



SENSATE SKINS:
UNFOLDING AN AFFECTIVE RESPONSIVE AESTHETICS

by

Dennis Humphrey
BA Sociology, Laurentian University, 1975

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

In the School

of

Interactive Arts and Technology

© Dennis Humphrey 2007

SIMON FRASER UNIVERSITY

Spring 2007

All rights reserved. This work may not be
reproduced in whole or in part, by photocopy
or other means, without permission of the author.

Approval

Name: Dennis Humphrey

Degree: **Master of Arts**
School of Interactive Arts and Technology

Title of Thesis: *sensate skins: Unfolding an affective responsive aesthetics*

Examining Committee:

Chair:

Dr. Chris Shaw
Associate professor
School of Interactive Arts and Technology

Dr. Susan Kozel
Senior Supervisor
Associate Professor
School of Interactive Arts and Technology

Thecla Schiphorst
Co-supervisor
Associate Professor
School of Interactive Arts and Technology

Diane Gromala
External examiner
Associate Professor
School of Interactive Arts and Technology

Date Defended/Approved: March 16, 2007



**SIMON FRASER
UNIVERSITY library**

DECLARATION OF PARTIAL COPYRIGHT LICENCE

The author, whose copyright is declared on the title page of this work, has granted to Simon Fraser University the right to lend this thesis, project or extended essay to users of the Simon Fraser University Library, and to make partial or single copies only for such users or in response to a request from the library of any other university, or other educational institution, on its own behalf or for one of its users.

The author has further granted permission to Simon Fraser University to keep or make a digital copy for use in its circulating collection (currently available to the public at the "Institutional Repository" link of the SFU Library website <www.lib.sfu.ca> at: <<http://ir.lib.sfu.ca/handle/1892/112>>) and, without changing the content, to translate the thesis/project or extended essays, if technically possible, to any medium or format for the purpose of preservation of the digital work.

The author has further agreed that permission for multiple copying of this work for scholarly purposes may be granted by either the author or the Dean of Graduate Studies.

It is understood that copying or publication of this work for financial gain shall not be allowed without the author's written permission.

Permission for public performance, or limited permission for private scholarly use, of any multimedia materials forming part of this work, may have been granted by the author. This information may be found on the separately catalogued multimedia material and in the signed Partial Copyright Licence.

The original Partial Copyright Licence attesting to these terms, and signed by this author, may be found in the original bound copy of this work, retained in the Simon Fraser University Archive.

Simon Fraser University Library
Burnaby, BC, Canada



SIMON FRASER
UNIVERSITY library

STATEMENT OF ETHICS APPROVAL

The author, whose name appears on the title page of this work, has obtained, for the research described in this work, either:

(a) Human research ethics approval from the Simon Fraser University Office of Research Ethics,

or

(b) Advance approval of the animal care protocol from the University Animal Care Committee of Simon Fraser University;

or has conducted the research

(c) as a co-investigator, in a research project approved in advance,

or

(d) as a member of a course approved in advance for minimal risk human research, by the Office of Research Ethics.

A copy of the approval letter has been filed at the Theses Office of the University Library at the time of submission of this thesis or project.

The original application for approval and letter of approval are filed with the relevant offices. Inquiries may be directed to those authorities.

Simon Fraser University Library
Burnaby, BC, Canada

Abstract

This thesis explores responsive aesthetics in art installations—how individuals, through their senses, engage in meaningful, affective exchanges with a responsive artwork that focuses on touch and the body as the critical loci of reciprocity. Concepts drawn from multidisciplinary writings assisted in developing this responsive aesthetics: approaches to the body, lived experience, reversibility and intercorporeity from existential phenomenology; the construction of the self and sexuality from psychoanalytical theory and gender studies; models of responsivity, the relationships between haptic, visual and multimodal perception from physiology, human perception and art criticism. The construction and exhibition of a prototype haptic responsive installation, *sensate skins*, provided a means of embodying and exploring the multiple folds of responsivity and gathering engagent impressions on their lived experience.

Keywords:

responsivity; aesthetics; phenomenology; touch; body; affect

Subject Terms:

Technology and the arts; Human-computer interaction; Existential phenomenology; Senses and sensation; Consciousness; Body human

Dedication

To my treasured Siu Po.

Acknowledgements

Several people have shared their time, support and expertise in the realization of this thesis.

I would first like to thank Susan Kozel, my senior supervisor, for her dedication, guidance and unwavering encouragement in developing the research thesis and project; her knowledge of the many intercalated folds of existential phenomenology and responsivity, as well as her experience with the nuances of research and artistic inquiry, have kept me motivated and on track over several years. Thanks as well to Kenneth Newby for his artistic support and encouragement, as well as his assistance with the computational poetics of *sensate skin's* underlying physical interaction system. His artistry and wizardry helped to breathe life into an otherwise inanimate entity. Thanks as well to Thecla Schiphorst for sharing artifacts of her responsive haptic works and for facilitating access to the i-Lab.

Thanks to Chris Groeneboer for the many animated conversations about a sensate approach to my research through artistic inquiry and lived experience. Thanks to Laura Marks who introduced me to concepts critical to my research project.

Thanks as well to Greg Corness for his assistance in setting up the exhibition space and to the engagers involved in the *sensate skins* study, who gave generously of their time and impressions to further this research; and to Stephanie Chu and other friends and colleagues for their support.

A special thanks to my partner Siu Po who provided encouragement and inspiration for the *sensate skins* project, assisting me as subject in numerous photo shoots, and in setting up the installation, all the while quietly enduring neglect during the many silent hours I spent exploring the multiple folds of responsivity.

Contents

<i>sensate skins</i>	Frontispiece
Approval	ii
Abstract.....	iii
Dedication.....	iv
Acknowledgements	v
Contents.....	vi
Figures	viii
Chapter One: Unfolding skins — introduction	1
Unfolding a responsive aesthetics	1
Metaphor of skins and folds	2
Chapter Two: Research skins — questions and methods.....	6
Research questions and questioning research	6
Lived experience and reflection	7
Methods of inquiry	9
Conceptual inquiry	10
Artistic inquiry.....	10
Phenomenology	12
Chapter Three: Experiential skins — theories of the body and perception.....	17
Physical skins	17
Philosophical skins.....	19
Psychical skins	23
Sensing and perceiving skins.....	27
Primacy of touch.....	28
Visual crossovers.....	30
Sensory interminglings	34
Chapter Four: Responsive skins — theories of interactivity and responsivity	37
Responsive aesthetics	37
Originators	39
Engagents.....	40
The fabric of interface	41
The senses perceiving.....	42
Representation	44
Enveloping folds of immersion	45
Contact and encounter	46
Engagency within the folds.....	49
Unfolding change through felt sensations.....	51
Responsibility.....	52
Unfolding an affective responsive aesthetics	53

