Sonographers may draw these women into the conversation about the image by encouraging them to look at their "grandchild."

III.C.2.b)(ii) Sonographers' Assumptions about Parents

The sonographers hold assumptions about certain kinds of parents and their descriptions of the fetal image reflect these assumptions. Parents who are perceived as "nice" tend to get elaborated descriptions of the fetal image. By elaborated I mean that the accounts contain many of the elements which I have been discussing, i.e., explicating the fetal image as a "baby" possessing appealing qualities, intention, emotion, and consciousness, and by incorporating the parents' appearance, sentiments, and social world into the description of the fetal image. Several behaviours and types of appearance qualify parents as "nice." "Nice parents" wait patiently for their appointment, follow the sonographer's instructions, and do not disrupt the examination with frequent questions. "Nice parents" do not "look funny" or "strange," do not have a "bad smell," and are not obese. The term is used for parents, particularly for women, who display evidence of caring about the health of the baby, and who do not appear overly interested in learning the sex of the fetus.

In contrast, when sonographers have a negative perception of a woman's appearance or behaviour, their accounts of the fetal image may be
brief and unelaborated. Clear examples of these unelaborated accounts involve 1) women who are assumed to be concerned primarily with knowing the fetal sex; 2) women whose behaviour or appearance is considered inappropriate; and 3) those women whom the sonographers perceive to be concerned with unimportant information. Accounts of the fetal image for these women tend to contain only brief descriptions of fetal anatomy and, sometimes, fetal activity. They do however, occasionally include normative statements about parental behaviour.

One, the sonographers assume that some women are overly interested in learning the fetal sex. From my observations I know that women who are perceived by the sonographers to be overly interested in learning the fetal sex may be told, "Finding out the sex isn't important. The most important thing is that the baby is healthy." This comment is particularly noteworthy since one of the first questions sonographers ask nearly all women during ultrasound is, "Do you want to know what sex it is?" The technicians told me that sometimes they are concerned that a woman will be disappointed by the sex of the fetus and if they think she may seek to terminate the pregnancy, they may simply tell her that they are unable to see whether it is a boy or girl. As the sonographers explained to me, some women, especially East Asian and South Asian women, "just come to see if they are having a boy." The sonographers also told me about cases where women had chosen to abort because of fetal sex.
As I mentioned earlier, normative comments are made to some women having their first child. If the woman wants to know the fetal sex, the sonographers may reply in a joking tone of voice, "This is your first? You don't want to know do you? You can always try again."

Two, the sonographers' accounts for women whose behaviour or appearance they consider to be inappropriate are also abbreviated. As in the third scan of the opening narrative to this chapter, some women are believed to be unexcited or unmoved by the prospect of having a baby. I believe there are cultural stereotypes operating here, too. The sonographers sometimes that black women or First Nations women, for example, "never show anything." Conversely, there are other women whose reactions of joy, crying too much or giggling too loudly, upon seeing the fetal image or learning the fetal sex are considered "too emotional."

Normative comments may be made to women whom the sonographers consider to be "noncompliant" or "not taking care of themselves." For example, the sonographers explained to me that if they know the women is smoking during pregnancy, they try to show her the placenta, so "we can show her the smoke in it." Men, who were once excluded from the ultrasound room, are now encouraged to come in and watch and talk part in the conversation about the image. Some of the women I interviewed came to the ultrasound alone and were asked, "Your husband couldn't come today?"
Three, sonographers are also less likely to give elaborated accounts of the fetal image to women whom they perceive to be overly concerned with “things that aren't important.” Sonographers told me they don't like to do these scans, saying for example, “the women don't care about the health of the baby, they just want to know to buy pink or blue.” In this category are those women described above who are believed to prefer sons. Sonographers reported that some women just want to know the due date so they can schedule their cesarean deliveries at a convenient time. The technicians told me that some women "don't want the baby if it has a finger missing or some other little thing." A few of the women I interviewed expressed their concern about fetal normality by asking the sonographers "to check and see that it has all its fingers and toes." I did not observe an ultrasound during which a "minor anomaly," such as a missing finger, was detected.

III.C.3. Subjectivity and Fetal Selfhood

There is a **subjective dimension** to selfhood, usually described in terms of the self's awareness of its surroundings and of being distinct from other selves, and its capacity for experiencing certain feelings. The fetal image is often described in terms of fetal consciousness, intent, emotions, and awareness of others. Fetal subjectivity appears in the accounts for parents in several forms. One, sonographers ascribe intention and emotion
to fetal movement and body position. For example, fetal movement which impedes the process of conducting the ultrasound examination is described as reluctance, dislike, or modesty on the part of the fetus: "He doesn't like it when I press" or "Look he runs away when I do this." While sonographers are attempting to photograph the image for parents they may say, "He moves away when I try to take the picture," or, "He's shy. He doesn't want his picture taken." The sonographers also refer to fetal shyness and modesty when visualising the genitalia is difficult. Conversely, when the fetal measurements are easily attained, the sonographers say "He's being good" or "Your baby is very cooperative." On particularly cold days, I would often hear the technicians explaining fetal position as a reaction to the weather: "They're all in a corner today" or "All my babies are hiding today."

Two, interaction by technicians and obstetricians with the fetal image suggests fetal subjectivity. They speak to the image, giving instructions, words of encouragement or reprimand: "Move over, baby." "Smile for the camera." They wave to the image, saying "Hello bébé!" and sometimes encourage parents to do the same. They may touch, stroke and "tickle" the image, particularly the fetal feet. The technicians may create a voice for the fetal image by raising the pitch of their own voice to a falsetto. On most of the occasions when I heard technicians creating a fetal voice it was to greet the parents: "Allô Maman. Allô Papa." Often, as in the following example, the fetal voice is part of a larger dialogue:
Technician: [trying to get the fetus to change position, she speaks in a falsetto] I'm sleeping this morning. [Then, in her usual voice.] Move, move, baby. Move so Mummy and Daddy can see you. [After a few moments, the fetal image changes and the technician resumes the falsetto] Allô Maman.

Woman: [hesitantly] Hello.


III.C.4. Fetal Propensity and Potentiality

Finally, selfhood involves a dimension of distinctive propensities and potentialities, usually labelled as "human nature" and referring to the ability of humans to acquire elements of cultural competence such as language, a moral sense, or a role as a "productive" member of society. Sonographers' accounts of the fetal image also include references to fetal propensity and potentiality to become certain kinds of humans. In the majority of these cases, the sonographers are describing potential physical or intellectual ability: "with lungs like that he'll be a runner," or, "A big brain - he'll be smart." Activity seen during the ultrasound may be described in terms of expected post-partum behaviour of the baby or young child: "Your baby is moving a lot. You're gonna be busy!" Some of the sonographers' statements about fetal potentiality are gender-specific. For example, "with thighs like that it has to be a girl" or, "What a big baby. It must be a boy!" The fetal image is also described in terms of potential resemblance to certain family members.
Obstetrician: Look at that nose!

Woman: [chuckling] My husband has a big nose.

Obstetrician: [to the fetal image] You're going to have a big nose like papa, eh?

Woman: [smiling] Poor kid.

Explicit cultural stereotyping is rare in descriptions of the fetal image, usually occurring in a joking manner. For example, when rapid movements of the fetal arms is observed parents may be asked, "Are you Italian?" On several occasions I heard technicians describe a square-looking fetal head as "un bloc de glace," a Québécois term for Anglophones.

IV. Summary

In this chapter I discussed sonographers' accounts of routine fetal images for clinicians and for parents. When sonographers talk among themselves about fetal images they tend to refer directly to the fetal image rather than to the fetus, to describe the image in terms of its parts, and to focus on the processes of producing and transforming the image into a diagnostic statement. Thus the fetal image is explicated for other clinicians primarily in terms of its technical elements (orientations, planes, grey scale and artifacts) and its diagnostic elements (anatomical structures, functions, and measurements). These accounts of the fetal image are aimed at classifying and comparing anatomical parts and measurements in order to
determine if the image is normal or abnormal. When obstetricians and technicians describe the fetal image among themselves they rarely incorporate references to the fetus as appealing, active, conscious, intentional. Nor do they elaborate on the social identity of the fetus or link the fetal image to parents.

Sonographers' accounts of the fetal image for parents differ strikingly from the accounts for other clinicians. When sonographers explicate the fetal image for parents they describe and interact with the fetal image as if it were the fetus, and call the image, "the baby." Accounts for parents generally lack a detailed technical or diagnostic content. Instead they are primarily concentrated on explicating the fetal image in terms of human social characteristics. Notably, dimensions of selfhood are included and the fetal image is described in terms of its social identity, activity, intention, consciousness, emotion, and a distinctive or potentially distinctive self. Sonographers accounts of the fetal image also situate the fetus within a world of other selves. In particular, sonographers personalize their accounts of the image for parents, comparing fetal behaviour and appearance to that of the parents, employing kinship terms to describe the image, creating a voice to enable the fetus to talk to parents, and encouraging them to reply. Sonographers' accounts also contain normative statements about parental behaviour.
CHAPTER FIVE: PREGNANCY AND LEARNING ABOUT THE FETUS

In this chapter I provide a context for women's accounts of the fetus by describing their beliefs about pregnancy and the books they read to learn about pregnancy and the fetus. I begin by further describing the group of women in terms of their ideas about pregnancy. There are, for example, some differences in their narratives on being pregnant, learning about pregnancy, and preparing for motherhood. In the second part of the chapter I discuss the descriptions of the fetus in some of the popular guides to pregnancy. During early pregnancy, women's explicit references to the fetus, especially to "how a baby grows," draw upon their readings in these pregnancy guidebooks.

I. Women's Accounts of Pregnancy

I begin by discussion women's beliefs about what they considered normal and usual about pregnancy and their descriptions of themselves during pregnancy.
I.A. Pregnancy: A Normal Medical Event

Each woman regarded pregnancy as a normal process, a part of being a woman and a sign that their bodies could work properly. They described physical and emotional "symptoms" of pregnancy similarly. Pregnancy implied nausea, headaches, fatigue, weight gain, food cravings, and women expected to be irritable, moody, or "emotional." Pregnancy was a time for women to "take care" or "be more careful than usual," a time to restrict some activities, to avoid stress, alcohol, cigarettes, "chemicals" (including medications, hallucinogenic drugs, and exposure to household cleaners, etc.), a time to eat nutritious foods and to get plenty of rest. Some women mentioned prenatal taboos they had heard from other women: a woman should not stretch up her arms in case the umbilical cord is tightened, nor scratch an itchy spot on her body in case the same part of the baby’s body is marked.

All of the women expressed mixed feelings about the changes in their bodies during the first few months of pregnancy. While they liked the idea of being pregnant, they described themselves as getting or feeling fat, as feeling "unsexy," and as not being able to do what they wanted because they were often tired, sick or uncomfortable. For several women, pregnancy offered a release from a constant vigil over their weight. As one woman put

1. Eight women said their husband was nauseous, gaining weight, and had food cravings.
it, "Being pregnant is great! I can eat whatever I want and nobody says
'Don't eat that, you'll get fat!'" When I asked women what they liked about
being pregnant, the majority (67%) replied, "the attention."

Each of the women regarded pregnancy as an event whose
successful outcome — having a healthy baby — depended on medical
supervision and care. The importance which they ascribed to medical
supervision is evident from the beginning of their pregnancies. Nearly all the
women conducted a pregnancy test at home or at a local pharmacy within a
few days of missing a menstrual period. Shortly after, they went to their
physicians for confirmation that they were "really pregnant." By contrast,
two Lebanese women and the Sri Lankan woman waited a further two
months, in order to "be sure" that they were pregnant.

Although women complained at length about the hours spent waiting
for each "three-minute" doctor's visit and for laboratory tests, ultrasounds,
and fetal heart monitoring (non-stress tests), this medical supervision was, in
their words, essential to "reduce risks" and "ensure a healthy baby." All of
the women wanted a hospital birth and most (53%) wanted what they called
"the big guns," i.e., whatever medications and equipment were available to
reduce the duration and pain of childbirth.
I.B. Being Pregnant

All of the women gave similar descriptions of the physical and emotional signs and symptoms of pregnancy, prescriptive behaviour (e.g., resting, being calm, eating a "balanced diet with lots of milk"), prescriptive behaviour (e.g., avoiding spicy foods and strenuous activity) and the need for a physician's supervision during pregnancy. However, from my earliest conversations with the women, I became aware of what Rapp (1990:40) refers to as women's differing "commitment" to medical discourse, to the language and models in popular guides to pregnancy, for example. Among the women I interviewed two different accounts of "what it is like to be pregnant" emerged. As I suggest in the following pages, these differences in the extent to which women relied upon and reproduced the ideas in their guides to pregnancy roughly parallel differences in their educations, although having had a miscarriage also seem to be an distinctive factor.

One, 60% of the women I interviewed, like the white middle class women of New York City in Rapp's study, talked about pregnancy in ways which closely reflect scientific accounts of pregnancy popularized in guidebooks. These women read avidly, searching, sometimes on a daily basis, in their pregnancy books for the facts with which to normalize their own experiences of pregnancy. They sometimes turned to their books during our interviews and answered my questions about pregnancy and the
fetus by saying, for example, "I read that ---" or "In one of my books, it says ---." They read general guides and books on specialty topics, like preparing for labour and delivery, prenatal exercise and nutrition, and infant care; a few women even read obstetrical textbooks. These women, and here I borrow Rothman's (1986:45) phrase, treated pregnancy "as a reading assignment." As two women recounted,

I've been thinking about having a baby for a while now. Whenever I used to go to a bookstore I would just stand forever flipping through all the books on pregnancy. As soon as I got pregnant I thought, "Great! Now I can buy all those books!" (Peggy)

I'm reading a lot, a lot. I bought three books, one about the baby, one for me about pregnancy and one about pregnancy for men written by a man. I thought my husband would like that one. (Louisa)

About 86% of the women with university degrees are included in this group and only 38% of the women with high school or grade school only. Women who had miscarried or described themselves as "always worrying" about miscarriage, regardless of educational background, also tended to say they were "reading a lot" and to turn to their books during our interviews.

Two, about 40% of the women I interviewed talked about pregnancy in words and ways infused more with their own sensations and experiences and with knowledge about pregnancy exchanged among friends and family, than with "facts" from their reading. When I asked if they were reading about pregnancy they said yes, but they infrequently referred to their
readings during our interview. More importantly, as I will show in the following pages, they talked about these books as just one means of understanding and normalizing pregnancy, not necessarily the definitive one. They read the brochures and pamphlets distributed by their physician or during the childbirth classes, but few purchased or borrowed books from the library or friends. One woman described her reading this way:

I read a bit at the beginning, in that Nine Months For Life, [a booklet published by the Québec Medical Association] I got from the doctor. But not so much now [at 16 weeks]. I mean, I look at the book to see where I am and what it looks like, but that's all. I figure I'll go to the classes at the hospital and they'll tell me what I need to know. (Norma)

Another woman, when I asked how she was "finding out about pregnancy", laughed and said:

Look, I've been around babies all my life. I'm the oldest in a big family. I was always helping my Mum. My sister's got two babies and I'm always looking after them. I helped her when she was pregnant. She tells me about things that happened to her and I say, "Yeah, I've got that." Everybody keeps telling me about books to read but I don't think I need them. (Rosetta)

In contrast to the previous group of "readers," the women whose accounts about pregnancy drew less closely from published accounts of pregnancy included 57% of the women with high school or grade school educations and only 14% of the women with university degrees.

As I illustrate with examples in the following pages, women's views about how and why to learn about pregnancy, their perceived ability to
influence the course and outcome of pregnancy, and their expectations for the transition to motherhood differed between these two groups. The differences in their educations and commitment to the medical discourse of their books also parallel differences in their descriptions of "how a baby grows", discussed in the following chapter.

I.B.1. Learning about Pregnancy

Each of the women I interviewed read about childbirth and fetal development while she was pregnant. The majority (84%) of the women attended childbirth preparation classes offered by the Metropolitan Hospital or by local community health centres (CLSCs). The eight women who did not take classes include four women from outside Canada, two English speakers who thought the courses were available only in French, and two women who did not feel the courses were necessary.

Women gave a variety of accounts of why they read about pregnancy, why they attended the classes, and the significance of what they learned. All women read because they were curious and wanted to

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2. There were a variety of guides to pregnancy read by the women. Among the more common titles were What to Expect When You're Expecting (Eisenberg et al. 1988), The Complete Book of Pregnancy and Childbirth (Kitzinger 1989), Nine Months for Life (Corporation professionnelle des médecins du Québec 1990).
reassure themselves that their experiences were normal. However, for the
women who read avidly, their books were a means of "getting involved" in
the pregnancy. For them, reading was a way to manage the pregnancy, to
anticipate and prepare for certain events, and, even to try to influence the
pregnancy's course and outcome. Women who did not depend on
published information talked about the guides as one of several sources of
general information about pregnancy. Their reading was perceived as
"interesting" and useful in the sense of increasing their knowledge about
pregnancy, but, unlike the readers, they did not depend on those books to
tell them how to be pregnant or how to have a baby.

So what if I don't have to pee constantly and I'm not throwing up. My
friends say its a blessing. I know it's not like in the book, but I'm not
complaining. (Pattie)

I.B.2. Preparing for Pregnancy

Women described what they called a "good time" to get pregnant,
however the meaning of this term differed among the women. Here again,
the differences in what is meant by a "good time" paralleled women's
differing educational backgrounds and commitment to the language and
models of pregnancy in their books.

University educated women whose accounts of pregnancy and the
fetus closely paralleled their readings tended to say they wanted to get
pregnant when they and their husbands were finished with their educations, established in their careers, financially secure, and able to qualify for extended maternity leave. Many of these women said they had selected an ideal time to deliver, basing their decisions on such factors as vacation plans, family events, and the weather (they did not want to be heavily pregnant during either the hot summer or icy winter months). Several charted their monthly ovulation patterns hoping to conceive exactly when planned. Two women had tried to influence the fetal sex; both tried to conceive on the day of ovulation in order to have a boy.

Not only were these women concerned to become pregnant at a good time in their professional and personal lives, but they prepared their bodies for pregnancy. These preparations included pre-conception check-ups with the gynecologist ("just to be sure everything was okay") and dieting so that pregnancy would not put them much above their usual weight. They adopted less strenuous forms of exercise, ate nutritious foods, and reduced their consumption of alcohol, cigarettes, and caffeine. After women stopped taking birth control pills they tried to delay conception at least six months to let the body "return to normal" or "clean itself out."

One point must be made clear. Forty-three per cent of the women who said they "got pregnant accidentally" were from this same group of women who talked about preparing their bodies and planning an "ideal time
to deliver". At the risk of stating the obvious, it would appear that although they described their pregnancies as a matter of carefully weighed decisions plans, conception did not necessarily follow their schedules.

A different meaning of "good time to get pregnant" emerged among the second group of women, those who tended to have high school or grade school educations and who were less committed to their published guides to pregnancy. They also talked it over with their partners and decided upon a "good time." The factors which determined that time included being young, being married, and ensuring that they and/or their partners had reliable and steady work. Once they had decided to have a baby, only two women said they had made any changes in their lives in preparation for conception: both quit smoking. None, as far as I am aware, dieted or changed her eating habits prior to pregnancy and those who stopped taking the Pill did so in order to get pregnant, not to cleanse their bodies. One woman ate "a lot of sweets" prior to conception "just in case it helps you have a girl."

During pregnancy all of the women made some changes in their daily habits. They tried to eat "properly", take vitamins, rest more often, avoid physical and emotional stress, abstain from alcohol, and reduce their cigarette and caffeine consumption. At one level, these acts had a similar meaning among the women: they were done to avoid "taking chances" and to produce a healthy baby. Women expressed anxiety during the interviews
about the risk of bearing a child with some physical or mental abnormality. Not only were they anxious, but they wanted to do "everything possible" to avoid that outcome.

However, the university educated women who read a great deal and who talked about preparing for pregnancy, sometimes described these preparations as means of trying to control or alter their experience of pregnancy. For example, they attempted to control morning sickness by getting up more slowly and not rushing, avoiding certain foods or activities (dancing, staying up too late). Feeling moody or tired was attributed to their failure to rest, to trying to do too much, or "letting things get to them." Eight women, all of whom were university educated and all reading avidly, told me they kept diaries during pregnancy, recording their daily weight, caloric intake, moods; as one woman said, "every little twinge gets written up.” One woman noted the frequency and intensity of her morning sickness, explaining that she wanted “to try and figure out what was causing it.”

During the early months of pregnancy, the women who read a great deal tried, more than others, to stop the nausea, to suppress their fatigue and feelings of moodiness, and, in other ways, to act and look as they had before pregnancy.

The changes other women made in their behaviour were described to me as "common sense" and "part of being pregnant" and not expressed as
a means of controlling or influencing the events of pregnancy. For these women, experiencing nausea, fatigue or irritability was a fact of the pregnancy and something that would pass with time. Some talked about the outcome of the pregnancy as ultimately not in their control. As one woman said,

I did everything I possibly could, now if something were to go wrong, well it's destiny. I don't drink. I don't smoke, I don't take any medications. I try to eat well. (Rosa)

Throughout pregnancy all the women attempted to understand and familiarize themselves with the causes and implications of what they were experiencing. In large part they wanted to reassure themselves that their experiences were normal. Relatively few women turned to their physicians if they had questions about the experience of pregnancy. Women who drew their understanding of pregnancy from their friends and kinswomen, infrequently expressed anxiety to me that their experiences were indicative of some problem with the pregnancy. For the women who read a great deal, the unaccustomed sensations and events of pregnancy were made normal primarily by what they were reading. They regarded the experiences of other pregnant women as secondary and subject to verification based on the ideal pregnancy in their books. They described looking up each new sensation in their books, reading to see what the next few weeks would bring and noting anything that was not in the book, not at the right time, or
not being experienced. They also expressed anxiety about the meaning of their sensations and worried openly if they were "eating properly" or "doing the right thing." Some of these women attributed their feelings of nervousness or insecurity during pregnancy to the fact that they had "read too much" or "knew too much."

The fact that women who read a lot tended to view themselves as active managers of pregnancy was clear in their detailed planning for childbirth. (Even during the first three months of pregnancy they memorized the stages of labour according to centimetres of cervical dilation, "normal" physical and emotional sensations in the woman, and by types of recommended relaxation exercises. Several had decided they wanted a "natural birth," had discussed what their partner's role would be, and were certain they did not want painkillers, episiotomy, or forceps. In contrast were the high school and grade school educated women whose accounts less closely paralleled their guides to pregnancy. They thought about the delivery more as a single event than as a series of separate stages. Although they knew the stages of labour from their reading and from prenatal courses, their descriptions of what would happen were not structured by those stages. One woman described how she anticipated the birth:

What happens during the birth? The baby comes out. It hurts a lot and you get mad at your husband and swear you're never gonna have sex again! [laughs] Then it's over and you forget right away. ...
My baby is in me and it has to come out. I can scream and yell and tell my husband off, but it has to come out. There is nobody that can help me but myself. (Rosa)

For these women, using epidurals or breathing exercises, finding a good position during labour and delivery, and involving their partner would be decided during, not before, childbirth.