Chapter Five: Felt skins — haptic responsive installations.....	56
Touched and felt responsive installations	56
Brazilian neo-concrete art.....	56
Ernesto Neto sculptures.....	57
Thecla Schiphorst installations.....	59
Haptic responsive installation project — <i>sensate skins</i>	61
Prototype installation.....	61
Installation design and construction.....	62
Physical interaction.....	66
Equipment and media.....	66
Chapter Six: Engaging skins — engaging impressions.....	73
Gathering engagent impressions	73
Treatment of engagent impressions	74
Insight from engagent impressions.....	75
Sensory perceptions.....	76
Felt experiences.....	77
Chapter Seven: Folding skins — discussion and future explorations	82
Methodologies.....	82
Installation enhancements.....	82
Future explorations.....	83
Review of research questions	84
Notes	86
Bibliography	88
Appendices	97
Appendix 1: Earlier responsive installation work.....	98
Appendix 2: Engagent impressions.....	102
Appendix 3: Engagent statements clustered thematically	119

Figures

Figure 1.	Conceptual representation of folds.....	2
Figure 2.	Fabric of responsivity.	7
Figure 3.	Fold photographs.	21
Figure 4.	Rendition of Freud’s topographical model of human consciousness.	25
Figure 5.	Enfolded model of responsivity.	54
Figure 6.	Ernesto Neto, <i>Navedenga</i> , 1998.	59
Figure 7.	Thecla Schiphorst, <i>Bodymaps: Artifacts of Touch</i> , 1996.	59
Figure 8.	Thecla Schiphorst, <i>Felt Histories</i> , 1998.	60
Figure 9.	Plan (top view) of <i>sensate skins</i> installation.	63
Figure 10.	<i>sensate skins</i> installation setup.	64
Figure 11.	Representation of the <i>sensate skins</i> prototype installation.	65
Figure 12.	<i>sensate skins</i> physical interaction flowchart.	66
Figure 13.	<i>chrysalis folds</i> main video projection.	67
Figure 14.	Digitally unprocessed photo of an arbutus trunk.	68
Figure 15.	Sequence of stills from one of the nine <i>transform</i> videos.....	69
Figure 16.	Image from the <i>throbbing heart</i> video sequence.....	70
Figure 17.	Sequence of stills from <i>data viz</i> video.	71
Figure 18.	Participant engaging with <i>kine[s]kins</i> personal, wearable skin.....	98
Figure 19.	Participants engaging with <i>kine[s]kins</i> collaborative skin.....	99
Figure 20.	<i>[s]kinaesthesia</i> installation.	100
Figure 21.	<i>second skins</i> installation.	101
Figure 22.	Instructions to engagers.	102
Figure 23.	Engagent sensory perceptions related to <i>touching</i>	120
Figure 24.	Engagent sensory perceptions related to <i>seeing</i>	121
Figure 25.	Engagent sensory perceptions related to <i>hearing</i>	122
Figure 26.	Engagent felt experiences related to <i>space</i>	123
Figure 27.	Engagent felt experiences related to <i>sensuality</i>	124
Figure 28.	Engagent felt experiences related to <i>responsiveness</i>	125
Figure 29.	Engagent felt experiences related to <i>encounters</i>	126
Figure 30.	Engagent felt experiences related to <i>states of being</i>	127

Chapter One: Unfolding skins – introduction

*The Cognitive Questions (asked by most artists of the 20th century,
Platonic or Aristotelian, since 1958):
How can I interpret this world of which I am part? And what am I in it?*

*The Postcognitive Questions (asked by most artists since then):
Which world is this? What is to be done in it? Which of my selves is to do it?¹*

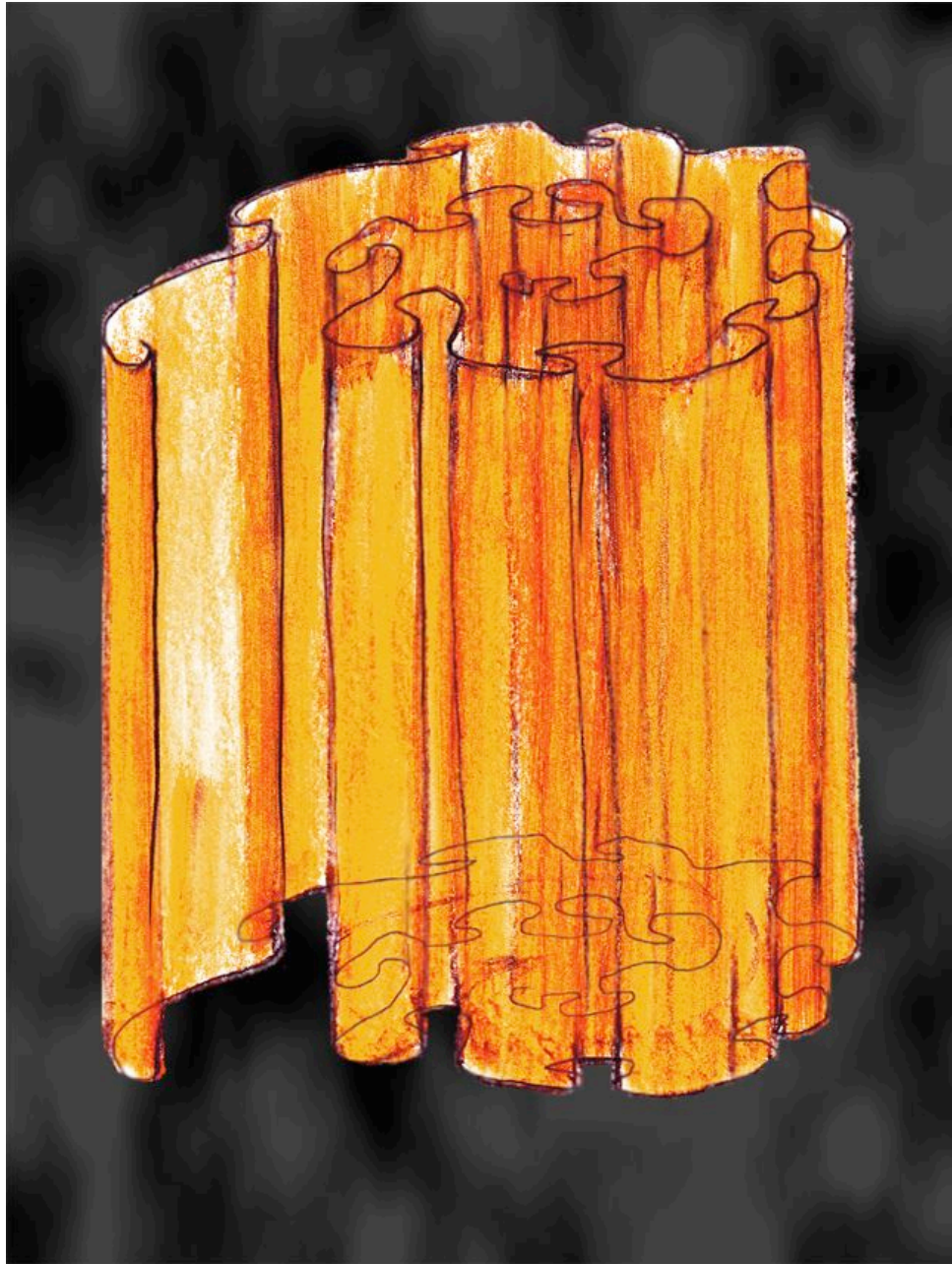
Unfolding a responsive aesthetics

This Master's thesis explores the interrelated folds of touch, body and affect. Critical elements of a responsive aesthetics are fleshed out and explored in *sensate skins*, a prototype haptic responsive installation situated in the physical world. The study of concepts related to aesthetics and art theory, human perception, existential phenomenology, psychoanalytic theory and gender studies help to clarify a responsive aesthetics. The self, the body, the senses, the interface, encounters, intercorporeity, agency and change were explored in a concrete setting to gather engagent² impressions on experiencing a responsive installation.

Participants were invited to experience *sensate skins*, which used touch to trigger sonic and visual events. The installation was a tent-like structure comprised of translucent spandex fabric skins or partitions. When participants touched the surface of the fabric walls, this action activated a cluster of bells connected to the ends of fishing lines. The bell sound detected by a small microphone triggered audio and visual events: images projected onto fabric panels showed animated layered folds and transformations from tree to human; as well, generative poems were recited. After experiencing *sensate skins*, the engagents wrote or drew impressions of their individual experience in a blank booklet, or used a voice recorder. The research project, comprising the responsive installation and the gathering of engagent impressions, fuses these layers or folds, allowing a more informed discourse from a variety of perspectives: the writers and critics from several fields, the engagents and the artist.

Metaphor of skins and folds

Skins and folds serve as a unifying metaphor throughout this thesis, the related installation and the study. It informs their structure, attempting to evoke and tie together knowledge from the corporeal, artistic, psychical and philosophical realms. Skins and folds envelop the thickness of the flesh of this thesis.



© 2007, Dennis Humphrey.

Figure 1. Conceptual representation of folds.

One can perceive folds as veils, layers, strata or skins, with varying degrees of transparency and porosity, linked to each other, superimposed onto or beneath one another. Each fold informs or is informed by others in this continuum; each evokes or invokes others and is associated with other folds that dynamically influence its form, texture and colour. Our own skin is also made up of layers and folds, some less visible. Our body can be seen as possessing an inside and an outside, separated by a layer of skin that mitigates between them. Within and without, it shows a variety of folds and interconnected organs and tissue.

Knowledge can also be perceived as skins and folds where various disciplines have a definite resonance or connectedness with one another and can, when interconnected, better inform our understanding of the world. This view can form the basis of an inclusive, interdisciplinary approach to research. It is my view that no single theory or discipline provides the answers to our existence or experience, and that, in order to better understand a given research area and to achieve greater clarity and relevance, we should envisage all knowledge and theory as porous, organic, dynamic and interconnected folds that cannot be confined to a single discipline. These folds need to be porous and pliable, caressing a multitude of realities and inviting us to consider hidden, less visible areas of knowledge.

What can overcome viewing the world through the “blinkers of binary opposition” is the “baker’s logic”, a mental process similar to folding dough over and over on itself.

In terms of perfecting the baker’s logic we have to knead binary opposition: to make the two terms fold in such [a way] that it is shown that both sides implicate each other and that as such they become, as Derrida would say, ‘both and neither/nor’. Neither positive or negative, neither one thing nor the other. (Yve Lomax, as cited in Doy, 2002, p. 156)

My intent, then, is to explore and bring to the surface some underlying principles of philosophy, psychoanalytic theory, gender studies, sociology and aesthetics, among others, that might assist in demystifying notions of the self, the body, the senses, the interface, encounters, intercorporeity, agency, change and responsivity, with specific relevance to the *sensate skins* responsive installation described later in this thesis. Such a *rapprochement* of interconnected folds embracing and incorporating knowledge created outside a given discipline, can only better inform the constitutive flesh of current responsive works of art.

I wanted to write a thesis in a way that approximated the movement of suspended cloth, its woven fabric and folds, its skin and flesh. I wish the reader to perceive and appreciate the transparencies, porosities, crossovers and interminglings, as they emerge between the layers of theory and practice and, through the touching and parting of the folds, in order to discover the underlying interconnections and derive other meanings. The truths are never fixed.

This thesis is organized, both structurally and conceptually, around the metaphors of skin and fold. It explores the notion of responsivity in art installations and the many skins of responsivity in order to develop a responsive aesthetics. However, beforehand one must search for and reveal more fully the intercalated folds that inform this central concept. How can one understand responsivity without knowledge of the experience of participants engaged in the act of responsivity with an artwork, the way they perceive themselves and the world, or how and why they engage with organic and non-organic entities.

This chapter, *Unfolding skins – introduction*, introduces the metaphor of skins and folds that provides the fabric for this research as well as the essence of a perspective on knowledge making.

The second chapter, *Research skins – questions and methods*, outlines my views on research, the research questions and the methodologies of inquiry that I employed, including conceptual, phenomenological and art inquiry.

In the third chapter, *Experiential skins – theories of the body and perception*, I describe theories of the self, the body and the ways we perceive the world and ourselves through our senses. This chapter introduces concepts that are central to the development of a responsive aesthetics.

The fourth chapter, *Responsive skins – theories of interactivity and responsivity*, describes elements that have served to elaborate various models of interactivity and responsivity related to human and computer interaction, virtual reality and responsive art installations. These are followed by the articulation of a responsive aesthetics related to responsive art installations.

In the fifth chapter, *Responsive skins – felt haptic installations*, I present examples of haptic interactive installations aligned with elements of the responsive aesthetics. As well, I describe my own prototype installation project, *sensate skins*, including its design, production and exhibition. It incorporates elements introduced earlier in this thesis,

related to the self, the body, the senses, the interface, encounters, intercorporeity, agency, change and responsivity.

Chapter six, *Engaging skins – engagent impressions* describes the research study undertaken with a group of engagents who experienced the *sensate skins* installation, including the gathering, treatment and interpretation of their personal impressions related to sensory perceptions and felt experiences.

In the final chapter, *Folding skins – discussion and future explorations*, I discuss and provide concluding remarks on this research and propose opportunities for further exploration.

Appendix 1 contains a summary of my earlier, prototype responsive installation work, completed during my Master's coursework: *kine[s]kins*, *[s]kinaesthesia* and *second skins*. Each of the iterations in the *skins* series was progressively enhanced to incorporate notions of the skin and the fold, to integrate media and technology and to focus on the participant's haptic perceptions and lived experiences.

In *Appendix 2* and *Appendix 3*, one will find transcriptions of engagent impressions, as well as thematic mind maps showing the clustering of their statements based on their sensory perceptions and felt experiences.

Chapter Two: Research skins — questions and methods

Research questions and questioning research

In a dialogue between Meno and Plato, Meno poses paradoxical questions to Plato, questions critical to meaningful research:

But how will you look for something when you don't in the least know what it is? How on earth are you going to set up something you don't know as the object of your search? To put it another way, even if you come right up against it, how will you know that what you found is the thing you didn't know? (Plato in *Meno*, as cited in Robbins, 1999)

Maurice Merleau-Ponty's existential phenomenology reformulates the question as "How does the subject come to know objects?" As a subject that is both subject and object, I do so through the experiences of my lived body that is in the world, through subject-object dialogue, through embodied perceiving. This phenomenal experience of the lived body provides an answer to Meno's paradox:

How do I know if I've found what I'm looking for? I know when I've found what I'm looking for because the world is already pregnant with meaning in relation to my body. Things begin as ambiguous but become more determinate as I become bodily engaged with them. On the other hand, I do not already know what I am looking for, because the world transcends my total grasp. At any given time, the world as it is given includes not only what is revealed to me, but also what is concealed. (Robbins, 1999)

Four central questions have guided my research and practice in the preparation of this thesis, the related responsive installation and study:

- What is responsivity and how can its qualitative elements contribute to the elaboration of an affective responsive aesthetics?
- How do the concepts of self, the body, the interface, encounters, intercorporeity, agency and change inform the dynamics of a responsive experience?
- How can the senses, more specifically touch, facilitate a personal, reciprocal engagement between the engager and the artwork?