I.B.3. Becoming Mothers

Women expected motherhood, especially during the first year, to be "hard work," exhausting, and to change their lives markedly. They believed that having a baby would mean changes, at least temporarily, in their employment and financial circumstances, their leisure time, and in their relationship with husbands. Again there are differences among the women which relate to their approaches to learning about the pregnancy and their reliance on the guides to pregnancy. Women who did not describe extensive plans for becoming or being pregnant did not talk about the transition to motherhood as a source of conflict within their lives or in terms of making choices between jobs and full-time motherhood. Although they anticipated physical work, financial difficulty, and a loss of freedom and mobility, they saw these changes as "just part of being a mother."

On the other hand, the women who read and planned a great deal tended to worry openly about their ability to cope with motherhood. They
expressed this anxiety in terms of what they called "the impact" or "the effect" of the baby on their lives, especially on their careers, relationships with husbands, and personal freedom. Several did not want to leave their jobs, even temporarily, and three remarked that after a few months of maternity leave they expected to be "screaming" or "dying" to return to work.

In summary, the women I interviewed held similar ideas about the physical and emotional course of pregnancy and they assumed the arrival of a healthy baby depended on medical care and supervision. While all of the women wanted to reassure themselves about their experiences during pregnancy, there were differences in how women expressed their own role during pregnancy. In general, women with high school and grade school educations turned to their kinswomen and friends for a means of understanding their own experiences of pregnancy. They tended to describe their physical and emotional experiences as "just part of pregnancy" and were not particularly worried about those sensations and changes. They did not try to prepare their bodies or their lives for conception or in other ways view pregnancy as an event about which they had to do something. In sharp contrast, a pervasive anxiety about pregnancy was evident among the women who had miscarried and the women, many of whom had university degrees, who read a great deal. They tended to rely heavily on their reading of popularized scientific
accounts of pregnancy to understand their own experiences. They were also more intent on preparing for and managing their pregnancies.

II. Women’s Guides to Pregnancy: Normative Selves

Prior to the first ultrasound, when I asked women to tell me what was going on inside their bodies, only a few women said they didn’t know or hadn’t given it much thought. In fact, it was clear from their descriptions that they had endeavoured to find out about the fetus. By our first interview, each woman had read about fetal development and had seen photographs or drawings of the fetus in their guides to pregnancy. In the following pages I describe how the fetus and pregnant woman are portrayed in some of these guides. The discussion is not intended to be a survey of all available popular guides to pregnancy, nor did all the women I interviewed read the publications I have discussed. However, these guidebooks contain widely disseminated cultural knowledge about pregnancy and the fetus. More importantly, in their distribution as “bestsellers” and “required reading” and their endorsement by physicians and medical organizations, these guides present normative cultural constructions of both maternal and fetal selves. As I will show in subsequent chapters, women’s

3. I began my questions about the fetus with, “Tell me what is what is happening inside your body now” and “What does it look like inside you now?”
descriptions of themselves as pregnant women and their accounts of the fetus often reproduced these normative selves.

Approximately seventy percent of the women in this study had received from their physician a publication of the Québec Medical Association (Corporation professionnelle des médecins du Québec 1990), entitled, *Nine Months For Life*. This booklet contains brief month-by-month descriptions of fetal development, physical and emotional changes women may experience, and routine medical care. The focal point of each description for the first six months of pregnancy is a colour photograph of the fetus *in utero*. The photographs were a source of fascination for the women. They studied them intently, compared them month by month, and referred to them during their conversations with me.

The fetal images in this publication are the work of Lennart Nilsson, a Swedish photographer who uses fibre-optics and scanning electron microscopes to photograph the events of conception, embryonic and fetal development. His photographs are reproduced widely. During the period of research, a new edition (1990) of Nilsson's book, *A Child is Born*, arrived in Montréal bookstores. Nilsson's photographs and similar ones have recently been featured on the cover of popular news magazines including, *Life* (August 1990), *Time* (Sept.30, 1991), and the Québec publication *L'Actualité* (15 novembre 1990). "The Miracle of Life," a video based on his
photography is available in Montréal.

Nilsson's photographs are strikingly clear and visually appealing. We know from autopsy and premature delivery that the fetal skin is a deep red colour until about the seventh month (Kantrowitz, Wright and Hager 1988). However, in Nilsson's photographs and particularly those reproduced in the Québec guide and in magazines, the fetus is bathed in a warm diffuse light, appearing golden or pink skinned, fragile, soft and translucent. Fetal faces, hands, feet, and genitals figure prominently in the photographs. In some of the most widely reproduced images the fetus appears as if sucking its thumb. In these ways, the images convey culturally salient elements of a "baby."

The images are prefaced on the assumption that the fetus is separate and knowable without reference to the woman. The exterior shape of a woman's body or even her uterus is absent from virtually all the photographs. Instead the fetus is pictured suspended or encapsulated in the soft amniotic sac against an opaque and dark background. In some of the photographs, the golden fetus appears in its amniotic bubble superimposed on a star filled background. The obvious parallel in these photographs with an astronaut floating in space has been discussed by several writers (e.g., Petchesky 1987). In the same way that photographs of humans floating in space seem extraordinary, these fetal images have an
"other worldly" or "sacred" quality to them. Both kinds of image suggest that
the boundaries of human experience and knowledge are, like space, infinite.
Man in the darkness of space and the fetus in the dark womb are available
for all of us to see and experience through scientific and technological
expertise. These images convey a clear message: if we want to know the
fetus, we must see it.

Many of the women in this study had seen Nilsson's in utero
photographs or similar images by the time of our first interview. Several of
the pregnancy guides used by the women in this study contain drawings
rather than photographs of the fetus (e.g., Eisenberg et al. 1988; Kitzinger
1989).4 Unlike Nilsson's photographs, the drawings in some of these guides
show the developing fetus not only within the uterus but positioned within an
outline of a woman's abdomen. Like the in utero photographs, the drawings
meticulously depict fetal facial features, fingers, toes, nails and hair.

The descriptions of fetal development and the photographs and
drawings used as illustrations in women's guides to pregnancy and in
prenatal classes provide women with a popularized version of what I take to
be a medical or scientific account of gestation. This account is well known

4. The editions of these two books I had while writing the dissertation are more
recent than those used by the women. However, the descriptions of fetal
development are unchanged in the earlier and later editions.
and probably accepted by many Canadians as the factual reporting of how humans are conceived and develop prior to birth. Canadians learn this account in school, read about it in books and magazines, see it on television, and hear it from others, including physicians. A version of this model of fetal development is displayed at the ultrasound clinic in a poster (see Chapter Four).

The medical-scientific model organizes pregnancy into a series of stages and describes certain physiological, especially anatomical, changes in the fetus and in the woman. Women’s experiences of being pregnant are organized into month by month descriptions. (Some publications describe pregnancy in three “trimesters”: weeks 1-13, weeks 14 to 26, and weeks 27 to 40. However, monthly descriptions were more common in the material I surveyed.) Within each month, a woman’s experiences of pregnancy are reduced to a checklist of physical symptoms, pertaining especially to excretion, digestion, the appearance and sensation of her breasts, and to weight gain, fatigue, and sleep patterns. Her emotional experiences of pregnancy are dealt with separately in these guides; the checklist includes instability, irritability, apprehension, happiness, mood swings, absentmindedness.

Women’s physical and emotional sensations are represented as symptoms which convey several meanings. First, their emotional and
physical sensations are rationalized as the result of the biochemical, especially hormonal, changes during pregnancy. Second, women are urged to know and "be in touch" with these physical and emotional changes, so that they can fully experience and enjoy being pregnant and not be unduly worried. Third, the sensations of pregnancy are depicted as signals for women to seek regular medical care, rest, eat nutritious foods, and in other ways behave appropriately in order to have a healthy baby. Women's sensations of pregnancy are cast as "reminders" of their new role and their responsibilities. Here is one clear example from the Québec Medical Association publication:

After the first few days of euphoria, once your pregnancy has been confirmed ... [there] are moments of inner questioning. ... Will you make a good mother? ... As soon as you think you're pregnant, even before your doctor confirms it, get comfortable with the idea that you are going to have a baby (Corporation professionnelle des médecins du Québec 1990:4).

Popularized accounts of gestation describe an interaction between the fetus and the woman existing from the first weeks of pregnancy. Women's emotional and physical symptoms of pregnancy are equated with a fetal voice expressing its needs. That voice represents a vulnerable, dependent fetus. The depiction of that interaction carries a clear message of normative maternal behaviour:

[At two months] The tiny human being attached to you is beginning to make demands on your body. These are harmless, but can cause
you some discomfort. It will take time for your body to adjust to these
new conditions, to the new being living inside of you. But you'll see.
In just a short time your body will adapt and you'll be pleasantly
surprised to find out how easily the two of you can live in harmony
(Corporation professionnelle des médecins du Québec 1990:6).

Your thoughts are starting to turn inward, and you may find yourself
day-dreaming. Your priorities have changed, your attention
increasingly focused on the being developing inside you (Corporation
professionnelle des médecins du Québec 1990:14).

Monthly descriptions of the "mother's development" (West 1990) are
paralleled by and linked to monthly descriptions of fetal physical and
behavioral development. At least one guide (Kitzinger 1991) describes both
maternal symptomology and fetal development week by week. Descriptions
of the early events of conception may be in terms of daily developments. I
include several examples of the portrayal of the fetus in the guides to
pregnancy.

Your baby is a cluster of cells which multiply rapidly as they continue
the journey along the fallopian tube (Kitzinger 1991:372)

By the end of the first month, your baby is a tiny, tadpole-like embryo,
smaller than a grain of rice. In the next two weeks, the neural tube
(which becomes the brain and spinal cord), heart, digestive tract,
sensory organs and arm and leg buds will begin to form (Eisenberg et
al. 1991:101)

[At 7 weeks the] primitive embryo becomes a primitive, well-
proportioned small-scale baby, less than one inch long; face is
flattening; eyes perceptible through closed lids; shell-like external
ears; mouth opens — has a human face with eyes, ears, nose, lips,
tongue; chest and abdomen completely formed; heart is internal, lung
buds appear; arms, legs, hands, feet are partially formed: the arms
are as long as a printed exclamation point and have fingers and
thumbs; the toes are all stubby but the big toes have appeared (Hotchner 1984:68).

[At 12 weeks, the] fetus has a large head and small, rounded rump; the sex organs are distinguishable though as yet incomplete; the eyes are closed, the retina showing dark and round through translucent skin. Toes and fingers are formed; the arms are the right length in proportion to the body and the nails are beginning to grow. The ribs and spine are just starting to harden into bone and the baby is moving vigorously. You cannot yet feel these movements, but it is kicking, curling its toes up and down, pressing its lips together, frowning, and making other facial expressions. The baby is also swallowing the amniotic fluid, gurgling it from its mouth or passing it out through its bladder. There is still plenty of room in the uterus, so the fetus can swoop and undulate in its own enclosed sea (Kitzinger 1991:67).

The baby [at 7 months] is probably making its presence vigorously felt. Its weight has almost doubled over the past four weeks. It measures 35 to 43 cm (14 to 17 in) and weighs about 1 kg (2 lbs 5 oz). Its skin, still wrinkled, now has a protective coating. Its nails are perfectly formed and at last its eyelids are open! In fact, many babies born at this stage in their development are able to survive (Corporation professionnelle des médecins du Québec 1990:16).

The fetus in these guides is given a specific and unambiguous identity: it is "the baby." Although the terms "embryo" and "fetus" appear in these guides, they are usually restricted to definitions, drawings labels, and topic headings. In most descriptive summaries of fetal development and whenever a relationship or interaction between the fetus and someone else (the woman, her partner or the physician) is implied, the term "baby" is used.

The fetus is described in terms of the appearance of certain physical
parts, especially the heart, brain, spine, and developing arms and legs. Small features are given special mention, for example: the genitals, toothbuds, ankles and wrists, hair, eyelashes, nails. The appearance and development of these physical parts bestow human and, especially, baby-like qualities on the fetus. Fetal features that are not yet recognizable are "buds," "starting" or "will soon develop."

Fetal size during the early months is often made meaningful through comparison to everyday objects, like the head of pin, a printed punctuation mark, an aspirin or a "medium-sized Spanish onion" (Eisenberg et al. 1991; Hotchner 1984; Kitzinger 1991:68). These comparisons make the size of the unseen and unfelt fetus familiar and they make concrete the juxtaposition of small size with physical and behavioral complexity. After the sixth or seventh month, fetal size is often described relative to the chance of survival if born.

In these popularized accounts of gestation, the fetus has emotions and experiences distinct from those of the woman. It is described as active and intentional, able to swallow, yawn, suck its thumb, frown, blink or "look around" (Hotchner 1984:70) and even "leap around energetically" (Kitzinger 1991:32). As in the final examples below, smallness of size, complexity or completeness of anatomy, potentiality, and existence of movements or functions are combined to emphasize what is baby-like or human-like in the
fetus.

The baby [during the second month] is now 3 cm long (1 1/4 in.) and weighs a little more than a pea (1 g or 1/30 oz.). Facial features are starting to form, eyelids are sealed shut, and ears are semi-circular ridges. Arms and legs are clearly distinguishable, with little buds at the tips that will soon develop into fingers and toes. And the baby’s heart has already been beating for four weeks! (Corporation professionnelle des médecins du Québec 1990:6).

Ten or eleven weeks old and measuring 3-3 1/2 cm (about 1 1/2 inches) from crown to rump, the fetus still enjoys ample space and is warm and comfortable in the amniotic fluid. ... What can the fetus do? Its body jerks and moves, it hiccups and flexes its arms and tiny legs, testing its new found abilities (Nilsson 1990:108).

In summary, in the imagery and language of these guides, the fetus is articulated as a distinct self, an active and intentional being. Its size and complexity of appearance are dramatized in statements and images to create a physical and, ultimately a moral, resemblance between the fetus and a baby. Women, too, are given a particular self, the "selfless" mother, nurturing and sensitive to the nuances of her body (her baby). These two normative constructions of self rationalize the existence of guides to pregnancy: they are intended to tell women how to become mothers, how to read their bodies for evidence of fetal needs, and how to take care of the fetus.
CHAPTER SIX: WOMEN'S ACCOUNTS OF THE FETUS PRIOR TO ULTRASOUND

The data I collected on women's accounts of the fetus is presented in two chapters. This chapter is about the ways in which the women I interviewed know, experience, and talk about the fetus prior to their first routine ultrasound. In thinking and talking about the fetus, women draw from a variety of sources. I begin by showing how women, some more than others and in different ways, used the descriptions of fetal development in their guidebooks (discussed in Chapter Five) as one way to talk about the fetus. I then discuss some of the other sources, including cinematic representations of the fetus, a woman's relationship with her partner, and the controversy over abortion, through which women construct the fetus as embodied, conscious, sentient, and active. What I will show in this chapter is that, drawing upon these multiple sources, women construct their accounts of the fetus within a common cultural frame of meaning.

I. Retelling the Scientific Fetus

There are three points to make at the outset of this discussion. One, the "routine" 18-week scan discussed in this chapter was not the first
obstetrical ultrasound for some (16%) of the women. Three women had a scan during a previous pregnancy and five women had ultrasound prior to ten weeks gestation in this pregnancy. Women distinguished these scans from the routine ones, pointing out to me that the early scans were done during an actual or potential miscarriage and thus were extremely stressful. At least half of these women were not permitted to see the ultrasound image during the early scan, while those who did see the image described it as "a blur" or "nothing really, just a dot."

Two, although a central concern of my research was to determine how women talk about the fetus and particularly, fetal selfhood, I quickly discovered how unhelpful were such questions as, "Does the baby have a self?" or, "Is the fetus a person?" The women in this study were aware that the idea of fetal self and personhood is under debate in Canada and often regarded my questions as an inquiry about their opinion on abortion. Beyond that, the fact that direct questions about "self" and "person" were unproductive is not surprising. Most of us cannot explain what we mean by the term "self." Concepts of "self" and of "person" are largely implicit in cultural action and not easily defined, objectified, or explicated.

Three, before the first ultrasound, relatively few women had told anyone other than close family or friends and their physician about the pregnancy. Most women had not begun to display the symbols that establish a social and public identity for the baby — wearing maternity
clothes, preparing a room or purchasing toys, clothes, cribs, or other things for the baby. (Interestingly, some men had purchased baby toys and clothes.) Initially, I had hoped there would be accounts of the fetus given by women that I could include in complete narrative form and analyze within the context of each woman's social world. However, particularly during the first interview, women talk about "being pregnant" more than they do about the fetus. Their accounts of what was growing within their own bodies emerged in bits and pieces and was often implicit in anecdotes, descriptions, and commentaries on their own lives. Thus, in place of lengthy narratives, I have used a conventional anthropological strategy of selecting interview segments as examples of the patterns, commonalities, and themes I discerned within the diverse and scattered references to the fetus.

I.A. Women's Accounts of Fetal Development

By the time I conducted the first interview, the women had all read some version of the medical-scientific account of fetal development and seen some of the fetal images described in the previous chapter. Here, I provide examples of their descriptions of conception and gestation and then discuss their retelling of the popularized scientific fetus.

It looks like a shrimp until the end of the second month and then it starts to lose the tail. And the head of course is huge in comparison to the body. It just looks like a tadpole almost. Then the arms and
legs start to take off during the third month and during the fourth month they start to get a little bit bigger and of course the tail shrinks. So it looks more like a human baby, but it's very small. The heart, instead of being a little tube, it's finally starting to get a little bit bigger. It start off as this little tiny, umm, cylinder almost. The eyes are formed and the teeth buds. The eyelids are later. (Cheryl)

The heartbeat develops first. By 14 weeks all the limbs and organs and everything are in place. Until 32 weeks the baby is actually quite small. In the last 8 weeks they gain most of their weight. (Sylvie)

Well, you can tell the sex now [at 17 weeks]. The heart and brain are there at the beginning. The arms and legs come after three months. At first they are just little knobs but now they grow. Fingers and toes are just starting now. Hair and fingernails — that comes later. (Alison)

When I asked the women to tell me "how a baby is made," none referred to the presence of a man and woman, to a social or emotional relationship between them, or even to the act of sexual intercourse. Unlike the summaries of fetal development in their guides, the events of conception and early development were either not mentioned by the women or glossed over as "cell division." Initially, only five women mentioned the sperm and egg and "fertilization." Later, when I asked, women elaborated that a fetus was made from the sperm and egg which contained "genes" or "all the stuff to make a baby."

Women's accounts parallel their reading in several ways. Like the texts, women focussed on fetal size, anatomical complexity, and the appearance of certain physical features after about 6 to 8 weeks gestation.
As in the texts, women's descriptions of the timing and order of appearance of fetal parts draw attention to the heart, spine, digits and facial features. Over 80% of the women said the heart was the first recognizable part to appear. Then head and spine appear, followed by the internal organs and limbs. Fingers, toes, facial features, hair, eyelashes and the functioning of the lungs were described as the "final details" or "finishing touches" which appear during the sixth to eighth month. The last one or two months of pregnancy were described simply: the fetus was "just getting bigger" or "just waiting."

In their accounts of fetal development, women called attention to three particular moments, each described in their guides to pregnancy and registering an important stage in the social status of the fetus. The first moment occurred between 12 to 16 weeks or "the end of the first trimester." This point was meaningful in several ways. It is the end of anatomical development, when "nothing new is added, but not everything is working yet and it still has to grow." It is also the point at which "it was starting to look human" or "less like a shrimp," but not really like a baby. This point roughly corresponds to the transition from embryo to fetus as explained in some of their books and the point at which these books often replace the terms "embryo" and "fetus" with "baby." Perhaps the most salient meaning that the end of the first trimester has for women is that they associate it with a
dramatic reduction in the risk of miscarriage.

The second moment is located between 5 and 7 months past conception. Then the fetus was "like a baby" or even, "a skinny newborn." As did their books, women drew attention to the vulnerability of the fetus; it resembles a baby but has a low "survivability" if born. The third moment is when "the baby could be born" or is "viable." Only three women located this point at the end of nine months. For most it is the "seventh month," or "27 to 28 week" benchmark reported in their books and in newspaper and television stories about premature surviving infants.

When women were explaining these moments of "having all its parts" and "looking like a baby" they sometimes showed me fetal images in their books. When they looked at the fetal images, women often located the point of "looking like a baby" earlier than they had during their verbal descriptions. What signalled a "baby" in these pictures of the four and five month fetus were facial features, and especially, the presence or emergence of fingers and toes.

After the women described gestation in their own words, I asked them to define the terms "fetus," "embryo" and "baby." The term "embryo" was meaningless to about one-fourth of the group. Some (29%) of the women described an embryo as "the stage before a fetus," or "from one to three months" (18%) and a similar proportion (27%) said it was a fertilized cell or
egg. The embryo was described like "a fish" or "tadpole," just a dot," or something "with no shape."

Each woman had heard the word "fetus." It was viewed, however, as a scientific or medical term and dismissed as too impersonal to use for one's own pregnancy. About half of the women said a fetus was "a baby before it's born" or "a baby on the inside." Women who had read a great deal tended to reproduce the definition of fetus from their readings: the baby from three months gestation to birth (e.g., Kitzinger 1991). There was also a sense that the word "fetus" was somehow tarnished by the abortion debate. Over 20% of the women remarked that it was a "dirty," "ugly" or "offensive" word which made them think of "aborted fetuses." Not all the women who felt this way held anti-abortion views. Three of the "pro-choice" women felt the term had been manipulated by abortion opponents to "make us want to say 'baby'."

Although the terms "fetus" and "embryo" appear in their guides to pregnancy, only three women, each with university science degrees, used those terms to refer to what was inside their own body. Women generally did not use the term "baby" in their descriptions of fetal development. Instead they used the term "it" or attached qualifiers to the word "baby", as in "the beginning of a baby," "pre-baby", or "the developing baby." When they talked about the individual they envisioned would eventually be born
and with whom they were forming an emotional attachment, women were at ease using the term "baby."

Well, technically, it's [the baby] just after it's born. I don't think of this [pointing to her abdomen] as a fetus. This is my baby. (Sylvie)

I'm not having a fetus. I'm having a baby (Jennifer).