- Can a responsive installation evoke in engagents the surfacing of unconscious responses through sensory perception, and invoke a greater conscious awareness of ourselves, others and the world?

Responsivity between human and non-human is the fabric of this research. The warp of this responsive fabric is physical-sensory, the "how"—experienced through the body and the senses (touch, etc.). The weft is conceptual, the "what" that we experience about the concepts of the self, body, senses, interface, encounters, intercorporeity, agency and change. This responsive fabric (warp and weft) is still and lifeless unless visual and sonic media, technology and interactive art animate it both in space and time.

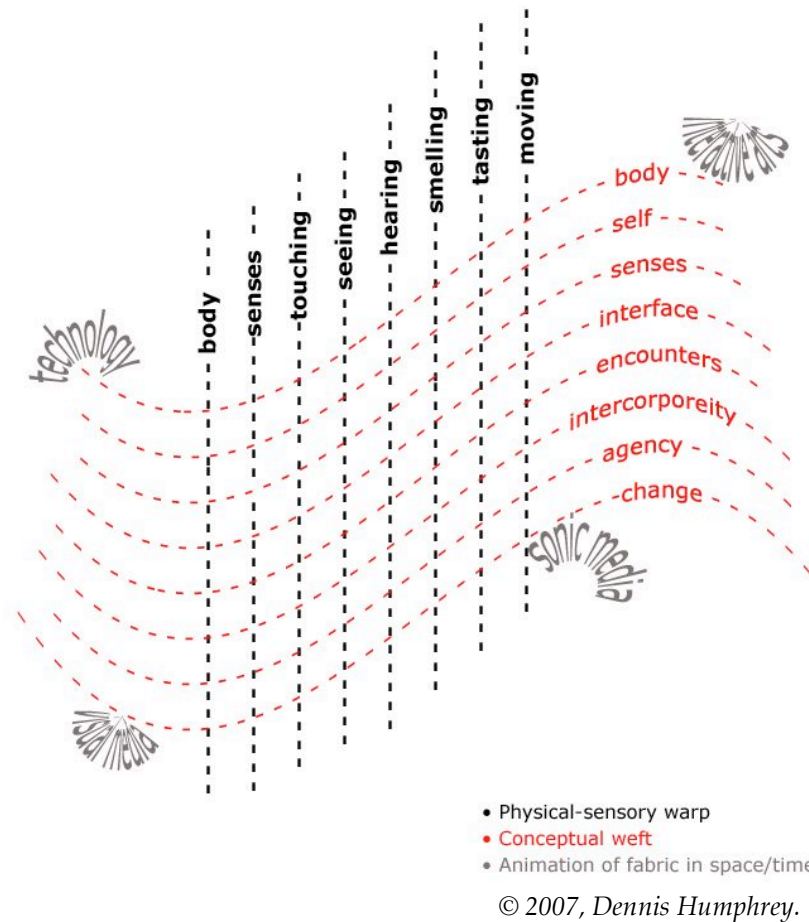


Figure 2. Fabric of responsivity.

Lived experience and reflection

The research thesis and project are intertwined and co-responsive. Both address important concepts drawn from the fields of phenomenology and psychoanalytical

theory with regards to the way we experience and reflect. For Merleau-Ponty, the lived experience occurs prior to abstract reflection; it is pre-thematic. While we are living it, we don't explicitly think about what we are doing. When we are engaged in a task, we do not consciously reflect on it and, in this mode, concrete engagement is the primordial, experiential ground that makes reflection possible.

When we reflect intellectually on our experience, we must play back the lived moments of our experience prior to that reflection, moments of imbibing, sensing and perceiving with our bodies the flesh of the enveloping world. From this perspective, the unconscious can be viewed as the pre-thematic, pre-objective, lived, concrete, latent experience of our engagement with the world, with both animate and inanimate entities, prior to the stage of reflection.

It is what we live out but do not speak or think. When we thematize it, bring it to reflection, we make it thematic or "conscious." From here, we can understand repression as a lived, pre-reflective and motivated refusal to thematize or reflect on that lived experience. (Robbins)

The *sensate skins* research project provided an environment for participant responsiveness through touch, sight and sound, an opportunity to engage with the artwork in a pre-reflective, experiential and unconscious realm. Such a bodily, sensorial engagement proceeds to a reflective stage once the engagers' sensations are allowed to percolate and surface into the conscious realm, when the participants can discover meaning in what they have experienced and can engage in some form of reformulation or reinterpretation of their psyche, if the psychological filters between their unconscious and conscious allow a degree of porosity. Our gender, sexuality, thoughts, desires and *pulsions* are an integral part of ourselves and of our daily, lived experiences.

Conscious and unconscious are not standard terms in phenomenology; some scholars might prefer to maintain a distance between psychoanalytic theory and phenomenology. My intention is to draw together certain concepts from both areas of knowledge in an attempt to reveal the complex folds of our lived human experience. Merleau-Ponty, in his "Preface to Hesnard's *L'Oeuvre de Freud*" (1969), echoes Angelo Hesnard's invitation to a *rapprochement* between phenomenology and psychoanalysis. They "are not parallel; much better, they are both aiming toward the same *latency*" (p. 87). We should

learn to read Freud the way we read a classic, that is, by understanding his words and theoretical concepts, not in their lexical and common meaning, but in the meaning they acquire from within the experience

which they announce and of which we have behind our backs much more than a suspicion. (p. 86)

I perceive the psychologically charged notions of consciousness, gender and sexuality, alluded to in this thesis, through an open phenomenological lens, without resorting to Freudian meta-psychology or seeking meaning through analysis. Through a phenomenological understanding of the unconscious, we can better understand it as a "lateral depth" (Robbins). Using the metaphor of intercalated folds, I view the unconscious as a deep psychic mnemonic fold that can affect, as well as be affected by, our current lived experiences through a process of surfacing.

The *sensate skins* prototype installation that complements this thesis presented tactile, skin-like fabric folds to the participants, folds that can reveal or conceal inner and outer dimensions of ourselves and the world. Engagements were invited to touch the thin fabrics evoking human skin, triggering sensors that activated multisensory events such as animated projected images, spoken words and sounds. This experience provided an opportunity for them to first engage at a pre-reflective experiential stage and later, to reflect on several levels and to record their personal impressions of the experience.

The project, study and thesis provided an opportunity, not only to explore what was revealed through existing knowledge and literature reviews, but also to explore what might be concealed within the folds of the engagements' lived experience through sensory perception, the surfacing of affective inner *pulsions* and sensations, and reflection on our lived, embodied experiences.

Methods of inquiry

The research involved four major interwoven folds of inquiry: exploring current literature for related concepts and theories; designing, constructing and exhibiting a physical prototype responsive installation that evoked the concepts; conducting a study that provided impressions on what engagements experienced when engaged with the artwork. Finally, the writing of this thesis merges these first three component folds.

A folded intercalated approach was also adopted for the methodologies of inquiry. As both the researcher and the artist embodied in all developmental phases of this research, I focused on the most relevant methodologies at specific phases of this research.

Conceptual inquiry

Before writing the thesis, I needed to develop research questions as well as locate, analyze, develop, associate and apply concepts from current scholarly literature in a variety of disciplines. It was important to map out the current knowledge related to my conceptual framework in order to situate and better inform my own research. This required the location, categorization and comparison of relevant concepts, both horizontally and laterally (e.g., tables); cross-referencing to other works in other disciplines (e.g., self, consciousness as viewed by phenomenologists and psychologists). The list of works in the bibliography reflects the multiple paths of the conceptual explorations that informed this work. In order to summarize the concepts, I needed to feel physical, mental and affective resonances between the conceptual and artistic, writing in a way that allowed me to explore the poetic and aesthetic, as well as the philosophical dimensions, all the while maintaining a deep corporeal, sensual and sensorial engagement with the concepts.

Artistic inquiry

The movement of desire and passion, of imagination and reflection, is physical in making, as well as spiritual and intellectual in conception.³

The Research Into Practice Conferences held at the University of Hertfordshire in England between 2000 and 2006 have provided an opportunity for art practitioner-researchers to discuss the foundations of practice-based research and the concept of knowledge in art and design (Biggs, 2000 & 2002), especially at the doctoral level. Anne Douglas, Karen Scopa and Carol Gray (2000) discuss four factors that influence three different interpretations of research in the fine arts. Funding, research context, motives and audience help situate personal research, critical practice and formal research.

What we currently have is a cacophony of different practices all claiming the same (or higher) status as Research, with no means to recognize the relativity of each type of research practice and its particular functionality. What is lacking is a clear method for defining where a particular research project is located and how it should be evaluated.

The aim of the research process “is not to reach consensus on a single ‘correct’ model of research — but to raise informed debates by locating and communicating research activities” (Douglas, Scopa & Gray). Within critical practice and formal research, seminal publications and conferences offer the opportunity for debate.

Douglas et al. define personal research as “a personal, private and often unpublished investigation of the development of a specific piece of work or project undertaken by the individual practitioner.” The research process is shared with other art professionals, and not necessarily within a research community: “practice is the ‘subject’ of discussion and the inquiry.” The research is aimed at the practitioner himself and, if published, at interested peers or members of the audience. In this case, knowledge is “either embodied or discursive / descriptive on the basis of *how it can be done*, rather than *why it should be done that way*.” In the personal research scenario, exhibition openings, journal reviews and interviews provide a venue for debate. For this reason, Douglas et al. mention that it is difficult to trace the impact of personal research on the discipline since there are few processes in place to help us determine this.

Critical practice, the second type of research, involves practitioners exploring new and innovative ways of working, often with others, often involving specific projects with funding assistance. The results of the research are presented through artists’ talks, discussions and publications, but situated within the practice itself. In this case, it is easier to gauge the impact of the research on the discipline itself, since the processes are more visible.

The third method, formal research in the practice of fine art is more geared to the academic community. Unlike the first two methods discussed, “a degree of validation has to be reached for knowledge to be recognised in the academic context, and to be passed on through teaching,” so that a certain level of competency in research methods is required. Practice plays a role in that it is part of the research methodology and the project has a supporting role in the development of the argument. “The proportion and role of artwork in relationship to text is or should be therefore negotiated discreetly and in relation to the research questions.” In summary, the “contribution to knowledge occurs both at the level of *how*, but also at the level of *why*.”

This research into a responsive aesthetics incorporates elements of both the personal and formal research processes described by Douglas et al. On the personal research side, a descriptive, aesthetic, introspective and reflective approach was used through artmaking to conceive and produce the material, visual and aural components of the responsive installation and to design the poetics of the installation’s underlying physical interaction system and the responsive installation itself. This is artistic inquiry informed by artmaking, by a personal phenomenology merging body, senses and psyche, constantly sliding along, through and between folds of intuition and reflection, *Eros* and *Logos*, theory and practice, visibility and invisibility. A more formal approach

to research was adopted through the exploration of concepts, the articulation of research questions, the application of valid research methods, the investigation of engagent impressions (requiring an ethics approval), and the writing of this thesis. The research contexts, motives and audiences for both of these approaches were different and required careful balancing to allow tempered interfoldings.

I believe there is a definite need for the practitioner-researcher communities to further clarify appropriate research methodologies in the art and design domains, “giving sensation and imagination a greater role, permit[ting] practitioners in the arts to generate a definition of knowledge which does not strive for absolute certainty” (Reilly, 2002).

Phenomenology

As discussed earlier, phenomenology focuses on lived experience. In this research, I made use of first- and second-person phenomenological methods outlined by Francisco Varela and Jonathan Shear (1999).

First-person phenomenology

Whatever descriptions we can produce through first-person methods are not pure, solid ‘facts’ but potentially valid intersubjective items of knowledge, quasi-objects of a mental sort. No more, no less.⁴

The first-person methodology involved having engagents experience the *sensate skins* responsive artwork and describe what they perceived through their senses, as well as what they thought and felt. Their accounts, written or spoken in metaphorical personal statements, comprise the results of these first-person phenomenologies. The engagent first-person accounts are found in *Appendix 2*; an explanation of the process followed can be found in *Chapter 6 (Engaging skins – engagent impressions)*. Varela and Shear’s major assumption is that “lived experience is irreducible, that is, that phenomenal data cannot be reduced or derived from the third-person perspective” (p. 4). The concept of irreducibility of experience is important in the case of this research, since my objective was to gather first-person accounts on an experience lived by the engagents and gain insight into how and what they perceived and felt in that experience. Through this research, I attempted neither to analyze nor to attribute universal or empirical truth to the findings. Thomas Nagel’s relational term “what it is like to be” (Nagel, as cited in Varela & Shear) refers to “what something is to something

else" (p. 3) and describes adequately what motivated my adopting a first-person methodology.

Second-person phenomenology

Daniel Dennett (1991) refers to a second-person phenomenology as a "heterophenomenology." According to Varela & Shear, this second person is "present as a situated individual, who has to generate intentional interpretations of the data ... an empathic resonator with experiences that are familiar to him and which find in himself a resonant chord" (p. 10).

As a purveyor of lived experience with the potential for new knowledge contained within it, one person's phenomenological account can be received by others within circles of shared truth. Truth according to this model may be objective and verifiable through repeated experiments, but it also may be entirely unrepeatable and subjective. The truth offered through phenomenology is better expressed as relevance. (Kozel, 2007, p. 34)⁵

Relevance can be defined as "reverberation, resonance, and repercussion" (Bachelard, as cited in Kozel, 2007, p. 34), where, according to Susan Kozel's interpretation of Bachelard, "first there is a reverberation, followed by the experience in oneself of resonances, and then there are repercussions in the way we see or feel the world" p. 34). Such a dynamic resonance can occur on several levels: cognitive, emotional and physical. This view sets the stage for a discussion of a second-person phenomenology, a revelatory layer between first- and third-person methodologies.