Although women were clearly fascinated by the descriptions and photographs of the fetus in their guides, they also expressed a sense of separation or detachment from these representations. For example, when they talked about conception and gestation, they separated themselves from these accounts by saying "this is what happens" or "this is how babies develop." Women also described the scientific accounts of fetal development as "amazing," "unexplainable" and "too weird for words." The descriptions of fetal development were labelled as "interesting" but difficult to understand and hard to remember. The images and texts also heightened women's awareness that fetal development was a complex process in which "anything could go wrong." Women's comments about the fetal images in their books suggest a sense of detachment and ambivalence about these images. They described the fetal images prior to about 12 weeks as "aliens," "weird little people" or "E.T." (referring to the popular movie about an extraterrestrial being). As one woman said, "It [the fetus at 12 weeks] is cute, but not exactly how I want my baby to look." The interview provided
some women with an opportunity to ask me about the origin and validity of the pictures; some asked, "Are these [fetuses] real?"

I.B. Retelling the Developing Fetus Differently

Among the women's accounts of fetal development there were some notable differences. These differences parallel to some degree, their different accounts of being pregnant which I described in the previous chapter. In general, university-educated women who read avidly about pregnancy and relied upon their books to normalize their experiences of pregnancy were more concerned that they should know about fetal development as described in their readings. They tended to give the most detailed accounts of gestation, describing specific and discrete events (e.g., the end of the embryonic and beginning of the fetal stage) and specific body parts (e.g., describing individual internal organs rather than saying "the insides of the baby"). They also tried to reproduce the vocabulary of their guidebooks and to recount the developmental events in what they perceived to be the correct timing and sequence. These women also gave decontextualized and abstracted accounts of fetal development. Thus, their summaries of "how a baby develops" were told as a complete piece without referring to themselves or to their own bodies. As the following accounts suggest, some of these women found it difficult to link the terms and images
from their texts to their own body.

When I was first pregnant, I wanted to know everyday what stage the baby was at, what feet were growing, and what toenails were happening. But it’s like I know that it’s in there, but it’s hard. Maybe when I see the ultrasound, umm, but it’s hard to put the two together, to know that everything that is in the book is in your stomach (Karen)

Well, this [pointing to a picture of 16 week old fetus] is the stage I’m at now. But, I can’t imagine that this is inside me. (Layla)

While some women gave abstracted and synoptic accounts of "how a baby is made", other women, particularly those who drew their knowledge about the fetus from friends and family, gave accounts which were concrete and particularized. They used the scientific model in their accounts of gestation as a general pattern to which they referred but did not try to reproduce verbatim. These women did not focus on the order, timing, and scientific vocabulary of fetal development. They tended to personalize what they had read, referring to their baby and their stage of pregnancy, saying: "Right now, I know my baby’s got all his arms and legs. His head is still weird-looking but, it’s all there." (Rosa). When these women showed me photos of the developing fetus they sometimes said "Here's what my baby looks like now."

There were five women who did not refer to fetal development in their accounts of pregnancy and the fetus. When I asked them to tell me "how a baby is made," each gave very brief answers or said, "I don't know." While
a Lebanese woman and Sri Lankan woman are in this group, I think their responses may have had more to do with the interview situation than with being raised outside of Canada. Two other Canadian women who said they didn't know anything about the fetus explained that they "hadn't had time to read about it.

Pictures in textbooks and pamphlets, shown to me as evidence of "how a baby develops", and the chronology of developmental events studied and re-studied from these books offered women only partial means of describing the fetus within themselves. Like the popularized descriptions in their books, the women used fetal size, the appearance of key organs (the heart and the brain) and fetal minutia (fingers, toes, facial features) to make distinctions about the onset of fetal selfhood, "when it's a baby." Unlike their guidebooks, women rarely mentioned the development or existence of fetal senses, cognition, emotion, or consciousness. Only a handful of women included the ability to hear and see in their accounts of fetal development. When I asked about the "non-physical" or behavioral aspects of fetal development, the majority of women looked surprised and said that they hadn't thought about it.

II. Fetal Selves and Lived Bodies

Although women were willing to answer my question about "what is
inside you" and "how a baby develops," they explained that they rarely thought about the fetus in terms of its physical development. Instead, women have a variety of other ways through which they imagine the fetus, construct a social identity for it, and develop a relationship with it. In their acts of talking to the fetus, caring for it and preparing for the newborn, women base their assumptions about fetal appearance, behaviour, and awareness upon a variety of concrete and personal experiences, including social relationships with husband and family, reproductive history, and cinematic images of the fetus.

II.A. Social and Reproductive Lives

Women's social relationships and reproductive histories were implicated both in women's decisions about making the pregnancy known to others and in how they talked about the fetus. Some women didn't want to make the pregnancy known to people outside their immediate family "in case something showed up on the ultrasound" or "in case something went wrong." These statements reveal both the social stigma of disability and abortion and the contingency of fetal identities on diagnoses of normality. Women who found it difficult to conceive and women who had miscarried in an earlier pregnancy, expressed a similar kind of hesitancy about the fetus. On the one hand, the current pregnancy was joyous news, proof that they
could get pregnant that they wanted to share widely. On the other hand, these women were cautious, saying they didn't want to "jinx" the pregnancy by being too confident.

Other social circumstances enter into women's accounts of the fetus. Some women were reluctant to tell their co-workers because they feared being laid off. A woman's relationship with her husband or other family members was also reflected in her statements about the fetus.

This baby is really bringing us together. I don't think my husband and I have ever been closer. It's like we've just fallen in love again. (Sandy)

Our parents, especially his, they didn't really want us to get married. They said we were too young or not ready or something. I don't know. I mean, I think this baby shows them that, you know, we're really serious about each other. This isn't some boyfriend girlfriend thing. We're a family now. (Erika)

Well I still haven't told my parents [about the pregnancy]. See, with my parents, at first they didn't like Ron because he is black, but now they tell him all the family stuff before they tell me. They are still old-fashioned though. They don't think you should have a baby out of marriage. And, he's not divorced yet [from his first wife]. (Norma)

II.A.1. Stories about Abortion

Stories about abortions, both their own and publicized cases occurring in Québec, appeared with surprising frequency in women's accounts of the fetus. Reflections on past abortions were sometimes woven into women's accounts of this fetus.
It [the abortion] was terrible. That was the worst thing I had to go through. ... I was 17. And he [her boyfriend] wasn't ready at all. ... So I was all alone. ... I was like, "Oh my God!" I mean, being Catholic. I mean we're born guilty, right? [laughs briefly] ... I had to take a week off work. And to this day, I haven't told my parents and I still won't. It would kill my mother. It killed me. Part of me died that day. I had a rough time in the hospital. I was in there two days, in labour [after a saline injection] for twenty something hours. Just as it was time I pressed the call button, but they were doing a shift change, the nurses, and I couldn't handle anymore. I ripped out the intravenous and went to the bathroom. By the time the nurse came I was in the bathroom with this fetus in my hand. It just blew me away. Of course they said, "Do you want to go for counselling?" No. No. It's the last thing you want to do. You just want to shut it off. ... This time, well, it's like I've got a second chance. (Rosetta)

What's done is done. I'm not proud of what I did, but I didn't really have a choice, you know. I think now I feel good about this baby in part because I had a choice. I was ready and we can have a baby now. I couldn't do that before. This is my baby. Before, it wasn't my time to have one. (Julie)

Some women turned to another kind of abortion story, a well-publicized legal battle, in describing their own pregnancies. The case involved a Québec woman, Chantal Daigle, whose boyfriend obtained a Québec Supreme Court injunction preventing her from having an abortion.¹

In July 1989, both the Québec Superior Court and the Court of Appeals upheld that decision. The Superior Court Judge ruled that "a conceived child not yet born is a human being under Article 1 of the Québec Charter of Rights and Freedoms" (Moore 1989:A1). In early August, Daigle underwent

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¹. In fact, during the summer of 1989 there were similar cases, one in Manitoba and one in Ontario.
an abortion despite the injunction. A few days later, the Canadian Supreme Court overturned the Québec injunction (Paquin 1989:A1) and eventually ruled that a future father or other persons could not legally prevent a women from having an abortion (La Presse 17 novembre 1989:A1-A3).

For a handful of women, each who described herself as either pro-life or pro-choice, the Chantal Daigle case was understood in moral terms, a story of right or wrong decisions and of fetal versus maternal rights. Other women found in Chantal Daigle’s story reasons to reflect on their own decisions and choices.

That poor woman. My God! She had everybody looking at her and telling her what to do. I'm not as far [along in the pregnancy] as she was [when Daigle had the abortion] and I've already felt it move. I don't know how she handled it. They made her wait so long [for the abortion]. I'm not saying that what she did was right or wrong. I'm just saying I think about her and I feel my baby and it makes you think more about what you're doing. I think about the baby more cause I know what she had to go through. (Esther)

Well, I don't know what she went through. All I know is what I saw on TV. It just made me shake. God. I'm so lucky. I didn't have to go through that, you know. I think about my baby and I feel like I need to take a big breath and say, "Relax. Everything is okay." I don't know. I don't want to take anything for granted with this baby. I know I'm not going to have an abortion, but I don't want to think that this is nothing. You hear about her [Daigne] and you have to think about your own situation. (Lena)

Although the story of Chantal Daigne and women's own abortion experiences appeared in their accounts, the discourse on fetal "personhood" or "fetal rights" was less common. Perhaps this is not surprising since these
women were not, or no longer, considering abortion. But before the first ultrasound and before I introduced the subject, only three women talked explicitly of the fetus being a "person." Each of these three women were pious Catholics and self-described "pro-lifers." They believed the fetus possessed consciousness, emotions, the ability to think (not just react), and to move on its own by the seventh or eighth week of pregnancy. For each woman, the "soul," present from conception, was what made the fetus a person.

When I did ask the women in this study about fetal rights and abortion, 25% declined to answer or responded to my questions by saying "I don't know." Among the remaining 37 women, about two-thirds (65%) felt decisions about abortion should be left up to the woman. The remaining women were opposed to abortion except for reasons of rape, fetal anomaly, or to save the mother's life. Over half (54%) of the women, especially Catholic women, believed the fetus was entitled to full and unconditional rights to life from the moment of conception. Women who felt the fetus had "some" rights generally believed the right to life should be unconditional after about 16 weeks gestation, when they felt the fetus was "already developed." Four women, each university educated, emphasized that decisions about the fetus were up to the woman alone and described fetal rights as a "non issue", "bullshit" or "anti-abortion propaganda." Just under 20% of the group
said decisions about abortion must be left to the woman but also felt the fetus had a right to life. These women did not perceive a contradiction in their opinions: the decision to abort infringed upon fetal rights, but it was up to a woman to decide.

II.A.2. The Fetus in Hollywood

A popular Hollywood movie, "Look Who's Talking," was available in Montréal video stores during the period of research. The portrayal of the fetus in this film provided another set of images and a dialogue for women to talk about the fetus, particularly to explain what the fetus could hear, sense, see and do. This romantic comedy opens with a photographic, rather than cartoon, dramatization of fertilization from a sperm's perspective. The opening events take place inside a model of the interior of the woman's body, inside her vagina, uterus and fallopian tube. The music — a Beach Boys tune called "I Get Around," and the voice of one sperm who encourages the others, suggest a party-like atmosphere. The sperm race along a pinkish but obstacle-ridden path towards an enormous luminous white (silent) egg which has just been released and awaits their arrival. At the moment of fertilization, depicted as a crescendo of music, fireworks, and electricity radiating from the egg, the winning sperm gives an audible sigh of contentment. Somewhat later in the film, the fetus makes its first
appearance portrayed by a doll with a large head, widely spaced eyes and relatively short arms and legs. The fetus blinks its eyes and floats gently within a warm-looking pink uterus. It catches sight of its hands and the fetal voiceover remarks: "I've got two of these things." Fetal gender is soon established. Not only is the fetal voice male, but in an early scene the fetus looks at his hands and then at his body, remarking that he has a "another little arm coming in down there."

The fetus appears throughout the film, experiencing and commenting on events in the woman's life. For example, while the doctor palpates the woman's uterus during a routine examination, the moving fetus blinks rapidly and shouts in surprise. At one point the fetus tugs on the umbilical cord, calling out, "Yo! Let's get a little apple juice down here." In the next shot the woman is obligingly gulping down the juice. After delivery, the fetal voice continues in the newborn ("Put me back in!") and eventually in the toddler.

A few women found the portrayal of the fetus in this film "silly" or otherwise overdrawn for comic purposes. Nevertheless, roughly one-third (31%) of the women incorporated images and dialogue from the film in support of their own statements about the fetus. As one woman explained, "I found that a terrific movie to get an idea of what the baby is feeling." (Annabella)

Drawing upon their social relationships and life experiences, women
found a variety of registers through which to express their assumptions about the fetus. In the following sections I describe these assumptions more fully.

III. Women’s Assumptions about the Fetus

III.A. The Physical Fetus

In general, prior to their first ultrasound women did not refer to the physical fetus, to the fetal anatomy, shape, size or appearance except in describing "how a baby develops." Whatever information they derived from the descriptions of fetal physical development in their guides to pregnancy, women’s own images of what was inside them were somewhat different.

The majority (88%) of the women thought about and had tried to picture the fetus and most (65%) had decided whether it was a boy or girl. About one quarter (23%) of the 43 women who described their image, visualized the fetus as partially formed with some recognisable human features. Several of these women referred to their image as an "alien" while others said their image was like an "embryo," "tadpole" or "shrimp." Most (67%) women imagined and visualized the fetus as a "newborn" or "a baby, any baby." Women raised outside of North America and who were less familiar with in utero images of the fetus described the fetus as "unformed" or without any human form.
III.B. Fetal Consciousness

At the time of the first interview, the majority of women (82%) had not yet felt fetal movement or "quickening." They knew they were pregnant, most (74%) had already heard the fetal heart beat, but it was quickening which they expected would confirm the presence of the baby. As most women explained, "When I feel it, I'll know it's really in there." Women also viewed fetal movement as a kind of indicator of fetal activity, emotion, personality, and awareness that would tell them "about the baby" or "what kind of baby it is."

III.B.1. Fetal Influences on Women's Experiences of Pregnancy

Even before they felt quickening, women described the fetus as an active and intentional being. When women talked about the physical and emotional sensations of pregnancy they usually attributed those sensations to the pregnancy in general or to "hormonal changes." The majority (71%) of women implicated the fetus as a cause of their nausea, tiredness, appetite and changes in their appearance.

So far this baby is not giving me a hard time. I'm not sick, I don't have morning sickness. I'm not gaining weight. I'm a little tired, but that's it. (Jennifer)

As explained in their books, the presence and growth of the fetus
made physical and emotional demands on the woman. In addition, as the following examples illustrate, women interpreted these changes as a kind of corporeal communication from the fetus, telling the woman what it needed.

[looking down at her body] I look at my tummy and say, "Okay, so you want more room." I throw up and I say, "Okay, so you didn't like dinner last night?" I feel like my body belongs to the baby. It's not mine. It's not my husband's! [laughs] He doesn't like that! It's all the baby. (Cheryl)

When I over exert myself, I get cramps and I think it's the baby telling me to slow down. (Kate)

I can tell how the baby is by the way I'm feeling with my stomach. Like when I get nervous I tend not to be very hungry. I eat just to keep the baby going, but it's as if the baby doesn't even want it. (Annabella)

During the first interview, less than one-third of the women (29%) did not refer to the fetus as an actor who was influencing their bodily sensations and feelings. Again, women who were relatively unfamiliar with popularized scientific descriptions of the fetus form a distinct group here. They tended not to describe the fetus as an actor, as did a few women who said they didn't feel "pregnant" or "different."

III.B.2. Touching, Talking, Listening to the Fetus

By the time of the first interview, 80% of the women had attempted to feel, hear, touch or "think to" the fetus. The women who were not making
these communicative acts explained it was "too early" in the pregnancy or
the fetus wasn't aware yet. This group included four women from outside
Canada. At the time of the first interview, 73% of the women were talking
aloud to the fetus:

When I talk to the baby I say, "Baby, please don't make me sick
today. I want to go out tonight and I don't want to be sick." (Maria)

I saw the movie "Look Who's Talking. ... And he [the fetus in the
movie] says, "Hey I need some juice down here" and she drinks juice.
And that's the conception I have. Like the baby is coughing every
time I have a cigarette. And she has a glass of wine one time and he
says, "Like this is really neat." ... So that's why every time I have a
cigarette I pat my tummy and say, "Sorry." [She laughs] ... That's why
when I get upset, I get pains and I keep saying, "I'm sorry." Like if I
yell at my husband or something. ... I speak to the baby all the time.
I'll even put earphones on my stomach and play my favourite music.
(Rosetta)

I know it can recognize voices now. My boyfriend talks to it, he says,
"Hi. I'm Daddy. And sometimes at work I say, "We're gonna get
those customers." Just stupid things like that. You know, "We're
going home now" and, "I hope you aren't tired like me." (Norma)

Women said they talked or thought to the fetus or touched their
abdomens in order to make the baby aware of their presence and their
feelings toward it. As one woman said, "I want this baby to know I'm here
and that I care." As in the examples above, their talk and thoughts to the
fetus included salutations, words of encouragement, and commentaries on
the woman's activities, moods, and her surroundings (the weather, noises,
people nearby). Women apologized aloud to the baby if they swore, forget
or delayed a meal, had a cigarette, or if they became emotionally upset or physically stressed. They also talked about doing things together with the fetus ("we're going home now") or described their communication with the fetus to me, as "We talk to each other all the time."

Men also communicated with the fetus. Both men and women emphasized they wanted the fetus to "recognize Dad's voice," and not be frightened by the deeper tone of a man's voice. Men who were talking to the fetus, did so directly, leaning down and speaking quietly but aloud into the woman's abdomen. A husband might also rub or touch his wife's abdomen to make the fetus aware of his presence. Three women said their husband had heard the fetal heartbeat by listening against her abdomen.

Several women had read about influencing the scholastic or artistic potential of the child by reading to it, playing music, or repeating simple calculations or spellings *in utero.* A few women felt there was some truth to these theories, but early in the pregnancy none were inclined to try prenatal learning. However, several women repeatedly sang a particular song, usually a lullaby, to the fetus. They hoped that once the child was born, the song would have a calming influence on the child. A few women felt their own characters and preferences had been fashioned in a similar manner.

My Mum, when she was pregnant with me she used to listen to a lot of Johnny Mathis and to this day I love Johnny Mathis. It drives him [her husband] crazy! ... It's gotta have something to do with it. There
is one song I'd like to find and to play over and over, so that when
the child isn't feeling well, it will know that this is its song and it'll feel
better. (Michelle)

Five couples had prepared tape recordings which they played
regularly against the woman's abdomen. So that the baby would recognize
their voices, these men and women taped introductions of themselves and
other family members, descriptions of their houses (especially, of the room
that would belong to the baby), favourite songs, lullabies, and stories. One
woman who plays her tape while she watches television explained,

    I still feel kinda stupid sitting there talking to my stomach so we made
the tape. He [the baby] gets to hear us and I don't feel stupid. (Julie)

III.B.3. Maternal and Fetal Emotions

    Women made conscious attempts to regulate their emotions since
they believed the fetus could sense, experience and be affected by their
moods and stress level. The majority (86%) of the women were confident
that the 16-18 week fetus could sense their emotional state. Four women
thought the fetus would sense their moods only later in pregnancy and two
said the fetus could sense only very strong emotions (e.g., depression,
rage). Over three-quarters of the women (82%) felt that the fetus could not
only sense, but could be affected directly by, the woman's emotional state.

    Women suggested their emotions could determine its later personality
as well as how the fetus felt at that moment. Over half the women (61%) said that fetal personality or character, although partially genetically determined, was influenced prenatally by the woman's emotions. By the first interview, some women had drawn conclusions about that character based on their own or their husband's personality. Four women said that the extent of their physical discomfort (especially nausea) was an indicator of fetal temperament. For others it was important to "be calm," to "avoid stress" and "not get upset" in order not to upset the baby or to make it nervous. Women also apologized to the fetus if they were unable to avoid getting angry or upset. For example,

I don't want to argue with my husband, because I don't want the baby to feel anything bad and aggressive. I don't want to scare the baby. (Debora)

If I'm tense, it's tense. So I say, "I'm sorry" to the baby. Then I talk to myself and tell myself to control myself. It can hear me. (Suzanne)

My little baby there needs me very much and he needs me to feel good. I think about that. I'm trying my best. ... My husband and I we don't want to scream too much to each other or fight because we know that this little kid can hear it and we don't want a nervous baby and a baby that is disturbed. We are trying our best to be calmer. ... I lost my mother a year and a half ago and my father five years ago. My father I got used to it, but my mother it is harder. So sometimes, two or three times, I really cried hard, but I explained everything to the baby. I tell the baby what is happening to me. That I'm sad, that something is bugging me. I have a good relationship with my baby. (Natalie)
III.B.4. Fetal Sentience and Thinking

Beliefs about fetal consciousness were not easy for these women to explicate. Few women could explain, for example, how the fetus could "feel" or "understand" their emotions; they just knew that it did. I tried to unpack their notions of fetal consciousness, by asking them to comment on what the fetus could sense and if it could think. Of the five senses, only sight, touch and hearing had any meaning for the women's descriptions of the fetus. The idea of the fetus being able to taste or smell was dismissed as unknowable.

Approximately one-quarter (24%) of the women I interviewed said that the fetus could not see, hear or feel anything at their stage of pregnancy, around 16 to 18 weeks. Only two women in this group thought the 16 to 18 week fetus was able to move on its own and four felt the fetus could not yet sense the woman's emotional state. Some women thought fetal sentience did not develop until near the end of the pregnancy and three said the fetus could not see until it was born. Included in this group are the Sri Lankan, Israeli, and Lebanese women as well as three Canadians, two who identify themselves as "Greek," and one as "Italian."

In total, 76% of the women I interviewed said the 16-18 week old fetus had some sensory ability. Each of these 37 women believed that fetal touch and the ability to sense movement and pressure on the woman's
abdomen developed early in pregnancy. Most (84%) of this group believed the fetal eyes could open and close and distinguish light and dark at 16 to 18 weeks, although many remarked that there was "nothing to see" inside the uterus. Ninety percent said the 16-18 week fetus could hear the sounds of the woman's own body and voice, as well as, loud external noises such as music, cars honking, and people shouting. Most (78%) women stated or implied that the fetus could not understand words but derived their meaning or the emotion conveyed by sensing "vibrations" or "the tone of voice."

Women statements about fetal thinking further suggest their beliefs about fetal consciousness, but this was a topic women found very difficult to express. Of the 42 women willing to offer an opinion, 43% believed that sometime prior to the last month of pregnancy, the fetus was capable of more than "involuntary" or "instinctive" thinking, that it could act with intention.

In summary, although women had difficulty defining or explicating the nature of fetal consciousness, many acted as if the fetus were able to sense and be affected by their touch, their mood, and their voices. To a certain extent, women perceived the fetus as an actor in pregnancy, able to influence their own feelings during pregnancy and able to communicate its needs through a woman's physical and emotional sensations. Women's assumptions of fetal consciousness did not differ markedly, although some
women who were born and raised outside of North America believed the fetus was not conscious or sentient until near the end of pregnancy.

IV. Cultural Assumptions about the Fetus

In the final section of the chapter, I identify the cultural assumptions about the fetus which gave their accounts a pattern and similar meaning. By describing the shared assumptions about the fetus I do not deny the existence of both differences in assumptions (e.g., the women who did not believe the fetus was sentient) and different registers through which these accounts became personally salient (e.g., family relationships, abortion stories, the relevance of expert knowledge). These variations in women’s accounts of fetus are discussed in Chapter Eight.

Many of the women in this study share certain assumptions about the fetus. First, there is no explicit notion of “the self” nor something they could they define as “fetal selfhood.” That the fetus is a self is not taken-for-granted among these women nor are its dimensions self-evident. Qualities which are conventionally ascribed to adult selves — a social identity and role, a moral sense, physical presence, self-awareness, consciousness, intention, and emotions — are not simply transferrable to descriptions of the fetus.

Second, women held similar ideas about how the fetus becomes a self. Few women assumed fetal selfhood existed from the moment of
conception. After learning that they had conceived and deciding to continue the pregnancy, the fetus is assumed to be human and assumed to have the potential to become a baby. Aside from those assumptions, the ambiguous nature of fetal selfhood is reflected in women's hesitance and difficulty in talking about the fetus. Throughout the pregnancy the fetus is assumed to become more like other selves. Transitional moments during this process had a similar meaning for women — "when it has all its parts," "when it looks like a baby," and "when it could be born." Thus, aside from the few women who said the fetus was "a person from conception," there was no fixed or pre-determined moment at which the fetus shifted from non-self to self. By the end of pregnancy, the fetus was equivalent or nearly equivalent to a newborn.

Third, throughout pregnancy, or at least from about 16 weeks or when I began talking to the women, they shared an image and vocabulary for talking about what was inside them. They imagine the fetus to be a small, but fully formed, physically complete baby or newborn. They make sense of what is inside their bodies through the shared cultural idiom of a sentient, dependent "baby" and a nurturing "mother." This idiom parallels the normative selves within popularized guides to pregnancy; although the need for this type of expert information was not held by every woman.

Most women in the study believed (although they could not explicate
their belief) that the sixteen week fetus could hear, see, sense movement and touch, and had some cognitive ability. In their private gestures and practices toward the fetus, women infer a subjective fetus, sensitive to tone of voice, to noises and maternal emotions, and possessing its own emotions and awareness of others. Women's actions are prefaced on the assumptions that the fetus is to some degree conscious and sentient and that their actions will have produce certain kinds of infants. Their assumptions of fetal consciousness, sentience, and potentiality rationalize and underlie both their attempts to develop a relationship with the fetus and their sense that they must act responsibly toward the fetus. Through acts of managing their bodies and emotions, women establish certain responsibilities and obligations to the fetus and infer its rights. Women talk to the fetus, introducing themselves, the father and other family members, describing their activities, feelings, and surroundings. Thus, even before the first ultrasound, and well before delivery, through their bodily acts and imaginings, women draw upon shared cultural assumptions in constructing both fetal and maternal selves.

The cultural assumptions which women held about the fetus were not seamless. For example, women's beliefs about fetal consciousness were ambiguous and inchoate, even impossible for them to explain. The cultural equations women make when they call the fetus a "baby" and themselves a
"mother" become problematic if looked at too closely and women turn to less salient terms such as "pre-baby" or "it." The important point here is that these areas of cultural ambiguity or contradiction were reproduced in many women's narratives.

In the next chapter I follow women's constructions of their own and fetal selves through the experience of ultrasound.
CHAPTER SEVEN: "SNEAK PREVIEWS": WOMEN AND ULTRASOUND FETAL IMAGES

In this chapter I discuss women's experiences of ultrasound fetal imaging. I begin by describing the women's expectations that ultrasound will provide them with distinctive knowledge about their baby. In the second section of the chapter, I discuss how women describe the ultrasound image. Like sonographers, women believed the first scan was an important means of confirming the pregnancy and demonstrating the normality of fetus. Women also use what they have seen and heard during the ultrasound session to elaborate their descriptions of their particular fetus. In the third section, I point out that by the eighth month of pregnancy few women still considered the fetal image an important means of personalizing their infant. After the birth, ultrasound has become for many women simply a "medical" procedure.

I. Women's Knowledge of Ultrasound

The women I interviewed had some idea of what having an ultrasound would be like: most had read about it or seen reproductions of ultrasound images in their books or from other women. Twenty-five per cent
of the women had had an obstetrical ultrasound prior to our first interview. Included in this group are eight women who had an early ultrasound (prior to the routine 16 week scan) in either this pregnancy or an earlier pregnancy. In addition, there were four women with whom I had to forgo a "pre-ultrasound interview." With these four women, I interviewed them for the first time as soon as possible after their first routine ultrasound.

In general, women knew little or nothing about how the image was produced, although about one-half told me that "sound waves" were used. They anticipated the image would be like "an X-ray" or "a snowy black and white T [picture]" that would enable them to see more than just the "shape" or "form" of the fetus. Women who had had an early ultrasound did not have different expectations than the others. Only 18% of the women, including five recent immigrants to Canada, had never seen an ultrasound fetal image. Several of these women thought the ultrasound picture would resemble the in utero colour photographs in their books.

The majority (71%) of women told me their physicians had "said nothing" about the ultrasound except to enquire if they had scheduled an appointment. Some physicians had explained why ultrasound were conducted, but none had said how ultrasound images were produced or what the procedure would be like. None of the women reported being asked if they wanted the ultrasound, nor did they expect to be. The women understood ultrasound fetal imaging to be routine: "'[It's] another one of
those tests they do when you're pregnant." What made this test distinctive was "seeing the baby."

I.A. Seeing the Baby: Women's Expectations

Women's expectation to "see the baby" has two primary meanings. First, women expect that the sonographers will "see everything" and determine whether or not the fetus is normal. The majority (92%) of women said screening for fetal physical anomalies was the main purpose for ultrasound and the primary reason they wanted the procedure. Women emphasized this point by saying, "only ultrasound can tell me if my baby will be normal." Relatively few women suggested other indications for ultrasound. They wanted to have the ultrasound "to see if everything is okay," that the baby has "got all its parts" and that "everything is working the way it's supposed to." Determining fetal age is a primary clinical justification for routine ultrasounds, but few (12%) of the women said that was why they wanted ultrasound. Few women knew what fetal anatomy would be examined or measured, how fetal age would be estimated, or how their own physician would use the results of the ultrasound.

Second, "seeing the baby" refers to women's expectation that they will see "what the baby looks like." The women assumed that with the help of the sonographers, they would be able "to see the baby." By this women
meant that, at a minimum, they wanted to be able to see the shape or form of the fetus and rule out the possibility of twins. They also wanted to see something that would personalize the fetus. In this sense women wanted to find out "what the baby looks like" and "what kind of baby it is" by learning if it was a boy or girl, seeing fetal movement and position, thumb sucking, the "build" of the baby, as well as facial features and hair. The ultrasound image was perceived as a way of knowing the fetus directly, rather than inferring its appearance from images in books and its presence from other tests.

You hear the heartbeat and you are really excited because you know there is a baby there, but at other times, it just seems your pants are getting a little tight. So while you realize that there is a baby there, it's hard to realize that it's true. It's hard to make the connection. I think about it cognitively, but not really psychologically that it's inside of me. Maybe when I see the ultrasound it will help me put it all together. (Karen)

I already know I'm pregnant. So it's not like it's gonna be a big surprise or anything. But I'm gonna see what it really looks like. My brother and me were bald babies so I really wanna see if it's got hair. (Natalie)

I'm dying to know the sex. ... I have to know. I hate surprises. I want to know if I should be calling it a "she" or a "he." (Elaine)

Although they viewed it as a routine part of being pregnant, none of the women considered ultrasound to be just a medical test or only a means of determining fetal normality. Ultrasound had additional meaning — a way to see the fetus and know it in social terms by discovering its gender,
appearance, family resemblance, and idiosyncracies. Some women
described the ultrasound as a "sneak preview" or "a chance to say hello."
One woman expressed her excitement about the ultrasound by saying "I feel
like I'm going to meet my baby." Another said it was a "chance to
experience the baby." The importance which women accorded the
ultrasound is evident in their desire to have their husbands, family members
and friends present during the scan and to have a copy of the image.

Combined with their desire to see the baby and determine the
normality of the fetus were women's doubts about the diagnostic reliability
and safety of fetal imaging. Women related to me a variety of cautionary
tales about ultrasound. Some tales encourage women to question the
accuracy of the ultrasound: missed anomalies, wrongly assigned gender,
rushed examinations, and false alarms about fetal size, age, normality,
health and other errors in diagnosis made during the ultrasound of a sister,
a friend, or other woman. In these stories, the expertise of the sonographer
is not questioned. Instead, women interpreted the stories as evidence that
the technology itself had some limitations: "ultrasounds can't tell you
everything and you shouldn't expect it to." Stories about anomalies and
stillbirths among babies born to women who refused ultrasound were offered
as testimony that women should have ultrasound since "it's better to be safe
than sorry."
Half of the women were concerned that the ultrasound might be harmful, that it could lead to cancer, ear infections, hearing loss, or nervousness in their infants. Despite their concerns, only four women asked their physician about the safety of the procedure. Instead women reassured themselves of ultrasound's safety by reasoning that "everyone has them now" and that doctors "wouldn't be doing ultrasounds if they were dangerous." Whatever the risk of harm from the ultrasound, it was perceived as small and less significant than the benefit gained from finding out that the fetus was normal. In the end, no woman refused an ultrasound.

II. The First Routine Ultrasound

II.A. During the First Scan

In this section, I describe women's experiences of fetal imaging based on my observations of their first ultrasound sessions and our subsequent conversations. My focus here is on the women's descriptions of what they saw.

In Chapter Four I discussed how the technicians and obstetricians at the Metropolitan clinic conducted the ultrasound and explained the fetal image to women in general. Since the clinic staff was unaware which women were participating in my study, they did not alter their protocol for the women I interviewed. I do not believe that the interviewed women had
ultrasounds which differed either in scanning protocol or description of the image from those of primiparous women scanned at the clinic.

Due to changes in clinic policy and practice during the earliest months of the research, the examination process differed slightly for women who entered the study early and those recruited later. Scans among the earliest women recruited were somewhat longer, but had less detailed explanations than those of the women recruited later. By the time the late recruited women had their first ultrasound, the technicians were more experienced and relaxed during the scans, able to describe the fetal image in more detail. I did not find these differences reflected in women's accounts of the fetal image.

II.A.1. Seeing the Baby in Parts

I cannot know precisely what each woman saw in the ultrasound image. Women's comments during the scan and their subsequent descriptions suggest they recognize little in the ultrasound image. After their first scan, about three-quarters of the 48 women I interviewed described the image by saying that they saw "parts of the baby" (see Table Five). Most recalled seeing the outline of the head and the beating heart, while about one-quarter of the women saw the spine. Fewer still said they saw the
Table 5. Women's descriptions of the fetal image after the first and second routine ultrasounds

<table>
<thead>
<tr>
<th>Body Part</th>
<th>Scan One (n=48)</th>
<th>Scan Two (n=44)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>58% (28)</td>
<td>50% (22)</td>
</tr>
<tr>
<td>Heart</td>
<td>46% (22)</td>
<td>40% (18)</td>
</tr>
<tr>
<td>Spine</td>
<td>27% (13)</td>
<td>32% (14)</td>
</tr>
<tr>
<td>Leg</td>
<td>17% (8)</td>
<td>0% (0)</td>
</tr>
<tr>
<td>Arm</td>
<td>13% (6)</td>
<td>5% (2)</td>
</tr>
<tr>
<td>Face</td>
<td>10% (5)</td>
<td>23% (10)</td>
</tr>
<tr>
<td>Hands</td>
<td>0% (0)</td>
<td>9% (4)</td>
</tr>
<tr>
<td>Feet</td>
<td>0% (0)</td>
<td>9% (4)</td>
</tr>
<tr>
<td>Movement</td>
<td>33% (16)</td>
<td>7% (3)</td>
</tr>
</tbody>
</table>

Saw only parts of the baby: 73% (35) 86% (38)
Saw all of the baby: 12% (6) 0% (0)
Saw nothing: 4% (2) 9% (4)

Did you see the baby?
- Yes: 66% (32) 48% (21)
- No: 4% (2) 52% (23)
- Don't know: 29% (14) 0% (0)
legs, arms or the face. Women who had read a great deal did not appear to have seen more in the fetal image. When I asked if they had seen something like the shape or form of a baby, the majority (76%) of women said they had not.

Nevertheless, two-thirds of the women talked during the interview about having "seen the baby." They used this phrase even when they did not see fetal shape or outline, often did not recognize what the sonographer was pointing to, and saw only the outline of the top of the head, the white line of the fetal femur, or the white blocks of the spine. Only two women who said they saw "nothing" consistently pointed out that they had not seen a baby. When the other women talked about the fetal image they talked about seeing their baby, commenting in their post-scan narratives, "Now that I've seen the baby —" or "Seeing the baby made me feel —.." Unless they were referring directly to their copy of the ultrasound image, the women rarely referred to the fetal image as "a picture of the baby."

In order to illustrate what women mean when they say they have "seen the baby," I begin with their descriptions of the fetal image.

To tell you the truth I couldn't see very much. ... I saw the outline of the baby's body, the head. The best part was the heart beat, finding something that you could really see. You could see it moving. Other than that it was just kind of the outline, like, of the arm. The body you couldn't really make out, it was just a round clump. I guess the legs were up. I couldn't make out any legs. ... I would never have
known it was a baby. I would never have recognized anything it if hadn't been pointed out. If I were to look at it again, I doubt I would recognize it. ... I've got the picture they gave me. I show it to everybody, like "Here's my baby." ... I feel great. I know everything's okay now. (Esther)

When I first looked at it, I couldn't see anything. Emptiness, whiteness. She showed me the head, spine, placenta, arms, and the heart. The heart was easy. But if she hadn't said, "Here is the baby," I wouldn't have seen. It was, like, okay, I'll take your word for it. ... Now that I've seen it, I have a picture in my mind. To be honest, I didn't have one before. I just couldn't imagine it. And I guess I have a different feeling about it. A better feeling. I feel more relaxed. I know they can't tell me everything about it, but I feel more reassured. (Adriana)

I found it was hard to get a whole picture. To tell you the truth, like, it was very interesting and I'm glad to find out that everything is okay and developing normally, but it just felt like I was looking at, um, I don't know. Like I wasn't even sure that it was inside me. (Sylvie)

As in the above examples, women are generally positive about the ultrasound and describe it as "exciting" and "wonderful." Some women did not like the experience and described seeing the fetal image as "weird," "unnerving" or "strange." Women's comments during the interview and during the scan suggest that they find it difficult to comprehend or recognize the fetal image and most recall seeing only a few fetal parts rather than a fetal outline. When describing the image to me, many women made the following kind of distinction: "I could see what she was pointing at, but I couldn't tell what it was." Moreover, as they recounted the ultrasound, women sometimes shifted from describing what they had seen to what the
sonographer had mentioned.

During the post-scan interviews it became clear that how women "see the baby" is influenced by the presentation of the image by the sonographers. In part the sonographers' explanations of the physical fetus, the heart, the legs, the head, and so on, enable women to recognize these parts on the screen or to know that they have been seen. However, from my conversations with the women, it is clear that women do not always see the on-screen physical fetus. To some extent women were aware that they had to rely on the sonographers to see the image. They described having to "take the technician's word" about certain parts of the image, "that everything was there," and that everything was normal. It is also clear that it is not only the sonographers' list of fetal parts which makes the image into a baby. As I described in Chapter Four, the sonographers often describe the fetal image in terms of activity, personality, and subjectivity — all of which convey meaning to the women that this is an image of their baby.

II.B. Women's Accounts After the First Scan

Women's accounts of the fetus changed slightly after their first routine ultrasounds. Notably, in these post-scan accounts of the fetus, women talked about the fetus being "real," "normal," and having a particular appearance, behaviour, and character. It is difficult to isolate ultrasound as
the sole or even the primary cause of these changes. The first routine fetal imaging coincides with other events in the women's pregnancy, such as feeling fetal movement, beginning to "show" or appear noticeably pregnant, and wearing maternity clothes. Since I found changes in descriptions of the fetus among women who had not yet quickened or begun to show, I believe that ultrasound is a significant factor.

II.B.1. The Fetal Image as Proof

The most striking feature of women's descriptions of ultrasound was its confirmatory effect. After the ultrasound, 77% of the women referred to the reality of the pregnancy or the fetus. For example, they said, "Now I know it's real," "I know there's a baby in there," or "Now I know I'm really pregnant!" Even among the one-quarter of women who did not explicitly refer to the fetus being "real," six said they were reassured because they had "seen the baby."

A recurring element in women's interpretation of the ultrasound image as proof of the existence of the baby and the pregnancy was that the evidence came from a source other than the woman's own body.

It's not my imagination. There really is a baby in there. I'm not just getting fat. (Jennifer)

Seeing the baby meant that it's really there. I'm not imagining things. It's been nearly four months and you can't really see any results.
Yes, I'm nauseated and have sore breasts. I'm tired and my stomach is sticking out, but seeing an image of the child, it's reality. (Michelle)

I include the following dialogue between one woman and her husband to further illustrate the importance women ascribed to the ultrasound in

comparison to both their own bodily changes and to other medical diagnoses of pregnancy.

Julie: When I heard the heart beat I knew something was there. Now [after the ultrasound] I know it's a baby.

Tom: [surprised] What did you think it was?

Julie: I don't know! [laughing] I mean, you know you're pregnant, you've had your test. You don't have your periods, but nothing is different. You don't show, you don't feel different. Now, now it's different. I've seen it.

Women elaborated their sense that the baby was real by saying they felt "different now" about themselves as women and about their responsibility to the baby. After the ultrasound, half of the ten women who were smoking intended to try harder to stop or cut down. Several women said they wanted "to take it easier" or "slower" and to "think more about the baby." A few women remarked that when they saw how "little" and "helpless" the fetus was, they wanted to "cuddle it" or "help it." Some said they "felt like a Mummy" when they saw the fetal image.

When describing their husband's reaction to the fetal image, women again referred to its confirmatory effect. The women had graphic
descriptions saying the ultrasound was like "cold water," "a slap in his face" or, "It really hit him when he saw it. It's real for him." They attributed certain changes in the men's behaviour to the ultrasound: "He wants to stay home more now" or "He feels he has to work all the time so we have enough money." The men I interviewed echoed these statements, saying they "suddenly woke up" or "realised a baby was on the way."

When women described their sense that the fetus was real, they often mentioned fetal movement. One-third of the women said they saw fetal movement during the ultrasound. Several of these women had seemed surprised during the scan to see the fetus move and three women later told me that they hadn't realized the ultrasound showed movement. Four women, including the Sri Lankan and the Lebanese Armenian woman, did not think that the fetus moved prior to quickening.

Particularly for women who had not yet felt fetal movement, seeing the fetus move during ultrasound seemed to reinforce their sense that ultrasound provided authoritative and accurate information about their baby. Seeing fetal movement was interpreted by the women as a sign of good health and normality. There was also disappointment at being able to see, but not feel, the fetal movement; a sense that an important experience has been taken from women:

It was like it [the fetus] moved for her [the sonographer], but not for
me. (Christina)

It was neat and all that, you know, to see the baby moving. But, I
don’t know, I guess I thought the mother was supposed to feel it.
Like that’s when you know it’s there. (Tina)

II.B.2. Fetal Normality

Not only did the first ultrasound confirm the existence of the fetus for
women, but it convinced most (81%) women of fetal physical normality.
Even if women do not recognize much of the fetal image, most assume that
the sonographers can see the fetus fully, conduct a thorough examination
and make reliable interpretations of fetal health and age. Hearing the
sonographer say "everything is fine," seeing the heart beat or fetal
movement, and finding out the fetus “has got all its parts” were understood
by women as evidence of fetal normality. However, this evidence did not
have the same significance for all the women.

First, as might be expected, the five women with a previous
miscarriage and three others who were particularly worried about
miscarrying found the ultrasound extremely reassuring. For these women
"making it to the scan" was an important sign of both fetal normality and
their own normality, or ability to stay pregnant. These women now felt they
could talk more openly about being pregnant, tell their co-workers that they
were pregnant, and begin to think ahead to delivery and parenthood.
Second, there were differences in women's assessments of what it meant to be told that "everything looks fine." About one-third of the women said they were "reassured" by the ultrasound. Women who had read a great deal and relied on their books to normalize their experiences of pregnancy tended to express reservations about the assessments of fetal normality based on ultrasound. For example, they qualified the ultrasound results by saying, "So far, so good" or pointing out that the ultrasound could only determine physical normality and not genetic disorders or mental retardation. The only women to question the sonographer's explanation of the first fetal image or to say they were not reassured by the scan were in this group. Four women thought the sonographer had described more anatomical detail than she had really seen; "All that stuff about the brain — that was B.S. They just say that to make you feel better." Another woman did not agree with the fetal age calculated by ultrasound.

In general, women accept the ultrasound diagnosis of fetal physical normality. The process by which they come to think of the fetus as normal depends on a variety of factors in addition to the sonographer's final diagnostic assessment. Certainly women's perceptions of fetal normality are influenced by their assessments of specific events in their own lives, such as cigarette smoking, accidents, emotional and physical stress in their jobs. During the first scan, five women were told that the ultrasound examination
had detected something "worth following." Three women had "a low lying placenta" near, but not covering the cervical opening. Two women were told that cysts (bilateral choroid plexus cysts) had been seen in the fetal brain. The sonographers urged these women "not to worry," explaining that "we see these all the time" and "they go away by themselves." Nevertheless, the women said they "worried" until the second routine scan at which time the cysts were gone and the placentas had moved away from the cervix.¹

Throughout the scan, the women were extremely sensitive to the sonographer's choice of words, tone of voice, topic of conversation, choice of language, body position, facial expression, interaction with others, and even to the number of people in the room. Particularly when women could not see or understand the image as the sonographer was describing it, they turned their attention to watching the sonographer or other clinic staff.