A second-person method can be perceived as layered and folded. It involves someone with first-hand knowledge of a phenomenon examining first-person accounts of that same phenomenon, viewing them through the interconnected porous folds of both his and the engagers' embodied experiences. In the case of this research, this mediative role is played by the empathic artist-researcher who is familiar with both the artwork and the experience.

The phenomenological experience of another person unfolds across physical description with latent conceptual elements extrapolated and can be relevant to me based on my having experienced the same thing, or simply because I have the ability to construct meaning empathically, perhaps through imagination or previous experience. Quite simply, I can resonate with another's experience. (Kozel, 2007, p. 35)

Kozel states that a second-person phenomenology, or a phenomenology of someone else's experience, can be disturbing, since "we expect to hear the physical

experiences of the one who speaks or writes but instead we hear of others' experiences" (p. 83). As well, "we wonder of the agency or the voice of others" and whether these are "silenced" or "well represented", since the phenomenological experience is "filtered between two bodies".

I made use of a second-person phenomenology in *Chapter 6 (Engaging skins – engagent impressions)* after examining, treating and interpreting the engagent impressions after they experienced the *sensate skins* installation. I consciously attempted not to silence the engagents' voices or points of presence.

Folded first/second-person phenomenology

If a first-person methodology involves describing a lived experience, then it may follow that an artist's accounts of what he perceived and felt when he imagined, created and exhibited an artwork can also lie within the folds of a first-person phenomenology. Likewise, accounts of what he perceived and felt while reading the engagents' individual first-person accounts could also be viewed as a first-person phenomenology, since the artist, having infused the artwork subjectively with his own being, is able to resonate with, or respond to, the engagents' impressions that described how they experienced the artwork.

Research into appropriate and relevant methodologies for this research have prompted much self-reflection and discussion. I have come to the realization that phenomenological methods best embody the qualitative, affective intent of my research—no more, no less. For this reason, I concur with Kozel when she states:

It is too easy to fall into a defensive mode regarding first person methodologies, assuming that their counterpart, the methods of scientific discourse which try as much as possible to efface the internality of the researcher in the interests of the objectively external, exist within an community of ease and accepted truth. This is obviously not the case. All knowledge is hotly disputed, or is a site of conflictual negotiation. (Kozel, 2007, p. 85)

Procedural considerations

Preparation of the more specific procedures related to the gathering, treatment and analysis of engagent impressions was inspired by the phenomenological study model discussed by John Creswell (1998). Creswell compares five traditions of qualitative inquiry in his work: biography, phenomenology, grounded theory, ethnography and case study. The phenomenological approach espoused by Creswell

focuses on lived individual human experiences (as opposed to group experiences) around a concept or phenomenon. The procedural considerations that follow assisted in implementing Varela & Shear's first-person method. Questions were developed that "explore the meaning of that experience for individuals and ask individuals to describe their everyday lived experiences" (p. 54). These questions, or starting points, found in *Appendix 2*, were written in a poetic and metaphorical style, inviting the engagents to describe what they perceived, felt and thought after experiencing the *sensate skins* installation. Subjective impressions were collected from fifteen engagents who "experienced the phenomenon under investigation". Creswell mentions that, according to this methodology, the information is sometimes "augmented with researcher self-reflection and previously developed descriptions from artistic works." This statement seems to support Varela & Shear's definition of a second-person methodology.

Analysis steps outlined by Creswell were followed in this study. Through a process of "horizontalization," the impressions were "divided into statements" (p. 55). In other words, statements that appeared similar across the group of engagents were listed as one unit since the purpose was not to quantify their occurrences. Then, the units were grouped into themes, or "clusters of meaning expressed in psychological and phenomenological concepts." The chosen themes were informed innately by the engagent data and included concepts related to sensory perception (touching, seeing, hearing) and felt sensations and thoughts resulting from these perceptions (space, responsiveness, sensuality, encounters and states of being). For the *sensate skins* engagent impressions, the thematic clusters were organized visually using mind maps; these are found in *Appendix 3*. Finally, these themes were "tied together to make a general description of the experience, the textural description of what was experienced and the structural description of how it was experienced." In *Chapter 6*, I discuss the colour and texture of the engagent impressions, cross-referencing them to elements of a responsive aesthetics that were developed in *Chapter 4*.

With regards to the development of a general description (textural and structural) of the experience in the last step of analysis, again seemingly in support of Varela and Shear's second-person methodology, Creswell states, "Some phenomenologists vary this approach by incorporating personal meanings of the experience, by using single-subject analysis before intersubject analysis, and by analyzing the role of the context in the process." More specific details regarding the gathering, treatment and interpretation of the engagent impressions are found in *Chapter 6*.

In conclusion, I perceive the folds of existing knowledge, and the new knowledge arising through the application of relevant methods of inquiry, to be interconnected both laterally and horizontally. For example, phenomenology, psychology and human perception are interconnected; artistic and phenomenological inquiry are interconnected; so are existing knowledge and new knowledge, reflected through engagent impressions of their lived, embodied experiences. All of these folds, when imbued with a certain degree of porosity, can express resonances, traversing liminal spaces, but only if these latent reverberations are encouraged to surface and inform our understanding of the world.

In the following chapter, I begin to weave that experiential fabric comprised of many folds. I explore notions and approaches to the body and the psyche, as well as ways in which we perceive and experience ourselves and the world. It is important to better understand these concepts before exploring the folds of responsibility.

Chapter Three: Experiential skins – theories of the body and perception

The type of responsivity I am exploring involves engagents interacting with an artwork, an actual responsive installation, through touch, vision and audition: it involves experiencing the world with one's body and mind. This chapter offers glimpses into what we are and how we perceive and experience our worlds.

Physical skins

Skin is both dividing and divided, at one and the same time inside, outside, and between.⁶

Every object has a skin. Thick or thin, smooth or rough, porous or impermeable, the skin is the line between a hidden interior and an exterior we experience.⁷

Our skin is a thin membrane that divides inside from outside as well as inside from inside (Elkins, 1999, p. 36). Our body is “enfolding” by this membrane, but it can also “infolly” or “involve”, turning inward and forming skin upon skin. “Involvement means ‘in-turning’, and invagination, the standard medical term for any infolding, is a common occurrence in membranes” (p. 39).

The body has orifices, some of which are closed (such as the ear) or permanently open (such as the nose, the esophagus and the intestines). These numerous infoldings and outfoldings of our body's membranes do not corroborate the bipolar view that our skin simply separates our living inside from the non-living outside. “Skin is not merely a boundary between what we are and what we are not, but it is the body, and we ourselves are skin: we are interface, coating and membrane” (pp. 43-44). Our body is a collection of membranes that enclose pockets (heart, chest, parts of the brain, joints), sacks, tubes (oesophagus and anus) and doughnuts that provide direct and indirect contact between the inside and the outside of our bodies. “If one turns a sock inside out, the area that once enclosed the foot now encloses the world and I have trapped the outside in the inside” (p. 44). The world on the other side is now an inverted pocket. The

world, then, is a series of invaginations and pockets; no way to tell what is inside and outside. "We become the folds themselves and their contents become the world" (p. 44).