¹ The obstetricians told me that women often have a low-lying placenta at the first scan, but in only a few women are there clinical implications for delivery (0.5% according to ACOG 1983). The cysts were described to me as "unknowns" that were "probably clinically insignificant." The two women with fetal cysts were followed differently due to changes in the clinic policy. Initially the size and location of these cysts were followed only by repeat ultrasounds. The day after the first woman's diagnosis, in order to provide another hospital with data, the Metropolitan began to do amniocenteses on women whose fetuses had cysts. This woman was called back for amniocentesis and waited "four agonizing weeks" waiting for the results. She had three additional ultrasounds prior to her routine 32 week scan. Five weeks later, when the other woman had her first ultrasound, not all of the clinic physicians were recommending amniocentesis. This woman had no amniocentesis, but "non-routine" scans.
Three additional factors, each linked to the clinical presentation bear noting.

One, nearly one-quarter of the women described the very act of searching for anomalies as disturbing:

I didn’t get nervous until I was sitting there waiting for her to call my name. Then I started thinking, in a few minutes somebody is gonna be telling me if everything is there or not. If my baby is alive or not. I just sort of sat and panicked. (Louisa)

I didn’t really have any worries until I got in there. I think she [technician] brought them to the surface! I sort of assumed everything was normal and then she said, “We’ll measure this and look for this” and I’m thinking “Oh my God!” ... I mean, I have to be honest. I found the whole thing pretty nerve wracking. There they are checking arms and legs. And is the spine there? My God! It was scary. (André, Michelle’s husband)

Two, over half of the women’s descriptions of the ultrasound referred to some behaviour by the clinic staff they found "alarming," "worrisme" or "scary." Women were often alarmed when the clinic physician came into the cubicle and whenever the technician was "quiet for too long" or "when she looked at the screen and didn’t say anything." Three women attributed their anxiety to comments by the sonographers like, "I can’t get the head," "It’s taking a long time to find the leg" and, "Where’s your leg baby?" Even being sent to empty their bladder was enough to make three women think something was wrong with the baby.

Three, consultations among the sonographers, particularly when that
conversation took place in a language the women did not understand was another source of anxiety.

It really bugged me that they talked in French. They'd look at the screen and then talk to each other in French. They talked to me in English but I was sure something was wrong with the baby. (Rita)

When the doctor came in I got a little freaked out. They were scanning for something and they couldn't find it. Then the doctor came in and she [the technician] said, "Je peux pas le trouver." [I can't find it.] The doctor helped her zoom in and then she said, "Voilà." [There it is.] And I was kinda trying to eavesdrop. It was in French, but my French is very good and it was almost as if they were talking in code. (Cathy)

To this point in the chapter, I have described how women see the physical fetus and determine its normality through the sonographers' presentation of the image. As I describe in the following sections, women also use the sonographers' explanation and discussion of the image in their constructions of fetal selfhood.

II.B.3. Knowing the Fetus

In Chapter Six I described how prior to the first routine ultrasound women referred only occasionally to the fetus within themselves. In contrast after ultrasound, women elaborated their descriptions of their own fetus. I want to clarify three points.

One, nearly three-quarters of the women used the fetal image, the sonographer's comments and behaviour, and the experience of the
ultrasound as a means of describing and knowing the baby. That is, in
addition to saying that the ultrasound confirmed the baby's presence or
reassured them of fetal normality, these women used the fetal image to talk
about what kind of baby they had. Women used the ultrasound image to
elaborate their descriptions of fetal appearance, gender, family resemblance,
behaviour, and character. In making this point, I exclude those few
instances where women's statements linking the fetal image to fetal
character or appearance were intended as jokes. The women's descriptions
of the fetus based on their interpretation of the ultrasound image are not, in
my estimation, simply isolated or offhand remarks. As the examples in the
following pages should make clear, women understood the fetal image to be
a reliable window through which to observe their baby and the
sonographer's comments as meaningful descriptions of that baby.

Two, the women who did not use the ultrasound image to elaborate
their description of the fetus tended to say they were disappointed by the
sonographer's explanation or expressed frustration and disappointment with
their own inability to understand the image.

Three, place of origin, reproductive history, and source of knowledge
about the fetus do not appear to differentiate whether or not women
interpreted the fetal image as a means of knowing the fetus or the types of
information women derived from the fetal image, including fetal appearance,
gender, and character.

II.B.3.a) Fetal Appearance

Two remarks I heard often in the post-scan interviews were, "Now I know what the baby looks like" and "Now I can picture it." By these statements women meant, one, that they had an image of the physical developmental stage of the fetus and, two, that they could now talk and think about it as a person.

For some women, the fetal image provided a substitute for or comparison with the in utero photographs in their reference books. In most cases they described fetus in the ultrasound image as "more developed" or "more like a baby" than they had expected.

Before, even though I knew that it had a head, arms, and legs and heartbeat and organs and everything else, seeing it and having a picture of it and the moving [on-screen] makes you think it's a real baby, a real fetus. A live thing, not just a mass of dividing cells. (Karen)

This kind of description is intriguing since so few women recalled seeing either the shape or an outline of the fetus. The Lebanese woman and the Sri Lankan woman were particularly surprised by the extent of fetal development. During our second interview, one of these women repeated several times that she had thought the baby "was just a blob."

The terms women used to talk about the fetus often changed
following the first ultrasound. Notably, once they had seen the fetal image women did not hesitate to use the term "baby." They also talked more confidently of the fetal anatomical shape, proportions and parts. The baby had "hands," "fingers" and "toes." Little trace remained of their earlier attempts to describe "the developing arms" or "sort of arms."

Having "an image of the baby" also meant visualizing it as a person, as someone about whom they knew such things as behaviour, character, gender, and resemblance to others. Women's descriptions of the fetus, following ultrasound, were sometimes framed in terms of communication, a meeting, "a chance to say 'Hello'," or even a physical contact.

It's like if you're talking to someone on the telephone and if you've never seen the person you can only say, you know, "Yah, yah." But if you've seen the person [Michelle changes her expression and smiles broadly], you can say, "Hey! Hi! How are you?" It's [the ultrasound] the same thing. It's more like a human being now, because I've seen what it looks like. Now I've seen the person. (Michelle)

When I saw the baby, it made me believe that I'm actually going to be a mother, like I held it in my arms. (Angela)

Some women found in the fetal image a physical resemblance between the fetus and their husband. In each case the woman saw similarities between the "bone structure" or "build" of the baby and her husband.

I was amazed. It looks just like my husband. I mean, because of the bone structure, I guess. But right away I thought -- that's like my
husband. (Angela)

The first thing I saw, it's crazy I know, but this kid has my husband's legs. Everything about it was like my husband. Just the way it looked, the build, the bones, the proportions. It was incredible. (Sylvie)

II.8.3.b) Fetal Gender

Fetal sex is generally not disclosed to women during the first ultrasound; sonographers maintain it is too early to determine it accurately. Fetal sex was accidentally disclosed to one of the woman I interviewed. The physician referred to the image as "une belle fille" although neither he nor the technician had enquired if the woman wanted to know the sex. In fact she had not wanted to know. Seven women (15%) and two men inferred the sex of their baby from their reading of the fetal image. In each case, fetal size or proportion suggested whether it was a girl or boy.

I think it was a little girl. Baby was tiny, just a little thing. Boy is bigger, stronger. My baby was skinny, little, like me. (Nirmala)

Right away I looked at it and I thought it's a boy. It was built, so it had to be a boy! Its arms were big. (Alberto, Rosa's husband)

Five of these women said that once they saw the fetal image, they begun to think about the fetus in terms of its gender and to feel "differently" knowing the fetal sex. While not all women began to use gender specific pronouns when referring to the fetus, one woman expressed her feelings by
saying, "You feel closer to the baby when you know it's not an it."

II.B.3.c) Fetal Behaviour and Character

In addition to inferring fetal gender, women drew a variety of conclusions about fetal behaviour and character based on the ultrasound session. Fetal movement and the sonographers' descriptions of that movement, in particular, were a sign of "what the baby's doing in there." Fetal movement suggested fetal behaviour, type of activity, emotion and character or indicated to women how the fetus felt about the ultrasound.

Women described the movement, or lack of it, in a variety of ways: "I saw the baby sleeping," "He was dancing," "I saw my child sitting so peacefully," and "He was really going." Three women said they saw the movement and felt good knowing that their babies were "having fun." Four women described the movement of the fetal hand as a communicative gesture: "It waved at us" or "It was like the baby said 'Hello' to me."

Seven women, each who had read extensively about pregnancy and ultrasound, talked specifically about how the fetus had responded to the ultrasound. Three of these women (and the husbands of two others) were concerned that the fetus was being hurt or made uncomfortable by the ultrasound "waves" or "light" or by the pressure of the probe. Even though they told me the fetus disliked the ultrasound, only one man voiced his
concern to the sonographer. Parents' statements of concern are based on their belief that the fetus can sense external stimuli. Furthermore, as the following quotes illustrate, these men and women believed that the movement they saw indicated fetal preference: the fetus disliked and moved to avoid the ultrasound.

The baby didn't like the scan. He kept moving away and putting his hand up. I really wanted her to hurry up and finish so he wouldn't be bothered by it anymore. I was thinking the whole time, "I hope this isn't hurting him." (Gillian)

I couldn't believe how much it didn't like the ultrasound. The whole time she was doing the scan, it was moving and ducking and trying to get away. You know, like, "Get out of my face." It objected to being disturbed like that. (Cheryl)

Well because it was moving a lot and the way it was moving I got an idea of what it liked and didn't like about the ultrasound. It seemed to be bothered by it and just wanted to be left alone. (Annabella)

Nearly one-third of the women inferred something about their baby's character from the ultrasound image or the sonographer's description. Each assumed further that this fetal character was indicative of the baby's postnatal character and behaviour. When women talked about fetal character they referred to fetal movement, a behavioral resemblance of the fetus to themselves or to other family members, and the sonographer's comments. Several women, as in the first quote below, described the fetus as "shy" or "modest," as if the fetus was unwilling to be observed.
It looked like a shy baby because we could never see the face. He was always turning away. He was shy or didn't want to be bothered. It was curious. Sometimes you see their hands or feet right on the screen, but this one was more shy. (Térèse)

I think the baby will be very calm as opposed to seeing my sister's baby which moved a lot during the ultrasound. ... I know now it's gonna have my attitude. It was calm and slow moving. If it was more like my husband, the baby would move a lot more and pace around. I mean, my husband's a great guy, but I'm glad it's gonna have my personality. (Marie-Claude)

The baby's taken on a character that we didn't know before. The fact that she mentioned the baby was sleeping with its hands over its head. That got to me, because that's exactly how I sleep. So that struck me as being very odd. And the character, the fact that it used its hands a lot. That gave us a kick because I use my hands a lot. It just kind of gave us the realization, that there's something there. Prior to that you know that there's something growing, but you really can't visualize it. (Cathy)

It was moving and kicking. Like a little spitfire, so I know it's gonna be just like my husband. (Angela)

II.B.4. The Fetal Photograph

For the women in this study, the copy of the ultrasound image they received at the clinic was a tangible and portable sign of the existence and normality of the fetus. Women displayed these images to others as "a picture of my baby." After the first scan, nearly all (94%) the women requested and took home a copy of the fetal image. (Two women were scanned before the clinic was routinely offering these copies and one woman did not want one.) Women often displayed the fetal image in their
homes, put it in an album or frame as "Baby's First Picture," and showed it to friends, family members, and workmates. At the time of the second interview, nearly one-quarter of the women had photocopied, and even enlarged, the copy to give to friends and relatives. Several men took the image for their wallets or their desk at work.

Although women often gave a prominent and public place to the fetal image, many were unable to identify the fetus in the image. When I asked the women what people said about these images, most remarked that the image was difficult for others to understand. One woman surmised, "I guess only a mother can see her baby in that."

III. The Second Routine Ultrasound

Women who are referred for obstetrical ultrasounds at the Metropolitan Hospital usually have a second routine scan at about 32 weeks gestation. In the next section I discuss women's accounts of the fetus after the second routine scan. The discussion is based on interviews with 44 women and observations of their ultrasounds.

III.A. During the Second Scan

In terms of duration, procedure, and explanation, the second routine ultrasounds are not dissimilar from the first. By the time the women in this
research were having a second routine ultrasound, the process of scanning had become unproblematic and routine for the clinic technicians and the direct supervision of an obstetrician was no longer necessary. The technicians could make decisions more rapidly about the "normality" of what they were seeing, sometimes without the aid of standardized charts. By this time, too, they talked while they conducted the examination, describing the image to the woman, chatting to her and to others in the room.

Women held different expectations for the second ultrasound than they had for the first one. This time only 21% of the women specified fetal normality, development, growth or health as something they wanted to learn during the second ultrasound. Of these nine women, five were told of a potential problem at the first ultrasound. Forty-one percent of the women, especially those who were wanted a "natural" birth, hoped for information related to labour and delivery. For example, they wanted to know their "exact due date," estimated fetal weight at delivery, fetal position, and if the fetal head would be "too large" or their pelvis "too small" to permit a vaginal delivery.

About half of the women who did not yet know the fetal sex wanted to know if it was a boy or a girl. Several women expected that it would be easy to see the fetal genitalia; three women intended not to look at the screen so they would not inadvertently see the fetal sex.
Women also wanted and expected that this time they would be able to see "the details" of the fetus. They reasoned that since the baby was bigger, it would be easier to see facial features, hair, fingers, and toes. These details were described as a means of knowing "who the baby looks like" (family resemblance) and "what its doing." About 25% of the women wanted to see the fetus sucking its thumb.

III.B. Women's Accounts After the Second Scan

After the second scan, women often remarked "I didn't see the baby" and their subsequent accounts of the fetus included relatively little from the fetal image. Women consider this second routine scan to be less important than the first scan for learning about the health as well as the character, appearance or behaviour of the fetus. Women often described the later scan as "more for the doctor," "just a double check" or "not all that exciting" and some questioned why a second scan was necessary if the first had found no problems. Just over half the women received a copy of the fetal image after the second scan, but not had requested one.

III.B.1. Seeing Parts of the Baby

As they had after the first ultrasound, most (86%) women now reported that they had seen "parts of the baby" rather than its shape or
outline (see Table Five). After the first scan 66% of the women talked about having "seen the baby," but after the second scan only 48% of the women said this. Women emphasized to me that they "didn't really see the baby" during the second scan because they could only see parts of it. As before, women usually recalled seeing the head, the heart and spine. Probably due to the sonographers' tendency to point out the face, hands and feet during the second scan, more women recalled these parts than did after the first ultrasound. Fewer women mentioned seeing fetal movement during the second scan.

III.B.2. Clinical Information

Women were reassured to be told during the second scan that the fetus was growing properly. However, as I noted above, in general they were much less anxious about fetal health and normality at this ultrasound. Their fears of fetal anomaly and miscarriage were alleviated by the first scan, by their regular visits to the doctor, and by the fact that they could feel fetal movement. By this time women were more familiar with the ultrasound protocol and, thus, less often alarmed by the presence of a physician during the ultrasound or by the sonographer's periods of quiet concentration. The women often characterized their second scans as "more relaxed" or "more fun" than the first.
Interestingly, after the 32-week scan more women expressed doubts to me about the accuracy of the clinical information than did so after the first. Following the second scan, 39% of the women questioned the ability of ultrasounds to detect anomalies, see the fetal genitalia, estimate fetal size or predict the due date. To give a specific example, although the ultrasound based fetal age and due date was accepted at the first scan, 21% of women rejected or questioned these estimates by the second scan. There are some exceptions here. First, women were still vulnerable to how the sonographer described the fetus. For example, women who were told that the fetus was "small" or "large" became alarmed that this meant "too small" or "larger than normal." Other women mentioned their anxiety when the sonographer said the fetus was not moving much. This anxiety was allayed if the sonographer described the lack of movement as "the baby's sleeping" or "resting." Second, each of the women who had been told of some problem during the first ultrasound accepted the sonographer's assessment at the second scan that "now everything is fine." Third, one internal fetal anomaly was detected during the second scan, but the sonographers could not make a diagnosis until after delivery. This woman left the study, but she endured many more ultrasounds and invasive tests and, as far as I know, never questioned the existence of the anomaly.
III.B.3. Fetal Gender

By the end of the second scan, over half the women (55%) had been told whether they were having a boy or a girl. Six women decided during the scan that they wanted to know the fetal sex. No one suddenly decided during the scan that they preferred not to know the fetal sex. Women who had expected to find out if they were having a boy or a girl were disappointed if the sonographer could not determine the fetal sex. Over one-third of the group still did not want to know the fetal sex.

Learning the fetal sex prior to delivery was, as one woman said, "a mixed blessing." On the one hand, women said they enjoyed knowing because they could "imagine it better" and think about it as "our daughter, not just our baby." On the other hand, nearly one quarter of these women regretted finding out because now "there was no surprise left" or "nothing to look forward to at the end of labour." One-third of the women who knew the fetal sex said that they and their husband were not intending to disclose it to anyone else. Four couples were faced with the problem in which one spouse knew the fetal sex and the other did not want to know. These couples and those who decided not to tell others had to avoid inadvertently revealing whether the fetus was a boy or girl. Although these women had wanted to know the fetal sex in order to prepare rooms and clothes in gender-specific colours, they found themselves unable to do so. Women
who did not want to disclose that the fetus was a girl were uncomfortable referring to the baby by the customary "he" or "it."

God! Why did I ever say I wanted to know what is was! Now I have to force myself to say "he" and "it" when I know it's a little girl. I feel totally weird doing this. (Julie)

Women did have doubts about the accuracy of determining fetal sex by ultrasound. In particular, they doubted that the female genitals could be seen. Several of their cautionary tales concerned errors in sexing the fetus. One-quarter of the women who had been told the fetal sex said they wouldn't know for sure until the baby was born. Only one woman expressed disappointment after learning the fetal sex; she underwent an additional scan at another hospital to verify the sex.

III.B.4. The Importance of Fetal Movement

After the second ultrasound, aside from what they learned about the sex and normality of the fetus, the majority (82%) of women did not refer to the ultrasound image in their descriptions of fetal character, behaviour, or appearance. In fact, women often answered my questions about the second fetal image by saying, "I didn't learn anything" or "I didn't see anything."

Only 18% of the women elaborated their accounts of the fetus with ultrasound information that was not related to learning the fetal sex. Six women linked the movement or position of the fetus to fetal character or
behaviour. Three women described a resemblance in the fetal image to themselves or to their husband. From my observations at the clinic, I know that sonographer’s explanations of the fetal image to several of the women in this small group included particularly animated and engaging comments about fetal character, gender, or the resemblance of the fetal image to the woman’s husband.

Although few women elaborated their descriptions of the fetus based on the second ultrasound, one-third (34%) described the scan’s impact on their own identity. They said they “felt like a mother” or suddenly realized they had a lot to do to prepare for the infant’s arrival. When I asked what made them feel that way, most women attributed it to “seeing how big the baby was.” As one woman said,

I know it’s been growing and I know how far along I am. I mean I can see that here [pointing to her abdomen]. But, my God! When she said the baby already weighed over four pounds I flipped. That’s like, already, a baby. I really felt like it’s on its way (Lena)

By the second ultrasound, women’s knowledge of the fetus within their own bodies came primarily from sources other than the ultrasound, their pregnancy guide books, or other women’s experiences. Some women continued to read, concentrating now on labour and delivery rather than fetal physical or behavioral development. As one women explained, “By now everything is there. The baby is just growing and getting ready to be
born." Instead, it was fetal movement which conveyed information to women about the fetus. Being able to feel the fetus move reassured many women that it was both alive and healthy. Fetal movement was further interpreted as a sign of fetal awareness, thought, preference, character, and mood. Women reasoned that since they could feel both the body and the movement of the fetus, the fetus could feel their touch: "it must know that I'm here and it's in there." Seven women said they could tell from the movement "what the baby is thinking" or "what sort of mood it's in." I include several examples of how women interpreted fetal movement.

The baby moves a lot these days and it gives me a good feeling. I know he's okay and everything is alright. When he moves I can sort of tell what he's thinking, like if he's in a good mood today, or feeling sleepy, or if he really wants to party. (Pattie)

It's like she [the fetus] say's "I'm here." Like she's telling me, "You're too quiet. Move!" I can tell what music she likes and doesn't like. If I put some on, she'll start kicking and moving all over. ... She'll get all excited when she doesn't like it. (Michelle)

I feel her all the time. It's great! I know what she's doing and what she's thinking. She's definitely not a morning person. She doesn't get up until later than me and she stays up when I want to be asleep. I'm pretty sure she's going to be slender and athletic too. The way she moves her body, like a dancer almost. (Jennifer)

I'm fascinated by it. I don't know! Ever since I've been pregnant I just get so sucky! I have this little person who's inside of me, she eats, she wakes up, she sleeps. And Tom played with her fist one night. Yah! One evening for about half an hour she'd poke out her fist and he'd touch it and then she'd pull away. It was great! (Julie).

By the time of their 32-week ultrasound, 96% of the women said they
were talking to the fetus. The Sri Lankan woman and Lebanese Armenian woman did not, as far as I know, talk to the fetus and both women believed the fetus could not hear or see until birth. The other women talked, as they had earlier in the pregnancy, to soothe and calm the fetus, to apologize for loud noises, and to describe for it events and people outside the uterus.

Twenty-five percent of the women told me that the fetus responded differently to their voice than to their husband’s voice. They believed the fetus could distinguish their voices because it moved in a distinctive manner, either stopping or moving more. One woman was attempting to teach the fetus simple words, explaining “it can’t hurt to see if it really works.” Two couples continued to play tape recordings to the fetus. Here are some examples of how women described talking to the fetus:

We both talk to her. When I feel her move I think, “Oh you’re awake” and then I’ll say something to her. ... [My husband] talks to her too. Usually when he does she gets scared and then she doesn’t move. (Kate)

Ron plays music to it. The baby moves to the reggae beat. And he give certain kicks to Ron’s voice and mine and he gives certain kicks when Ron or I rub my tummy. When Ron says “Kick for me,” he does, the baby kicks! (Norma)

I talk a lot, especially when I feel the baby move. I wonder what it’s going through, like why is it moving. I talk to it and I say, “I’m sorry if you don’t have enough room.” ... I know it can hear whenever I talk to it or my husband talks to it. It can tell our voices. ... I’m sure it can tell our voices because when my husband talks to it, it moves differently than when I do. (Annabella)
IV. Post-Partum

I now turn to women's post-partum commentaries on and recollections of fetal imaging. As I show, after childbirth, many women were sceptical about ultrasound's reliability and did not rank the ultrasound as an especially meaningful moment in their pregnancies. This was particularly true of women who had additional ultrasounds in the weeks prior to childbirth and women who were dissatisfied with their labour and delivery. Thus I begin this section by describing women's experiences of these additional ultrasounds and their accounts of childbirth.