The clothes we wear on our bodies are also skins that we don and shed: they are an outward expression of our inner selves. The use by fashion designers of folded, pleated, plissé, crimped, rimped, wrinkled and rumpled fabrics indicates an interest in surface dimensionality to establish an interspace between the body and the outer shell of the clothing, between the inside and the outside. In the world of high fashion, one notices how textile and clothing designers have evolved the idea that clothing embodies the wearer. In some cases, this concept has evolved into clothing designs that are the shell or habitat of the wearer, the "rooms for the body" (Blaser, 2001, p. 68). Such fabric carapaces, often reminiscent of exoskeletons, are evident in the structured garments of Christa de Carouge, a French-Swiss *couturière*, as well as in the creations of the Japanese designers Issey Miyake and Eiko Ishioka. De Carouge's fundamental credo is that there is a "close existential relationship between clothes and buildings" (Blaser, p. 8). We rely on a covering that delimits the inside and the outside, protecting us against cold and heat. Japanese designers made clothes and body mutually independent and their "intentionally unfinished shells created a new space between skin and fabric" (Blaser, p. 13). For several decades, Issey Miyake has been in the forefront of Japanese fashion design, always exploring and innovating in his use of fabrics and garment construction techniques that incorporate folds and pleats. Miyake considers that the "outside of clothing should be perceived visually and the inside sensually" (Blaser, p. 13). This is consistent with the design of the Japanese kimono that Miyake considers to be the most ingenious garment, since its design incorporates a standardized shell that facilitates its construction and storage through folding. Eiko Ishioka constructs her clothing with pleated, folded and textured fabrics and materials, often inspired by insect carapaces and deformed human bodies. The garment then, though a lifeless structure, acquires shape through the human form and life through the wearer. Fabric folds and pleats incorporated into its design and construction play an important role in mediating between the body inside and the world outside.

A similar relationship is present in the construction of architectural spaces. In the *sensate skins* prototype installation, discussed in *Chapter 5*, my intention was to create draped, folded fabric skins that delimited the inside and outside of the piece's 'body', in a sense protecting both itself and the engagents within from the sensory world outside. A comforting insular fabric shell was created inside which the participants could experience the entity's and their inside worlds, both physically and psychically, by

engaging with their senses in a non-threatening way. This notion of a physically enclosed private space or inner sensorium, created from fabric, light, shadows and sound, was crucial to the design and experiencing of the piece. Though my intent was to create a closed inner world of touch, sight and sound, elements of porosity, transparency and permeability were integrated into the structure and the experience. The fabric was semi-transparent, light penetrated the various layers, and sound permeated the space; these elements were meant to elicit sensory interspaces, layering and mingling the depths of perception and experience.

Visibility, invisibility and states and spaces in between, are explored in the next sections, through phenomenological and psychical folds.

Philosophical skins

My body remembers who I am and where I am located in the world. My body is truly the navel of my world, not in the sense of the viewing point of the central perspective, but as the very locus of reference, memory, imagination and integration.⁸

Experiential phenomenology studies our body and how it interacts with the rest of the world through lived experience. There is therefore a close association with the inside and outside layers or folds of the body and the way in which we experience the world through our senses.

For Maurice Merleau-Ponty, the body is a “thing among things” (1968, p. 137); we perceive and are perceived by living and non-living things, visible and invisible, through our senses. The touchers are touched, the seers are seen, and the perceivers are perceived, both by themselves and by others. “This can happen only if my hand, while it is felt from within, is also accessible from without, itself tangible, for my other hand, for example, if it takes its place among the things it touches, is in a sense one of them, opens finally upon a tangible being of which it is also a part” (p. 133).

My body is sensate, sentient and sensed; things are both visible and invisible, inside and outside. But these are not separate: through a reversible and intercorporeal relationship, they interact with each other and intertwine, creating infinite folds that reverberate through the matter in such a way that all are affected (p. 141). The interspace between the visible and the invisible is a “thin pellicle of the *quale*, the surface of the visible ... doubled up over its whole extension with an invisible reserve” (p. 152).

Another way of defining a “quale” (plural “qualia”) is as a subjective “what it is like” (Nagel, 1974) description of a mental state from the point of view of the engagent.

In his interpretation of Gottfried Wilhelm Leibniz, Gilles Deleuze examines and discusses this philosopher's notion of the self and the world through the endless folds of the Baroque.

The Baroque refers not to an essence but rather to an operative function, to a trait. It endlessly twists and turns its folds, pushing them to infinity, fold over fold, one upon the other. The Baroque fold unfurls all the way to infinity. (Deleuze, 1993, p. 3)

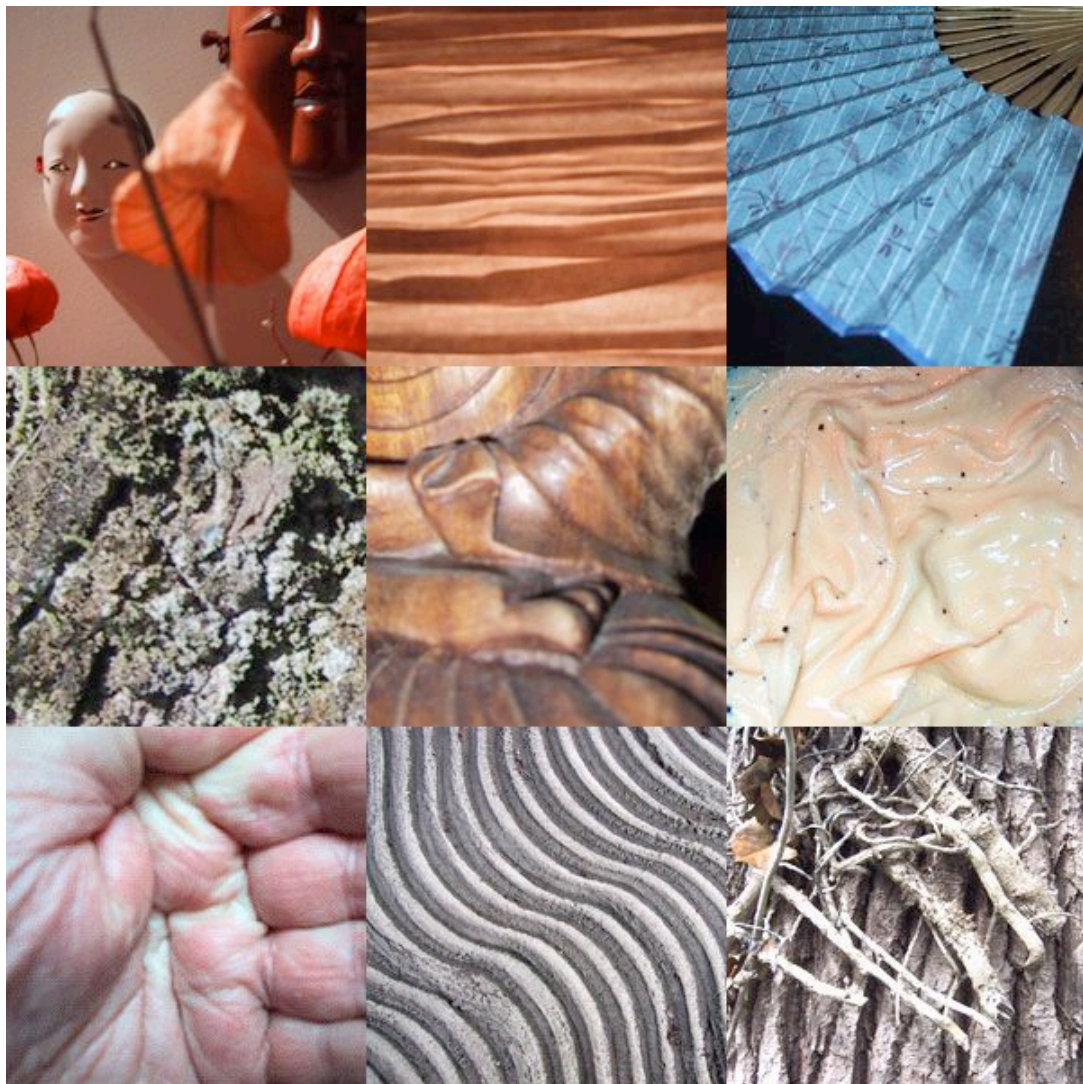
According to Leibniz, there are two ways to differentiate the folds of the Baroque as they move along two infinities organized allegorically in two connected stages or floors of a house. Below are the pleats of matter which surround animal, sensitive souls inhabiting “common rooms, with ‘several small openings’: the five senses”. Above are the folds of the soul where “reasonable” (or rational) souls exist in a closed, private room” (p. 5). “It is a dark room or chamber decorated only with a stretched canvas ‘diversified by folds’, as if it were a living dermis Placed on the opaque canvas, these folds, cords or springs represent an innate form of knowledge, but when solicited by matter, they move into action” (p. 4). They “trigger[s] ‘vibrations or oscillations’ at the lower extremity of the cords, through the intermediary of ‘some little openings’ that exist on the lower level” (p. 4). When this occurs, the upper floor begins to resonate “as if it were a musical salon translating the visible movements below into sounds up above.”