IV.A. Additional Pre-Delivery Ultrasounds

About one-quarter of the 44 women interviewed post-partum had additional ultrasounds after the routine 32-week scan. One of these women chose to have an additional scan at a different hospital in order to confirm the fetal sex. The other women were scanned so their obstetricians could assess fetal size or position. At these non-routine scans, three women were told that the fetus was "large" or "larger than average" and six women were told it was "smaller than average."

IV.B. Labour and Delivery

I believe that the experiences of childbirth among the women in this
study were not atypical from other primiparous women delivering at the Metropolitan.  

All but one of the 44 women interviewed post-partum gave birth to a healthy, clinically normal infant. One infant was diagnosed post-partum with a treatable congenital anomaly. About two-thirds of the women had a vaginal delivery and one-third underwent a cesarean section. Most women (80%) began labour spontaneously, others had labour chemically induced (14%) and three women had a cesarean prior to labour. The majority (78%) who experienced spontaneous labour had their labours further stimulated by hormones or by artificially rupturing the amniotic membrane. In accordance with hospital policy, all of the women were attached to an intravenous glucose drip and all were continually attached to an external electronic fetal heart monitor. Many women also had an electrode introduced vaginally and implanted in the fetal scalp. Like the majority of primiparous women at this hospital, 80% of the women in the study had an "epidural" and were instructed not to move while the anesthetic was dispensed slowly by automatic pump into their lower spine. Despite

2. I compared the reports of women in my study to statistics gathered by the hospital's Obstetrics Department.

3. Their labours were induced by the administration of Pitocin, a solution containing the synthetic hormone, oxytocin.
women's earlier intentions to walk during labour and find their own comfortable positions, the artificially ruptured membranes and attachment of monitors, electrodes, or needles effectively constrained women to bed for the duration of labour and delivery.

There were no differences in the rates of epidurals, labour stimulants, or cesarean deliveries between groups of women. However, women who had planned to have "natural" childbirth expressed considerable disappointment with the restrictions on their movement and were often critical of the obstetrical staff.

IV.C. The Post-partum Significance of Fetal Imaging

In women's post-partum commentaries on fetal imaging, two points were clear. First, the overall assessment of ultrasound by two-thirds of the women was that it had a positive effect on their experience of pregnancy. They recalled the fetal image as "reassuring," "enjoyable" or "exciting." Only 14% of the women felt that having ultrasound had made their pregnancy less enjoyable or more stressful. Eleven per cent said the ultrasound had no effect on their experience of pregnancy and 7% said it had both a positive and negative effect.

Two, by post-partum, women tended to diminish the overall significance of ultrasound for their experience of pregnancy and to
emphasize the limitations of ultrasound. I asked the women to compare the importance of their first routine ultrasound to two other events during pregnancy: the first time they heard the fetal heart beat and their first sensation of fetal movement. As part of their routine care, most women (96%) heard the heartbeat prior to the first routine ultrasound and most (78%) saw the fetal image prior to quickening. The fetal image was "the most important" or "most meaningful" of these three events for relatively few women (18%). Far more women (46%) said that hearing the heartbeat was the most important and about one-third said this of quickening. Two women ranked the three events as equally significant.

Those women who preferred the fetal image did so because it reassured them the fetus was normally developed and permitted them to know the fetal sex. Not surprisingly, their descriptions focus on the value or impact of "seeing." For example,

For me seeing her on the ultrasound was incredible! It was like, Oh my God! There really is a baby. I felt so protective after that. It's just this little thing inside you. I wanted to be very careful, crossing the street, eating properly, not drinking. ... I never really saw myself as a mother before. The ultrasound really helped me to prepare for that. When you see, you believe it's true. I mean when I first felt her, it could've been gas. ... Seeing her and finding out that it was a girl. It was really important for me to use her name and talk to her like that. I hate it when people say "it." (Michelle)

I guess seeing it was more important because I knew he was really there. When you have an ultrasound you think, "It's real." You actually see it. It's not just an idea. You know he's developed okay
and you see all the physical things, seeing all his parts. (Francesca)

Women who said the heartbeat or quickening was especially meaningful for their experience of pregnancy found the ultrasound "exciting" and "reassuring," but hard to understand without assistance.

The movement was way more important to me than anything else. Because when you are seeing it on the ultrasound you don't know what you are seeing. Someone else is seeing for you, "This is the arm. Here is the head." But the movement I felt it. No one had to tell me what it was. I felt it. (Térèse)

The ultrasound was too hard to see. I couldn't understand anything until it was pointed out. It was great to know he had all his parts, but that's about it. ... Hearing the heartbeat was very exciting. It was so early and I knew my baby was alive, everything was fine. That's what I liked. (Adelena)

These six women now felt the ultrasound was "for the doctor" or "a medical thing." In their view, fetal movement was distinctive since it did not require this interpretation and, later in the pregnancy, was a continual reminder that "everything was okay." Women who said the fetal heartbeat was especially meaningful often described it as "the first sign" of the pregnancy or commented on how early in the pregnancy they had heard it. In fact, their post-partum descriptions of hearing the heartbeat are strikingly similar to their earlier narratives on the fetal image.

It [hearing the heartbeat] was my first realization that I was going to have a baby. It told me the baby was well. That there was a baby in there! A little human being. (Angela)
The heartbeat was the most reassuring. It was great! There is a living being in there. There is life! It's real! (Rosetta)

During the post-partum interviews about one-third of the women questioned the ability of ultrasound to anticipate problems for delivery and to estimate the size of the fetus. Some women noted discrepancies between the fetal image or ultrasound results and the outcome of the pregnancy. The majority of these women did not rank ultrasound as especially important to their experience of pregnancy. Women whose scans had indicated larger than average or smaller than average fetuses now felt these assessments were wrong and had caused them unnecessary worry. The two women who were told the fetus had cranial cysts felt that, in retrospect, they would rather not have known about these anomalies. In addition, women who had difficult or premature deliveries questioned why the ultrasound hadn't been able to predict or detect any problems. Prior to delivery, they understood that the ultrasound, especially the second routine scan, was done to predict labour complications.

I'm lying there pushing and grunting and thinking, "What the f--- do these guys know?" My doctor told me the second scan would show the position of the baby and if there were any problems for the delivery. Now here I am and this same guy is standing there telling me I'm too small and the baby can't come out. Too small? They couldn't see that on the ultrasound? Come on. (Kate)

This kind of reflection was particularly strongly felt by the one woman whose infant was born with an anomaly detected during the routine neonatal
assessment. Although I cannot say whether her sentiment is shared by
other women in similar situations, I include her final opinion of ultrasound:

I don't know why they want to do the ultrasound. The doctors say
they can't see everything. Why didn't they say that to me before? ... And they say even if they see this [anomaly] on the ultrasound they
can't fix it. You know? The baby is still going to have it, when they
[sic] are born. I don't know. You don't see much and I think maybe
the doctors don't either. 4

V. Summary

In this chapter I described how women recall the first fetal image as
confusing and difficult to understand, but still meaningful as an image of
their baby. The sonographers' presentation of the image appears to be an
important factor in enabling women to say they "have seen the baby." In
comparison to their earlier accounts, after the ultrasound, women talk more,
in more detail, more explicitly and more confidently about the "baby" within
their bodies. This change in women's accounts of the fetus can be
characterized in two ways. One, women now have a strong sense that the
baby is "real" and that it is "normal." Two, women use what they have seen
and heard during the ultrasound as a means of personalizing this baby.

Based on the ultrasound, they may assign a physical appearance, gender,

4. In order to ensure full anonymity for this woman I have not included her
pseudonym.
character, and family resemblance to the fetus. After the scan, women attach considerable importance to their copy of the fetal image. The image is displayed, reproduced, shown to others and often referred to as "baby's first picture."

In contrast, information from the second routine scan appears to be less significant among the women. Aside from what they learn about the sex and normality of the fetus, the majority of women did not refer to the ultrasound image in their descriptions of fetal character, behaviour, or appearance. By post-partum, the ultrasound has become, for many women, just another medical procedure.

In the following chapter, I analyze these findings more fully and situate my research within other social critiques of reproductive technology and the fetus.
CHAPTER EIGHT: ULTRASOUND IMAGES AND FETAL SELVES

In this final chapter I clarify the process by which ultrasound images become representations of fetal selves. What I will be doing here is distinctive in the social analysis of reproductive technology. The authors discussed below have charted the historical emergence of the fetus as a patient and the social and ethical implications of fetal personhood. They have claimed that ultrasound fetal imaging is a form of social control over women. However, none of these authors have deconstructed the precise meaning of ultrasound images, either for women or for sonographers. Nor have they identified how images become meaningful or how they become a form of control. In this chapter I address these issues based on the findings from my ethnographic study of ultrasound imaging in Montréal.

I will be arguing that ultrasound images do have an influence on how women think about and behave toward the fetus. Part of this influence derives from sonographers’ interpretations of fetal images which incorporate dimensions of selfhood and assumptions about social relationships. However, I will argue that the meaning which ultrasound images hold for women and the extent to which those images inform their thinking and
behaviour toward the fetus is neither inherent in the technology nor created by the sonographers' explanations of the image. In fact, to a large degree, the fetal image holds similar meanings for sonographers and women. Instead, ultrasound images become representations of selves in a dynamic matrix of culturally and socially situated discourses, practices, and interpretations. This matrix includes cultural assumptions about the self, the technical development and professional organization of ultrasound, obstetrical ideologies about the fetus, the particular institutional agendas where fetal imaging is used, as well as, the multifaceted webs of belief, relationships, experience and emotion in which women suspend the fetus. The meaning of a fetal image is transitory, a temporary combination of assumptions and emotions, structured by existing cultural idioms, personal histories and relationships of power, dependence and authority. By restoring ultrasound images to the multi-dimensional social and historical contexts in which those images are produced, interpreted, and experienced, I am able to show how they may be culturally meaningful as a window on the fetal self and how they may be a means of social control.

I begin by examining the main assumptions and issues in several influential social critiques of reproductive technology and the fetus.

I. Reproductive Technology, Women and the Fetus

The term "reproductive technology" has come to include not only the
"new" techniques like \textit{in vitro} fertilization and gamete transfer, but the whole range of techniques used in the course of pregnancy, labour and childbirth. Techniques such as ultrasound imaging, abortion, amniocentesis, fetal heart monitoring, and cesarean section are all within the realm of reproductive technology. Given the volume of writings in this field, I focus my discussion on those researchers who have addressed the combined issue of fetal selfhood and reproductive technology.

I.A. Key Issues in Studies of Reproductive Technology

The notion of "control" is central to these writings and I want to clarify its meaning in this context. In many sociological and anthropological analyses of reproductive technology, "control" refers to the authority to define and manage the events of reproduction. A primary assumption is made that prior to the involvement of medical specialists in pregnancy and childbirth, women had more control over their bodies. Historically, according to this line of argument, this authority has shifted from women and lay midwives to physicians (e.g., Ehrenreich and English 1973; Leavitt 1986; Rothman 1982). Thus "medical control" over reproduction refers to the transfer of the control over definitions about the onset, progression, normality, and termination of pregnancy to medical professionals. Control also refers to how women behave during pregnancy, that is, decisions about what they should do and what should be done to them are now made by
those professionals.

"Control" has two other dimensions. Some of the authority to define and manage reproduction is extended to the state. Thus, "control over reproduction" refers to the legal sanctions on women who may want to end a pregnancy (e.g., rights to abortion), on women during pregnancy (e.g., fetal abuse cases involving pregnant women who ingest alcohol or illegal drugs) or during childbirth (e.g., court-ordered cesarean deliveries), and sanctions about who may manage childbirth (e.g., the legality of midwives, home births). Also, a "loss of control" by women refers to the belief that women have been alienated from their bodily experiences of pregnancy, that their interpretations of those experiences are no longer authoritative, that they require medical expertise in order to reproduce, and that they do not always have the social or legal right to decide what happens to their bodies during pregnancy.

In the development of a social analysis of reproductive technology a number of issues have persisted. They are each related to the fundamental theme of these analyses: medical control over the processes of reproduction, pregnancy and childbirth has entailed the loss of control by women over their bodies. An early issue in social critiques of reproductive technology concerned the location of power and authority during pregnancy and childbirth. During the 1970s and 1980s, a number of social and feminist histories of childbirth appeared, analysing the shift in the locus of control
and authority from women and midwives to (male) physicians and from home to hospital (e.g., Ehrenreich and English 1973; Leavitt 1986; Rothman 1982).

Another important issue explicitly identified in these studies concerns the role of technology in the control over women and reproduction. The introduction and use of forceps exclusively by physicians is generally regarded as a turning point in the history of medical control over childbirth. The medicalization of reproduction as now generally assumed to coincide with the increased use of technology in reproduction. Some authors argue that women are now alienated from their bodies and have only the "impoverished metaphors" of technology with which to experience pregnancy (Jacobus et al. 1990).

Arney (1982) and Oakley (1986a) both view technology as a resource from which obstetricians have historically drawn in order to expand and legitimize their profession. They suggest that obstetrics has used technology to extend its control over pregnancy in two ways. First, obstetrics demarcates its territory as "abnormal" pregnancies and retains control over the technology (forceps, caesarean section, anesthesia) to intervene in abnormal pregnancy. Second, obstetrics has developed a wide range of technologies (ultrasound, fetal heart monitors, amniocentesis) to monitor "normal" pregnancies on the assumption that "something might go wrong."
A more recent issue in the writings on reproductive technology is the role of the fetus in furthering the medicalization of reproduction and hence the erosion of women's control over their bodies. The general argument is that the medicalization of reproduction has entailed a redefinition of the "fetus." The fetus was once viewed as part of the woman, inseparable in either a social or moral sense until delivery. Today, the argument continues (Rothman 1989), the fetus is conceptualized as a separate person within the mother's body. Within obstetrics that fetus is further defined as "potentially at risk" and in need of technological surveillance. Pregnancy has thus been reconceptualized as an interaction between the physician and the fetus.

Arney (1982), Oakley (1986a), as well as, Petchesky (1986) and Rothman (1986; 1989) have each argued that the notion of the fetus as a person has been an important and recent element in the continuing extension of power and authority by obstetricians and the corresponding loss of control by women over reproduction and their bodies. In Chapter One, I discussed these authors as part of my theoretical framework for studying ultrasound. In the following pages, I concentrate on their claims about the fetal self.

I.B. The Fetus in Studies of Reproductive Technology


William Arney's analysis of the rise of the obstetrical profession in
Britain and America focuses on the use of specialized technology and the redefinition of "normal" pregnancy. Prior to World War II, obstetricians claimed abnormal pregnancies and deliveries as their professional territory and developed an array of instruments and techniques to intervene in those circumstances. After World War II, "the ever-present chance that something might go wrong" was used to transform obstetrics from a profession of intervention to one of "surveillance" (Arney 1982:54,123). In the Foucauldian terms (cf. Foucault 1979; Gordon 1980) employed by Arney (1982:89) a new order of obstetrics emerged in which "subjects must be separated, individualized, subjected to constant and total visibility". In the new obstetrical "gaze" (Foucault 1975), one of those emergent subjects was the fetus. The fetus is conceptualized as an entity separate from the woman and bearing its unique signs of normality (rates of development, heart rate) and abnormality ("fetal distress"). Obstetricians' professional claims to manage pregnancy were based on their ability to monitor and interpret those fetal signs. Arney makes the important point that during the past few decades, "the interests of the child" are used more and more often as justification for increased obstetrical surveillance and intervention during pregnancy (Arney 1982:134).

Arney provides an historical perspective on the contemporary obstetrical notion of the fetus as a patient through the use of medical technology. Nevertheless, he says very little about how this fetus is
constructed during clinical practice, that is during the day-to-day use of that
technology.

I.B.2. Oakley: Ultrasound as a Strategy for the Social Control of Women

The main theme in Ann Oakley's (1984:250) history of British
obstetrics is that prenatal care is "a strategy for the social control of
women." She makes two convincing points about ultrasound and the fetus
in relation to this theme. First, she points out that reproductive technologies,
especially fetal heart monitoring, amniocentesis and ultrasound, are
"revolutionary because, for the first time, they enable obstetricians to
dispense with mothers as intermediaries, as necessary informants of fetal
status and lifestyle" (Oakley 1984:155). This "direct contact with the fetus"
by physicians has been a critical element in obstetrical claims to expertise
and authority in pregnancy. Knowledge based on a woman's own contact
with the fetus, a contact independent of technology, is marginalized and
devalued.

Oakley (1984:185) also argues that "ultrasound must ... take its place
in a long line of other well-used strategies for educating women to be good
mothers." Thus, obstetrical claims that "normal" pregnancy includes
maternal-fetal emotional attachment and that ultrasound can promote this
attachment are part of this strategy. Oakley sees this strategy as further
evidence of the social control of women.
Arney and Oakley have dealt with the relationship between the fetus, reproductive technology and the profession of obstetrics. They claim that technologies, like ultrasound, and the idea of the fetus as a patient have suited the particular purpose of extending and legitimizing the obstetrical profession. The next two researchers I discuss have attempted to analyze this newly conceptualized fetus in more detail.

I.B.3. Rothman: The Alienation of Women from the Fetus

In her analyses of prenatal diagnosis (1986) and of motherhood (1989), Barbara Katz Rothman discusses the ideological premises of the fetus in American society. Her argument is that American ideas about the fetus and "modern ... motherhood rest on ... the ideology of patriarchy, the ideology of technology, and the ideology of capitalism" (1989:26). A central part of this ideological configuration is the image in liberal philosophy of society as a collection of atomized individuals (Rothman 1989:58-59).

Rothman argues,

We have in every pregnant woman the living proof that individuals do not enter the world as autonomous, atomistic, isolated beings, but begin socially, begin connected. ... Motherhood is the embodied challenge to liberal philosophy (1989:59).

Rothman extends her critique of patriarchy, technology, and capitalism to the fetus and its ultimate desocialization. In visual representations, such as ultrasound images, the fetus is pictured against a
dark background, attached by the umbilical cord to an unseen woman (Rothman 1986:114). Rothman argues that these representations desocialize the fetus. By "desocialize" she means that technologies like ultrasound represent the fetus as separate from the woman and deny the physical, social and emotional relationship of pregnant woman and fetus (1989:91). Thus the fetus is viewed as an "isolated, atomistic individual" with whom the mother must develop an attachment after birth during the period of "bonding" (Rothman 1989:89; 1986:115). Rothman (1989:157) argues that "the alienation of the woman from the birth, and more fundamentally from the baby, is, ... the most important and consistent theme in modern obstetrics."


Rosalind Petchesky’s studies of fetal images in obstetrics (1987) and in the American anti-abortion movement (1990) are based on the premise that the fetal image is a symbol with multiple meanings. In the clinical context those meanings are (1) a source of evidence for clinicians’ diagnostic claims about the fetus (1987:71); (2) a means of establishing and surveying normative maternal and fetal behaviour during pregnancy and

1. Rothman is talking about pregnancy and motherhood in America. Her assumption about the relationship between pregnant women and the fetus may not apply cross-culturally.
delivery (1987:69); and (3) a source of obstetrical fantasy, in which men and technology have control over reproduction and women's bodies in general (1987:68-71). Petchesky did not discuss the fetal self in obstetrical ultrasound images. Nevertheless, her work suggests how the fetus and ultrasound have become central to obstetrical beliefs about pregnancy, risk, and women's bodies.

The idea of the fetus as an ideological symbol is elaborated in Petchesky's (1990) analysis of the American anti-abortion movement. In anti-abortion images, the fetus is represented as "the small, the helpless, and the mortal" (1990:339). In short, the fetus is represented as the "baby" (1990:338). Petchesky makes three important points about this symbolic "baby." First, photographic and ultrasound images highlighting the morphological resemblance between fetus and newborn are used by the pro-life movement in conjunction with scientific statements about the human genotype to argue that all humans are persons from the moment of conception (Petchesky 1990:333,341). Second, she suggests that anti-abortion images which represent the fetus as the baby have a strong emotional content. They are intended to stir up feelings of protectiveness and "arouse one's sense of identity with the fetus" (1990:339). Third, fetal images are used to evoke "mythic" values: women's sexual innocence, "good" mothers, and the "traditional" family (1990:xiv). Thus in the context of the anti-abortion movement, the representation of the fetus as baby
condenses "a much broader ideological struggle in which the very meanings of the family, the state, motherhood, and young woman's sexuality are contested" (1990:x).

Petchesky disputes this reduction of fetal personhood to biological determinism and at the same time is critical of its implications for women. She argues that the symbolic representation of fetal personhood as human biology excludes two criteria that are essential to an understanding of fetal personhood. One criteria is "the existence of a [fetal] self ... involving some degree of self-awareness in relation to others" (1990:346). The other criteria is "the subjectivity of the pregnant woman, her consciousness of existing in a relationship with the fetus" (1990:351). Like the other authors reviewed here, Petchesky believes that the construction of the fetus as biology and baby has reduced women's value to a reproductive function and has undermined their legal rights and social claims to make decisions about pregnancy.

II. Windows onto Fetal Selves

My ethnographic study of fetal imaging in Montréal was carried out within the general theoretical framework of these authors. My working assumption, like theirs, was that fetal images need to be understood as historically and culturally specific objects which become meaningful in specific social contexts. However, none of these authors have identified the
precise meaning of the image as a representation of self, the process by which the images become meaningful, or how images are translated into control over women. Instead, they have tended to assume: 1) that fetal imaging is part of a linear and purposeful history, aimed primarily at controlling women’s bodies; 2) that the meaning of the fetus (and of fetal images) is determined by obstetricians; and 3) that women uniformly accept this meaning.

Based on my research in Montréal, I offer a different approach to understanding how ultrasound fetal images become meaningful. I suggest that these images derive their meaning from a matrix of discourses, practices, beliefs, emotions, and relationships. In saying this, I draw from my own findings and from Rayna Rapp’s (1990:30) argument that “a conflict of discourses necessarily characterizes the arena of reproductive technology, where nothing is stable.” In the following sections I look more closely at this matrix of meaning from several perspectives or entry points, including the notion of self in sonographers’ accounts of the image, obstetrical ideology and the notion of “risk,” the professional and institutional agendas, women’s assumptions about the fetal self and their personal registers of experience and emotion. I begin by deconstructing the interpretation of ultrasound images by sonographers.
II.A. Sonographers: Showing the Baby

Fetal imaging is described for women as a diagnostic tool. It is used routinely in Montréal and elsewhere as a means of screening for fetal anomalies and for problems which might complicate childbirth. Ultrasound fetal imaging may seem undistinguished as a diagnostic procedure: the sonographer carries out her examination, gives a brief summary of the findings and little more is said to the parents. The ultrasounds that I observed were by and large conducted in a different manner. The sonographer, the woman, and her partner did not talk about the diagnostic or technical aspects of the images but about a distinctively social aspect — "the baby." When sonographers and expectant couples talk during the ultrasound, they resemble people gathering round to admire a baby in someone's arms (see Chapter Four).

Sonographers' interpretations of the ultrasound images for women draw from several dimensions of selfhood: a physical dimension, a social and moral dimension, a dimension of subjectivity and one of potentiality. The argument I make here has two parts. One, these dimensions are part of the cultural assumptions of selves and integral to how the ultrasound image is made culturally meaningful as a "baby." Two, embedded within the practices of fetal imaging are cultural norms about the social relationships of pregnancy. The interpretation of the ultrasound image as "the baby" is inseparable from the social relationships surrounding that interpretation.
One, there is a physical dimension to selfhood, a set of assumptions about the human body, its functioning, normality and capacity. The physical dimension of selfhood reflects the cultural value placed on conformity to a "normal" body and a devaluing of physical difference or disability. Thus, sonographers try within the first few seconds of the scan to establish that the fetus is not only alive, but has no gross physical abnormalities. Once sonographers believe that the fetus is "normal" at this level of examination, they begin to describe the image for the woman. They begin to do what they refer to as, "showing her the baby."

The physical dimension of selfhood in the interpretation of fetal images also reflects a cultural fascination with the fetus. Here I agree with Petchesky's (1987) description of the fetal image as a symbol of fantasy and of scientific progress. In Chapter Five, I discussed how the juxtaposition of small size and complexity of form and function within fetal images in women's guides to pregnancy evoke a sense of awe about the fetus and the human (technological) capacity to see the fetus. A similar juxtaposition is an integral part of the clinical interpretation for women.

Most of what sonographers say to women during a routine ultrasound refers to the physical fetus, to its shape and anatomy. Sonographers draw attention to those fetal parts which are not part of the diagnostic examination but believed to be appealing to parents: the face and the fetal hands and feet, especially the fingers and toes. Furthermore, parts of the fetal body
are often not simply named, but described in terms of intentional activity such as "playing", "swimming", "thinking", "stretching" "resting". They are also described in reference to their baby-like appearance and their resemblance to the anatomy of other family members. In this way, the fetal image is presented as physically familiar — it has a body like our own.

Two, there is also a social or moral dimension, in which people talk about the self in terms of culturally specific identities associated with sets of rights and obligations. During the ultrasound the fetus is identified as "the baby" or "your baby." The term "fetus" is generally restricted to diagnostic matters. The pregnant woman and her partner are often referred to as "Mama" and "Papa" and family members who are present are encouraged to look at their "niece" or "grandchild," for example.

Linked to these identities and included in the sonographers' accounts of the fetal image are normative expectations about parental behaviour. Implicit in these accounts is the idea that women who come for ultrasound, who avail themselves of the benefits of this technology, are doing what is best for their babies. Some women are perceived by the sonographers to be overly interested in learning the fetal sex and others are assumed to want only male babies. Women who are particularly interested in learning the fetal sex and women having their first child may be told, "Finding out the sex isn't important. The most important thing is that the baby is healthy." This comment is particularly noteworthy since one of the first questions
sonographers ask women during ultrasound is, "Do you want to know what sex it is?" If the sonographers are concerned that a woman will be disappointed by the sex of the fetus, especially if they think she may seek to terminate the pregnancy, they may simply tell her that they are unable to see whether it is a boy or girl.

Normative kinds of comments may be made to women whom the sonographers consider to be "noncompliant" or "not taking care of themselves." For example, women who admit to smoking during pregnancy may be shown the image of the placenta and told "we can see the smoke in it." Men, who were once excluded from the ultrasound room are encouraged to watch and to participate in the conversation about the fetal image. Emotions, identities, and assumptions about responsible parents coalesce in the ultrasound evidence. Clearly the social and moral dimension to selfhood involves a form of control over parental behaviour.

Establishing the identity of the fetus as the "baby" also engages sonographers in relationships of rights and obligation with the fetus. There is a general obligation expressed by the sonographers to do what they can for the "little guy on the inside," to look carefully for anomalies and ensure the fetus is normal before they tell women that "everything is okay." Reluctance or unwillingness, reported by sonographers to me, to disclose the fetal sex if they believe the woman will be disappointed further illustrates their sense of obligation to the fetus. Anecdotal or published accounts of
legal action against sonographers for failing to detect fetal anomalies
intensify this sense.

Three, there is a subjective dimension to selfhood usually described
in terms of the self's awareness of its surroundings and its (in)distinctness
from other selves. This also includes the self's capacity for experiencing
certain feelings. Awareness, intention and emotion on the part of the fetus
are included frequently in the explanation of the image for parents. Thus,
fetal movement which impedes the process of conducting the examination is
described as evidence that the fetus is "shy", "modest" or "doesn't like"
something. Conversely, a clear, easily attained fetal image may be offered
as evidence that the fetus is "being good" or "very cooperative."

One of the most remarkable observations for me was that
sonographers interact with the on-screen fetal image. They speak to the
image, wave "Hello," and give instructions, words of encouragement or
reprimand. They may touch, stroke and "tickle" the on-screen image and
the technicians occasionally create a voice so the fetus may "speak" to the
parents or communicate its "feelings."

The subjective dimension to selfhood serves two important symbolic
purposes. First, constructing the fetus as conscious, emotional, intentional,
willful and even capable of communication confirms that the fetus bears
more than a physical resemblance or biological link to other selves. What is
essen does not merely look like other selves but is seen to act like other
selves. Thus the image is not merely one of a fetus, a biological being, but an image of a baby, a social being. Two, as Petchesky (1990) has argued, the dimension of subjectivity, like the notion of physical resemblance, brings about an emotional and protective response from the viewer. If the fetus is aware and sentient it needs to be protected.

Finally, selfhood involves a dimension of distinctive propensities and potentialities. This is usually labelled as "human nature" and refers to the ability of humans to acquire elements of cultural competence such as language, a moral sense, or a role as a "productive" member of society. Thus the fetal image is described in terms of its potential to become a certain kind of self, a certain kind of child (a boy or girl, athletic, smart, wakeful, fast-moving, just like Dad). Propensity and potentiality, as I suggested in Chapter Five, draw the viewer away from an ambiguous fetal appearance and uncertain subjectivity. The fetus is repositioned on a developmental and moral continuum leading to its eventual emergence into the world of known and certain selves (newborns, little boys and girls, family members).

In their interpretations of the routine fetal image, sonographers present the fetus as normally embodied, socially and morally situated within a world of other selves, possessing emotion, consciousness, and a distinctive or potentially distinctive self. Those dimensions are multiply determined and meaningfully interdependent. Evidence of one dimension of
selfhood provides evidence of another. The social identity "baby" is preaced on assumptions about the physical and subjective fetus. The potential of the fetus to become a certain kind of self engages parents and sonographers in social and moral relationships with that self. In short, what is presented to parents from the ultrasound image is not a "fetus" but a "baby." The ambiguous nature of ultrasound images permits sonographers to move away from the image of the fetus with its peculiar appearance, uncertain subjectivity, and contested personhood toward the certain, uncontested image of a baby.

To this point I have been arguing that notions of self are "hermeneutical devices" through which sonographers construct meaningful interpretations of ultrasound images for parents (Gaines 1982:177). Later I will show that these devices are also integral to the way in which parents make sense of the image. I have also argued that the representation of the fetal self through ultrasound is linked to cultural norms about the parental and professional relationships surrounding that fetal self. Presenting the fetal image as a "baby" through the dimensions of selfhood carries with it assumptions and expectations about how sonographers and parents, among others, should think and act towards this baby. Now I want to delineate the cultural tradition of self being constructed in the ultrasound clinic.

In Chapter One I summarized Gaines' (1982; 1985) argument that there are at least two notions of self in the West: an indexical self and a
referential self. When sonographers interpret the fetal image and engage parents in conversations about that image they incorporate both notions of self. On the one hand, they construct a primarily referential self for the fetus, defining the physical boundaries of the fetus and locating its emotion, agency, and "personality" within that body. The fetal body is read as a source of information about the fetus, its normality, its potential to become a full self in the world of other selves, its awareness and sentiment, and its character. The fetus is assumed to be self-aware and capable of acting independently of others, of acting based on its particular needs and feelings.

At the same time, sonographers encourage an indexical notion of self for parents. Parents are expected to be non-discriminatory and nurturing. Women, in particular, are encouraged to think of their own bodies and selves in terms of other selves, in terms of fetal needs.

To argue, however, that the fetal self is fully or only a referential self, and to say that the maternal self is entirely and only an indexical self would be false. Women are simultaneously indexical and referential; nurturing, constituted of other selves (fetal), but also living in an historical, linguistic and ideological tradition of individualism (Kondo 1992:33). Thus women are assumed to be able to act, seek expert help, and gain control over their lives and bodies in order to have a healthy baby. The fetus too has its multiple selves. While ultrasound fetuses appear to be secure translations of referential selves, bounded self-reflective, and self-determining, that same
self is constituted through maternal behaviour, emotion, and, as I discuss later, maternal "risk factors."

The existence of these two notions of self within the clinic, within the same interpretation, or within the same body is not, in my view, illogical or contradictory. Nor does it suggest a problem with Gaines' characterization of Western conceptualizations of self. In fact, Gaines has also argued that the two traditions are both found in North America. The referential self is found, for example, in the professions including medicine, while many patients (e.g., the Mediterranean, Jewish, Latino, Afro-American, Southern Baptist/Fundamental/Evangelical Anglos) hold indexical notions of self (Gaines 1993). The existence of multiple notions of self does however, support my claim that the interpretations of fetal images are not the uniform and static representations of self assumed by some researchers. Instead interpretations of fetal images are derived from multiple sources within a larger matrix of meaning, emotion, and relationships.

There is one further question I want to address based on my observations about how fetal images are made meaningful by sonographers. To what extent are interpretations of fetal images a conscious and deliberate attempt by sonographers to influence how women think and feel about the fetus?

2. Recall from pages 5 to 6, however, that Gaines (1985) found an indexical notion of self among Christian psychiatrists in the American South.
II.A.1. Are Sonographers’ Accounts of the Fetal Image Deliberate Constructions of Self?

The idea that reproductive technology has been developed and is used purposefully to control women’s bodies is a recurring theme in social critiques of this technology. This view has its strongest expression in radical feminist critiques of reproductive technology (e.g. Arditti et al. 1984; Corea 1985; Corea et al. 1987 Spallone 1989) and is implicit in Rothman’s (1982, 1986, 1989) work. Petchesky’s (1987) view of the fetal image as an obstetrical fantasy about men controlling women’s bodies is another example. Sonographers are the primary interpreters of this technology; they are also the gatekeepers to ultrasound’s “facts” about the fetus. It might be tempting to say that sonographers deliberately and consciously interpret the ultrasound image as a “baby” in order to influence women’s behaviour and thinking, to make women more compliant or more emotionally committed to the fetus. Even sonographers acknowledge that seeing the fetal image may have this effect on women.

In some situations sonographers do consciously construct their explanation of the image in order to influence what women think about the fetus. For example, sonographers may dissuade a woman from knowing the fetal sex if it is her first child. Or, if they feel a woman is too interested in the sex of the fetus, they “remind” her that the health of the fetus is more important than its sex. Sonographers also select for identification those fetal
body parts (feet, hands, face) they feel make the fetal image appealing to expectant parents. However I believe that most of what sonographers say about the fetal image is tacitly based in their assumptions about women and the fetus. Sonographers assume that most of the women who come for ultrasound want to have a baby and are emotionally attached to the fetus. Sonographers also assume that most women already think of the fetus as "the baby." Thus, when sonographers talk about the fetal image they are doing what seems commonsensical to them — what they believe the technology allows them to do — show her the baby. Their assumptions about the self are not created by the technology of ultrasound. Their interpretations of the fetal image are not individual strategies for control, but tacitly reproduced cultural knowledge about pregnancy, women, and the fetus. Ultrasound produces certain facts about the fetus (size, sex, health), but those facts are not equally available to women. Cultural assumptions that women be non-discriminatory and nurturing toward the fetus provide sonographers with a rationale for selecting which of ultrasound's facts about the fetus are given to women.

When sonographers have a negative perception of a woman's appearance, behaviour or interest in the ultrasound, their accounts of the fetal image tend to be limited to brief descriptions of fetal anatomy and activity. This is true for women whom the sonographers believe do not display evidence of caring about the health of the fetus, are believed to be
overly interested in knowing the sex of the fetus or are not taking care of themselves (e.g., smokers). Noticeably absent from the accounts for these women are many of the elements which I have been discussing, i.e., explicating the fetal image as a "baby" possessing appealing qualities, emotion, and consciousness, and incorporating the parents' appearance, sentiments, and social world into the description of the fetal image.

I expected the relationship between the degree to which the image is presented as a baby and the sonographers' perception of the expectant woman to be reversed. That is, that the ultrasound image would be explicitly and deliberately interpreted as a baby when sonographers believed the woman did not follow cultural norms about pregnant women or mothers. Perhaps sonographers' lack of explanation here is a kind of cultural criticism, in which sonographers register their disapproval by withholding their full interpretation of the image. The significance of this observation requires further research.

II.B. The Fetus in Obstetrical Ideology

Deconstructing the ultrasound image in terms of the sonographers' explanations reveals only one of the ways through which the image becomes meaningful. In the next two sections I deconstruct the patterns of echoes in ultrasound images in two other ways. First, ultrasound images are part of a broader discourse on the fetus in obstetrics. Second, the
images have a particular meaning within the institution where they are
produced. In Chapter Three I argued that the technology of fetal imaging,
conventions about diagnostic interpretations of the image, the professional
organization of ultrasound, and its routinization are part of historically and
socially constructed discourses on the fetus. In the next two sections I want
to restore the clinical interpretations of fetal imaging to these social contexts,
explicating how those interpretations have particular historical and
institutional meanings.

Based on the history of ultrasound images described in Chapter
Three, it is clear that contemporary clinical interpretations of ultrasound
images reflect and reproduce fundamental changes in beliefs about the
fetus. I agree with Arney’s (1982) and Oakley’s (1986a) general conclusion
that the “discovery of the fetus” has held tremendous importance for
obstetrical claims to expertise in managing pregnancy. The fetus is
believed, according to this new obstetrical ideology, to produce its own
diagnostic signs. Through techniques like ultrasound, these signs can be
assessed and interpreted without reference to the woman. Moreover, the
status of the pregnancy now depends largely on the status of the fetus. For
example, estimates of the stage of pregnancy based upon “fetal age” are
given priority over those based on menstrual weeks. Historically contingent
standards of fetal physical and functional normality determine the normality
of the pregnancy. The fetus often seems to be viewed in obstetrics as
separate from, but not independent of, a woman's body. No doubt there are variations in this obstetrical discourse on the fetus. In the routine practice of prenatal care, pregnant women are "mothers having babies." In the lexicon of problematic pregnancies, experimental fetal surgery, and *in vitro* fertilization, women become "hostile environments" and "fetal containers" and the fetus, a "product of conception."

The reconceptualization of pregnancy as the "interpretation of fetal signs" and of pregnant women as "maternal environments" signals a social space between fetus and woman. Herein lies ideological support for the referential notion of fetal self in sonographer’s accounts of the ultrasound image. Coincident with that separation is the emergence of new meanings for the fetus and new relationships through which those meanings are translated into practice. In obstetrics, the fetus has become a patient who can be observed, diagnosed, treated and positioned in a network of medical technologies, specialties, patient rights and professional obligations.

Common sense reminds all of us, sonographers included, that there is a physical connection between the fetus and the woman. This physical, bodily and experiential connection has, however, taken on new meaning with the new technologies. One way in which the connection between a woman and the fetus is now conceptualized is in terms of "risk." Arguably the most significant element in contemporary obstetrical ideology about the fetus is the assumption that it is "at-risk" and that a woman's genes, body,
behaviour, and lifestyle are the source of that risk. Here I want to show how Quénéhart’s (1987, 1992) “risk factor ideology” is useful for understanding the meaning of ultrasound images. Her discussion of the implications of these assumptions for women’s experiences of pregnancy will be presented later in this section.

Quénéhart (1992:164) defines “risk factor ideology” as the set of doctrines that legitimate new social behaviours, constructing objective conditions of danger in order to justify new modes of intervention (Castel 1983:123). In other words, the risk factor ideology is based upon a substantial logic which aims, through various discourses and practices, both to legitimate insecurity (by giving specific meaning to it) and to prevent it.

These discourses on risk, as Quénéhart (1992:164) points out, exist “in all areas of social life.” In obstetrics, the ideology of risk is fundamentally one of fetal risk and it rationalizes the need for specialized monitoring, like ultrasound imaging. The legitimacy of both routine scans and the idea of risk is confirmed when anomalies and complications are “caught” through ultrasound. Quénéhart (1992:164) writes that,

the notion of risk factors is developing apart from the presence of a danger but is “caused by the relationship between abstract data or factors that render the undesirable events more or less prone to happen” (Castel 1983:122). ... It is in this way that one begins to estimate the level of risk to a fetus during pregnancy. More precisely, it is not just the mother’s genetic background, but other variables such as age, weight, blood pressure, overall health, etc., as well as data related to personal habits and lifestyle, that are used to create multiple categories among pregnant women: namely those at risk, (read “those whose fetus is at risk”) — be it high or low — and those who aren’t.
Within this ideology, when the sonographers in my research classified ultrasounds into "normals" and "high risk," they were referring primarily to the perceived risk to the fetus, not to the woman (see Chapter Four). Furthermore, I found, as does Quénéart (1992:165), the ideology of risk situates responsibility for the outcome of the pregnancy on women and to a lesser degree on physicians. In Quénéart’s (1987:217) words,

"Ces nouveaux dispositif préventifs, au centre se trouve la notion de risque, représentent en fait de nouvelles modalités de la surveillance, du contrôle social, qui devient indirect. [These new preventive strategies based on the notion of risk are, in fact, new and indirect forms of social control] (my translation).

Following this argument, I believe that the individualizing of responsibility for risk and the interpretation of more or less risk to the fetus is central to understanding in what sense ultrasound images are a representation of self and in what sense they are a form of social control. Each image is a social construction where the fetus and others are situated in a particular social relationship. The notion of "risk" intensifies the moral and emotional dimension to those social relationships and links the image and those relationships to other domains of meaning such as public health, science and law. In obstetrics, for example, when the fetus is judged to be at low risk, the fetal image is explicated and understood as like other selves, pregnant women are assumed to act like mothers, and sonographers are understood to be caring for the fetal patients.

When the fetus is judged to be at risk, the meaning of the ultrasound
image, the construction of selfhood, and the relationship among fetus, woman, and sonographer are different. Then the ultrasound image becomes meaningful as a window onto an endangered fetal self and onto the source of that danger — the woman's body and behaviour. Thus, the ultrasound images of the placenta and a smaller than average fetus "shows" a woman's smoking habits. Fetal size ("intrauterine growth retardation") and threatened miscarriage "shows" that she must rest in bed. The poor quality of the image "shows" that the woman is obese or has had (too) many children. The ultrasound image may also be used to "prove" the need for a cesarean delivery. In some cases in the United States, this proof has been used to justify court-ordered cesareans against the wishes of the woman (Irwin and Jordan 1987).

In the case of anomaly or miscarriage, the ultrasound image may be interpreted as a fetus who has succumbed to the risks. Then the image may be less meaningful as a representation of selfhood than as a window of scientific opportunity. For example, even though there is usually no treatment, a fetal anomaly may be studied at length through multiple ultrasounds and additional tests. If the anomaly is believed to be treatable, the ultrasound image "shows" a self in jeopardy; physicians are expected to try all possible, even experimental, treatments and women are expected to comply with those regimes of treatment.

In light of the obstetrical ideology of fetal patients and risk, the
sonographers' construction of a referential fetal self and an indexical parental self makes sense. These interpretations surround fetuses in the cultural meaning and social relationships of health, normality, and responsible parenting.

II.C. The View from the Clinic

Not only do ultrasound images derive some of their sense from their location and history in obstetrics, science and law, they also have a particular meaning within the network of personal and professional relationships at the institution where they are produced and interpreted. Indeed, the professional contest between radiologists and obstetricians for control of ultrasound has, at least in the hospital where I did my research, favoured a certain kind of interpretation of fetal images.

A fundamental premise of ultrasound is that it provides specialized knowledge about the fetus and pregnancy. Specialized knowledge from ultrasound and other obstetrical technologies has established, expanded, and legitimized obstetrical claims to authority in managing reproduction (Amey 1982; Oakley 1986a). Part of the history and contemporary practice of fetal imaging involves a dispute over the authority to produce and interpret those images. This dispute was important at the hospital where my research was conducted. The obstetrical claims to authority over ultrasound fetal imaging at the Metropolitan Hospital depended, in part, on their
interpretation of the fetal image as a "baby."

I conducted my research at a particular time in the history of obstetrical services at this hospital. As is common in Canada, routine obstetrical ultrasounds at the Metropolitan Hospital, were being done in the Department of Radiology by radiologists and radiology technicians. Obstetricians at the hospital claimed that they could improve diagnosis and patient care and were successful in establishing their own ultrasound clinic. As a result, the obstetricians are now able to train their own residents, select and train the ultrasound technicians, and purchase their own equipment. Further, they may institute and carry out their own research agendas and allocate a portion of the fees for ultrasound for obstetrical research and development.

The issue of physician reimbursement for ultrasounds is noteworthy here. Following widespread reforms of the Québec health care system during the 1970s, the government has used legislation to restrict physician-incurred costs. For example, "all physicians, whether general practitioners or specialists, [are] paid the same amount for the same service," including ultrasound (Renaud 1981:383). In comparison to other provinces, the Québec reimbursement rate for these services is held very low (Gagnon 1991:B3). During 1989-90, the fee for an ultrasound at more than 14 weeks in Québec was $18.50 (obstetrician, interview). The same scan in British
Columbia was worth $76.50 and in Ontario, $74.60 (Anderson 1992:15). The existence in Québec of low payment schedules set by the provincial radiologists's association provide incentive for obstetricians to increase their use of ultrasounds.

Obstetricians offered several reasons why a separate clinic was needed at the Metropolitan. They pointed to the long waiting list at the radiology clinic as evidence that the existing demand far outweighed the available services. "Québec," one of the obstetricians explained, "is undergoing a mini baby boom." They drew upon the Metropolitan's prestige in obstetrical care in arguing that expanded obstetrical ultrasound services would reduce the incidence of neonatal anomalies, premature and low-birthweight deliveries, and complications during childbirth. Most importantly, obstetrician's claims to authority over producing and interpreting ultrasound images at the Metropolitan were based on what they called "the obstetrical perspective." That perspective refers to fully understanding the indications and implications of using ultrasound within the spectrum of clinical care during pregnancy. The obstetrical perspective also means "knowing how to talk to patients." Obstetricians believe that radiologists are better able to obtain technically proficient images and accurate, precise measurements but lack this "obstetrical perspective."

"Knowing how to talk to patients" condenses within it several assumptions about pregnant women. From my conversations with obstetricians, I can say that it refers in part to their perception that they are dealing with a population that is dependent upon their care and yet increasingly demanding. Pregnant women are believed to be attracted to alternatives in childbirth, such as decreased medical intervention, home births, and midwives. They are known to be willing to bring legal scrutiny to bear on obstetricians' decisions in cases of missed anomalies and neonatal death. At the same time, obstetricians believe women are both anxious about the possibility of fetal anomaly and very interested in some of the non-clinical aspects of ultrasound ("seeing" the baby, finding out the fetal sex). In setting up their own ultrasound clinic, these obstetricians believed they would be providing fetal imaging that was both clinically superior to that provided by radiologists and more in tune with patient needs. A comment by one obstetrician about the selection and training of the ultrasound technicians reflects this belief: "We want them to be able to do excellent scans and we want them to be warm and friendly with the patients. That's what we want to achieve here."

The way in which fetal images are interpreted at the Metropolitan is perceived by the technicians and some of the obstetricians as something which distinguishes their hospital from others. The Metropolitan staff believe their attempts to make the explanation personal and friendly, to converse
with expectant couples about the baby, and to ease women's anxieties are distinctive in Montréal. When they knew I had been observing ultrasounds at other hospitals, the staff at the Metropolitan clinic would ask me if I had noticed "How we do things here." They were careful to point out to me that their ultrasound practice is not "zip-zap you're done" but includes time to "show women the baby."

The dispute between radiologists and obstetricians may be understood as an issue of control over resources (patients, equipment, funding, scientific data, medical prestige) and of professional autonomy and influence. Obstetricians at the Metropolitan Hospital have grounded their stake in this dispute in their claims to be able to use the technology in a distinctively humanistic and compassionate way. Through local traditions, like "knowing how to talk to patients" and "taking the time to show the baby," interpretations of ultrasound images are shaped by their professional and institutional agendas.

II.D. Women: Seeing the Baby

Here I approach the fetal images from yet another set of positions, the shared assumptions and personal experiences of women.

I have argued in this dissertation that the conclusions about the fetus which women draw from the ultrasound image depend, in part, on the sonographers' presentation of that image. The dimensions of selfhood
through which fetal images are made meaningful by sonographers implicate certain relationships with the fetus. Those relationships incorporate normative, cultural expectations about parental and professional obligations toward the fetus and, thus, implicate relationships of control. In previous sections, I also suggested that the meaning of the image is given a particular social shape by the notion of fetal risk and by the particular institution where the images are produced and interpreted. In this section, I want to continue with the issue of ultrasound and social control and suggest what fetal imaging means for women's ideas about and behaviour toward the fetus.

The women in this study share many of the same life circumstances and reproductive histories. They occupy a similar status as young women (all between 22 and 33 years old) who have only recently established a household apart from their parents, who have not long been in the work force, and who have not yet borne a child. Their familial and economic circumstances are not greatly dissimilar. Many of them are "Canadian" and some also have ties to the cultural traditions of the circum-Mediterranean. In Chapter Six I suggested that women's accounts of the fetus prior to ultrasound share certain cultural assumptions, namely a sentient, dependent and vulnerable fetus and a nurturing sensitive mother. Gaines (1982;1985) has pointed out how deeply rooted is the indexical notion of self within cultures of the Mediterranean. Thus the indexical constructions of fetal and
maternal selves used by sonographers may have some cultural resonance with these women. It may be equally true, however, that these selves are familiar because they part embedded and reproduced through medical and popular guides to pregnancy.

But referential selves are also familiar to the women in this study. Well before the first ultrasound, in their guides to pregnancy and, more generally, in media texts and iragery, women encounter the idea of the fetus as a conscious, sentient, and active entity. The fetus in these guides is remarkably independent and self-determining. Their books tell them that they are "having a baby," not "carrying a fetus," and that their body, emotions, and life style influence the fetus, determine what kind of baby they will have.

Women's assumptions about the fetus at this early stage of pregnancy are unstable and the cultural vocabulary for talking about the fetus is ambiguous and inchoate, even contradictory. Even the popularized guides women may turn to for information about pregnancy and fetus present women with multiple meanings. On the one hand, women see a fetus, unbelievable, unconnected to their sense of the pregnancy, and strange-looking, or in their words, like "E.T." On the other hand, the texts and images present an image of a baby — active, intentional, sentient, aware and intensely appealing.

Unlike these images and unlike the heterogeneous circumstances in
which women experience their pregnancy, the routine ultrasound conveys a relatively consistent image. The women’s hopes that ultrasound will allow them “to see what kind of baby” they have are not dashed by unclear images. Most women see “a baby” during the ultrasound. They do not see a “fetus” in the ultrasound image nor is the image presented to them as one of the fetus. Instead, the process of ultrasound, including the sonographer’s explanation of the image, their descriptions of fetal position and movement, assessments of normality, and attempts to personalize the image provide women with a coherent body of information about the baby. Specifically, what women see and hear during the first scan is incorporated into their accounts of the fetus, along several dimensions of selfhood.

One, women describe the physical appearance of the fetus as “just like a baby.” They do not see an image which recalls the in utero photographs of their books. Women see very little in the ultrasound image - - the top of the head, the beating heart, and possibly a glimpse of the spine or of the leg. Through the sonographer’s explanation of these parts of the image, descriptions of fetal position and movement, and assessments of normality, women’s uncertainty or ambivalence about the appearance of the fetus and “when it looks like a baby” is reduced. The ultrasound image "looks" like the baby they imagined the fetus to be.

Two, the sonographer’s assessment that the fetus is normal is an important element in women’s construction of the fetus as a "baby." In part,
fetal normality confirms for the women that the fetus "looks like a baby." I believe it is also important as a sign for women of the potential of the fetus to become a full person. Thus, after the first scan, most women are certain not only of the physical presence and appearance of the fetus, but are reassured by its potential — it is "a normal baby." Lingering doubts about the health of the infant are related to problems identified by the sonographer, to women's perceptions of the limitations of the ultrasound technology, or to anxieties created during the scan, either by diagnosis or the sonographer's behaviour.

Three, following the first ultrasound, the fetal social identity becomes more specific, secure, and elaborated. Women confidently describe the fetus as "a baby" or "my baby." Fetal gender and family resemblance may be inferred from the ultrasound. Thus for some women the baby is further socially situated as "a little girl" or "just like my husband." Women, too, begin to talk more confidently about themselves as "mothers" and to articulate more consciously some of the responsibilities associated with motherhood. Some women wanted to change their own behaviour to "take care of" the fetus, others said they felt more "protective" toward the fetus following the ultrasound.

Four, in a limited way, women draw from their experience of the ultrasound to confirm or elaborate the subjective dimensions of the fetal self. A few women, for example, interpreted the on-screen fetal movement as
evidence of fetal consciousness and character.

Each of the dimensions of fetal selfhood I've described above are part of a social process by which selfhood is ascribed to the fetus. For the women this is a gradual transformation. This shift from "being pregnant" to "having a baby" begins before the first ultrasound and involves multiple signifier including quickening, hearing the fetal heart beat, bodily changes in pregnancy, and wearing maternity clothes. I did find evidence that, following their first routine ultrasound, some women made some changes in their behaviour toward and thinking about the fetus. A few women said they felt "more responsible" toward the fetus and wanted to decrease their smoking and rest more. A number of women said that once they knew the fetus was normal they could publicize the pregnancy by wearing maternity clothes, telling friends and family, and making plans for the baby's arrival. Men also responded to seeing the fetal image by saying they felt an increased sense of responsibility toward the fetus. There are no dramatic changes after ultrasound since women are already enmeshed in the sort of relationships with the fetus that sonographers routinely use to describe the fetal image.

Ultrasound does seem to provide women with a vocabulary for talking about the fetus. Women incorporate statements and information from the ultrasound image into their accounts of the fetus. Specifically, they use what they have heard and seen during the ultrasound as a means of personalizing and particularizing their idea of the fetus. They begin to
describe the fetus in terms of its social identity by talking more confidently about "the baby" or "my baby" and about themselves as "mothers." After the first routine scan, women also begin to elaborate their understanding of the baby by assigning a physical appearance, gender, character and family resemblance to the fetus.

Most striking was the extent to which women responded to the fetal image as proof that the fetus was "real" and that it was normal and healthy. The authenticity of the image and its compelling quality for women stems, in part, from the general cultural acceptance of medicine as the authoritative source of information about the human body, including reproduction. The convincing quality of the ultrasound image also stems from its visual and pictorial nature. For these women, ultrasound is equivalent to a photograph of the fetus and, in their words, "seeing is believing." In addition, women perceive the fetal image to be objective and neutral. Ultrasound's objectivity rests, in part, on the idea that its evidence about the fetus is independent of a woman's perception of her body. Ultrasound's "public" nature reinforces its objectivity. Not only do women witness the baby, but so do their husbands and the sonographers. Although women have had positive pregnancy tests and heard the fetal heartbeat, these cannot be taken away from the context of the examination. Ultrasound images can be transported and displayed outside the clinic. Although their content may be difficult to
explain precisely, those images are still convincingly "Baby's First Picture." 4

Fetal movement seen during the first scan has a particular importance to ultrasound's credibility for women. Women's perception of fetal movement is conventionally regarded as the first sign of "life" and is eventually interpreted by women as a sign of fetal health and character. During ultrasound, fetal movement has these meanings but is now separated from a woman's perception and presented to her by sonographers as further confirmation of ultrasound's specialized knowledge of the fetus.

Finally, the notion of fetal risk enhances the credibility and distinctiveness of ultrasound's facts about the fetus. Based on her research in Montréal, Quériart (1987;1992) makes several observations about pregnant women and the notion of fetal risk. She points out that women experience "acute insecurity" during the early months of pregnancy since they are constantly worrying about the health of their future newborn (Quériart 1992:165). She writes,

while the initial insecurity of these women is quite understandable, given that this is their first pregnancy, it grows into an obsession with normality. ... It is not surprising that women feel the need for reassurance at all costs even if it means — and herein is ...[a] paradox — taking risks (Quériart 1992:165,167).

Not all women in my research were equally anxious about the risk to

4. Among women who experience miscarriage and stillbirth ultrasound images have a particularly poignant validity. As Layne (1992:41) writes, "sonogram photos and scraps from fetal monitors are frequently saved by bereaved parents and utilized as evidence to prove to others that a 'baby' existed."
the fetus and few were "obsessed" with normality. Women who relied on published guides for ordering and making sense of their experiences during pregnancy tended to be more anxious than other women. Nevertheless, fetal "risk" and fetal normality make sense for these women in terms of its implications for the construction of their own (maternal) self. A normal fetus enables one set of emotions, identities, and relationships; an abnormal fetus enables quite another. Although many of the women I interviewed were unsure of the long-term effects of ultrasound on the fetus, they were willing to take a risk and undergo ultrasound in order to "avoid" the risk of an abnormal newborn (Chapters Five and Six).

I would argue further that the meaning of pregnancy, at least for some groups of women, has been modified through the ideology of risk. At one time, delivery marked not only the end of pregnancy but a social transformation, when women became mothers and when the child emerged into the world of other selves. Today, women are more and more often viewed as mothers from the time of conception. The fact that some women I interviewed, often professional and well-educated women, prepared their bodies for pregnancy suggests they are responding to certain social pressures about "maternal" behaviour even before pregnancy. In general, the ultrasound image was meaningful to women as a signal that they can continue the pregnancy, they can continue to talk to the fetus, and to plan for the future newborn. Ultrasound has become a technological quickening
signifying that a woman's social status is changing and she is becoming a mother. However, those images are part of, not the source of, the social transformation from woman to mother.

I want to emphasize that ultrasound images do not, by themselves, make women into mothers or fetuses into babies. I have already pointed out that ultrasounds are only one discursive practice through which the fetus is viewed as the baby. Moreover, there is some indication it may not be the most significant one for women.

By the second routine scan, during the eighth month of pregnancy, ultrasound was a much less important means of confirming, normalizing and personalizing the fetus. By this point in the pregnancy, women regard their own perceptions of fetal movement as meaningful signs of fetal health, sentience, character, emotion, and behaviour. It is through those signs that women continue to ascribe selfhood to the fetus. As in the first scan, it was difficult for women to see a fetus in the ultrasound image. After the second scan, however, few women said they "saw the baby." Aside from those women who were told whether they were having a boy or girl, only a few women used the second fetal image to further construct the social identity of the fetus (see Chapter Seven).

Why is the 32 week ultrasound less significant for women? Without further research, I can offer only a suggestion why this might be so. By the eighth month of pregnancy, women are more openly and unambiguously
defined as mothers by themselves and by others. A woman at eight months looks pregnant, she assumes the fetus looks like a newborn, she and others assume she will deliver a healthy baby, and no one refers to the "fetus," now they only speak of the baby. Thus, aside from fetal sex, the second routine ultrasound image offers very little in the way of distinctive information about the fetus.

II.D.1. Individual Registers of Meaning

In the process of thinking about the fetus as a self, each woman draws upon her own knowledge and experiences, her social relationships, what she knows directly and can infer about the fetus, and the changes in her own body. Differences in life experiences and in family situations, having an abortion or miscarriage, and even images of the fetus in films provided women with a multi-hued palette from which to construct their accounts of the fetus. Women's differing "commitment," as Rapp (1990) calls it, to medical discourse explains some variation in their accounts. For example, women who regarded the popularized scientific models as standards against which to measure their own experiences of pregnancy

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5. Davis-Floyd (1992:4) comes to a similar conclusion in her analysis of pregnancy and birth in the United States "as a year-long initiatory rite of passage" into motherhood. She (Davis-Floyd 1992:27) writes that "by the seventh or eighth month, ... [the pregnant woman] has adapted to her new symbolic status and the social rituals that accompany it."
may feel both compelled by and distant from these models; regarding the fetal images as both "authoritative" and "alien." My observation here is similar to Rapp's (1990:40) comment that New York City white middle class women viewing ultrasound fetal images undergo "a paradoxical separation and reconnection to fetuses." In contrast, there were women who expressed less commitment to the medical discourse of their guidebooks. They gave concrete and personalized accounts of the fetus, comparing their own experiences with those of other pregnant women.

"Pro-life" women assumed the fetus was sentient and conscious from conception, resembled a newborn from very early in pregnancy, and was capable of intentional thought prior to delivery. They set aside uncertainties about fetal consciousness or appearance and morally engaged the fetus into the social world of persons, sometimes through the idea of a soul. For women who were anxious about miscarriage, engaging the fetus in the world of other selves was suspended, contingent upon the passage of time until delivery.

And, finally, a small number of women, each born and raised outside of North America held distinctive assumptions about the fetus. They said very little about the fetus, did not talk to the fetus, at least, not until near the end of pregnancy, and believed the fetus was not sentient until near delivery. Unfortunately, the group was so small, comprised of one Armenian Christian woman, one Lebanese Muslim, and one Sri Lankan woman, that I
cannot generalize from their accounts to any particular pattern of cultural variability. Perhaps these women were less familiar with popularized biomedical models of pregnancy, but that could not be said of all the participants from outside North America. Nor do I wish to overemphasize what may be a spurious difference between these women and the other women in this study. I suspect that the character of their accounts was influenced by the interview situation, by my inability to speak their native language, and by their perception that possibly I was testing their knowledge about the fetus.

III. Concluding Points

At the beginning of this chapter I discussed several influential interpretations of reproductive technologies. The argument in those interpretations is that reproductive technologies represent a form of social control. They are, it is argued, changing cultural beliefs about pregnancy, the fetus and motherhood. In this chapter I have argued that ultrasound does have an influence on how women think about and behave toward the fetus. I have also shown that clinical interpretations of fetal images incorporate dimensions of selfhood and those dimensions are linked to assumptions about social relationships.

However, I have argued that the meanings which ultrasound images hold for women and the extent to which those images influence their
thinking and behaviour is not produced solely by the technology nor by the sonographers' explanations of the image. Rather it is the social and historical discourses through which those images are produced, interpreted, and experienced which make them meaningful as windows onto fetal selves. But fetal selves are not fixed and hegemonic, they are, like other selves, "sites for the play of multiple discourses and shifting, multiple subject positions (Kondo 1992:44)." I conclude by making three final points.

First, I believe that the interpretation by some authors that reproductive technologies construct the fetus as a separate entity and alienate women from the fetus is incomplete. For example, Rothman (1986; 1989) and Petchesky (1986), among others, argue that through reproductive technology like ultrasound, fetal selfhood is constructed in such way that the woman must then bond with the infant following delivery. My observations of ultrasound imaging suggest the construction of a somewhat different relationship. On the one hand, the fetus is represented as a separate being, "the little guy on the inside" or the "baby." On the other hand, the dimensions of selfhood through which the image is made meaningful incorporate cultural expectations that women engage in a social, moral and emotional bond with that baby long before delivery. Court cases in which women have been charged with and convicted of "fetal abuse" or "fetal endangerment" make those expectations even clearer.

Second, some social critiques of reproductive technologies argue that
technologies like ultrasound control women and fetuses. I agree that the meaning of the relationship between the fetus and the pregnant woman has changed fundamentally and clearly with the emergence of the notion of fetal selfhood. However, I believe that the issue of control goes beyond women and the fetus to include others. For example, from early in their partner’s pregnancy, men are cast in the role of expectant father. They are now expected to come to a woman’s regular prenatal visits, to attend childbirth preparation classes, and most of all to be involved in the labour and delivery. Men are, to some extent, given the role of watching over women, ensuring they eat nutritiously, rest adequately and follow medical regimes. Furthermore, they are expected to attend the ultrasounds and, like women, to show interest in the fetus and evidence of caring about the fetus.

The controlling aspect of ultrasound also extends to sonographers. Ultrasound is, in the words of one obstetrician at the Metropolitan, "a double edged sword." Sonographers believe that ultrasound improves their ability to provide effective care. Their claims that ultrasound provides specialized knowledge about the fetus are, unquestionably, a means to extending and legitimizing professional influence. Nevertheless, both technicians and obstetricians are uneasy about ultrasound for at least two reasons. First, sonographers admit that they cannot see everything, the quality of the image is variable, and they do not know the significance of all that they see. Moreover, they believe that ultrasound, more than X-ray, is "operator
dependent” and that they do make errors. Sonographers worry that ultrasound may increase their medical-legal liability since they are expected to see everything, but often do not. Technicians, in particular, feel vulnerable since they are given the responsibility of distinguishing between normal and abnormal images. Second, there is also recognition that the growing dependence of physicians on technology like ultrasound undermines their ability to practice with "good clinical judgement." In writing about this transformation of the therapeutic relationship, Quénéart (1987:226) says

les tests et les techniques, ... tendent de plus en plus à tenir lieu de diagnostic: le jugement humain est évacué peu à peu chez l’expert comme chez la femme [The growing tendency is for tests and techniques to serve as the basis for diagnosis: human judgement is lost little by little among physicians and women] (my translation).

Three, in the first few pages of this dissertation, I described the ambiguity of ultrasound images. Throughout the writing, I have endeavoured to show how that ambiguity is replaced and masked by social meanings. Here, at the end of the dissertation, I return to the issue of ambiguity.

The ambiguity of ultrasound images is conventionally understood as a technical limitation of ultrasound. I believe that the ambiguity is a reflection of the unstable and sometimes contradictory meanings which are attached to the fetus. Ultrasound images reflect and reproduce different meanings about the fetus from different social domains: from obstetrics, science, and a political-legal arena, within different institutional contexts, and within
multifaceted personal contexts. At this historical moment, the fetus is represented simultaneously in different ways.

For the women in this study, there are many different and sometimes contradictory meanings attached to fetal images. The prominent place given to descriptions, drawings, and photographs of the fetus in guidebooks to pregnancy suggests to women that the fetus is something about which they must know. The women found the images of the fetus, and particularly the in utero photographs, fascinating. At the same time, however, some women find it difficult to associate these images with their own sensations and sentiments of pregnancy and their idea of the fetus as a baby. These fetal images enable an emotional and social relationship at the same time that they present the fetus as an abstract and impersonal object of the scientific gaze. During routine ultrasounds, however, women encounter the fetal image in relatively coherent and unambiguous terms. The image itself is ambiguous but the meaning in the explanation is clear — this is your baby.

Separate from the meanings held by the women I interviewed, there are even more meanings attached to the ultrasound image. In one representation, the fetus is an object produced through techniques of egg harvesting and sperm collection and cultivated in petri dishes. In this view, the fetus can be manipulated, selected, frozen, thawed and, eventually, either discarded or placed in a woman's body. Fetuses also are scientific objects when they are reduced to tissue which is grown, harvested and even
purchased for use in the treatment of certain diseases. Even the number of fetuses may determine to what extent they are selves. An "option" for a woman who has "too many" fetuses (usually three or more) is "selective reduction" in which two fetuses are permitted to live while the others are "terminated" (Berkowitz et al. 1988). In another representation, the fetus is part of the "products of conception" which are expelled during an abortion or miscarriage. And, finally, the fetus has entered the political and legal arena. There the meaning of this social category is debated in the context of issues about maternal rights to terminate pregnancy, to refuse treatment, to use her uterus in surrogacy contracts, and to use alcohol, cigarettes and drugs during pregnancy.

The ambiguity of ultrasound images is not a technical problem. It is a reflection of the multiple and sometimes contradictory cultural meanings which the "fetus" has at this particular historical moment. The existence of those different meanings reinforces the argument that ultrasound images are socially constructed and not an objective window. As Petchesky (1990:xiv) cautions, the authenticity of the image must not be assumed.

By now, the curled-up profile, with its enlarged head and finlike arms, suspended in its balloon of amniotic fluid has become so familiar that not even most feminists question its authenticity (as opposed to its relevance). Yet this prototypical fetal image epitomizes the distortion inherent in all photographic images — their tendency to slice up reality into tiny bits wrenched out of history and social context.

My aim in this dissertation has been to deconstruct prenatal
ultrasound images, specifically, to examine what makes these images authentic representations of the fetus. I have argued that the authenticity of these images is not created by the technology nor by the sonographers alone. Nor is there only one meaning to the fetal image. Patterns of echoes are regarded by both sonographers and by pregnant women as compelling and influential representations of fetal selves. But the meaning of these echoes is contingent, varied and shifting, rather than assumed, uniform and consistent. What ultrasound images say about the fetus is dependent upon emotions and experiences, assumptions about the self, and institutional, professional, and personal interests.
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