Deleuze states that the matter has “infinitely porous, spongy, or cavernous texture without emptiness, caverns endlessly contained in other caverns” (p. 4). In explaining what Leibniz' interpretation of the body, Deleuze summarizes by stating that “a flexible or an elastic body still has cohering parts that form a fold, such as they are not separated into parts of parts but are rather divided to infinity in smaller and smaller folds that always retain a certain cohesion” (p. 6). He likens this inflective folding of matter to a sheet of paper, origami, a tunic in folds, a cavern in a cavern, a labyrinth and even meiosis or cell division. This infinite infolding is a baroque trait where there is “an exterior always on the outside, an interior always on the inside. An infinite ‘receptivity’, and infinite ‘spontaneity’” (p. 35).

If one further expands on the idea of matter folding infinitely upon itself in an elastic way, one can perhaps better understand the relationship between the subject, matter and the world as well as Leibniz's notion of the monad. A monad (from the Latin

'monas' or unit, and the Greek 'monos' or single) is a unit of substance that is indivisible and impenetrable—a microcosmic representation of the world. Like the Baroque house, it has no windows and does not allow anything to come in or go out.

We come across countless representations of organic and non-organic folds and pleats in nature: in trees, lettuce leaves, cabbage, fiddleheads, sand dunes, waves, rocks, trees, wind or the many folds of a fried egg; in the folds, pleats and wrinkles of our own skin and body parts; as well, they are present in materials and objects fabricated or transformed by humans, such as our everyday clothing and art objects. Folding and pleating seem as well to embody memory, in many cases showing evidence of the physical process of change or transformation of a material over time.



© 2007, Dennis Humphrey.

Figure 3. Fold photographs.

Deleuze's take on Leibniz exemplifies "the convergence of the neo-baroque and the postmodern ... We are discovering new ways of folding, akin to new developments, but we all remain Leibnizian because what always matters is folding, unfolding, refolding" (Deleuze, p. 137).

Leibniz was interested in "the exploration of sensory perception based on what emerged from indistinct and minor perceptual experiences occurring at the margins of responsiveness" (Munster, 2006, p. 42). Referring to digital aesthetic experience, Anna Munster describes it as a "reverberation that enfolds and is enfolded by baroque inflections of the relations between bodies and technics" (p. 7). She states that the "'synapses' between the folds or reverberations demand conceptual and sensory crossings," and that "the fold simultaneously describes the experience of living the discontinuities and connections of digital sensory experience" (p. 8). Munster extends our perspective on the baroque fold when she says that, "rather than a continuing series of folds, differentials and modulations comprising the world as a folding, the baroque is actualized as a smoothing out of creases through accord, harmonization and the reintegration of fragments" (p. 46). By smoothing out the folds and creases, we are in fact increasing the porosity and transparency of the intercalated fold fabric, attaining a greater degree of visibility between the adjoining folds. This allows new accords, interminglings and crossovers to develop between otherwise disparate entities. The conceptual model of the fold introduced in *Chapter 1* (see *Figure 1*), as well as the *sensate skins* installation and the affective responsive aesthetics that will be introduced in later chapters, can be perceived as embodying certain characteristics of baroque sensibility.

Gen Doy (2002) adopts a more sensual approach to the notion of the fold. She states that our use of drapery in contemporary art reveals an overt concern with eroticism and the body, whether the body is actually included in the image or not. The drapery itself becomes a focus for sensual explorations, taking the place of the absent body and often functioning as "a 'surface' for the play of modes of representation and illusion" (p. 211). Like a veil, it alludes to "partly concealed truth," and, once lifted, it "open[s] up the possibility of understanding" (p. 130). In this sense, like the fold of drapery, the veil reveals and conceals at the same time, similar to the dual role of the mask. A metaphorical relationship between folds and eroticism is also alluded to in the Greek word *ptychoseis* that refers to both free-falling folds and drapes, or to organized pleats. The folds occur on particular surfaces, especially on textiles, on the ground (valleys, gorges or narrow valleys), on the skin and on other parts of the human body, or

on animal parts and on metal surfaces. When used metaphorically, the *ptychoses* are “hidden, secret parts” (Vassilis Zidianakis, personal e-mail exchange, May 24, 2005)⁹

The foldedness of our embodied sense of being and experience in this world and the existence of partly concealed interspaces are also alluded to in a psychoanalytical view of consciousness.

Psychical skins

Freudian psychoanalytic theory proposes that the *id*, *ego* and *superego*, the three realms, or folds, of identity within the unconscious, interact with one another, each associated with the others in varying degrees of transparency. This theory has as its premise that human consciousness, knowledge about ourselves and the rest of the world, is always threatened by the unfolding or surfacing of our unconscious self in which reside our basic instinctual and corporeal strivings, *pulsions*, drives, forces or desires related to hunger, keeping warm, defecation and sex.

The conscious and the unconscious are two separate dimensions or layers of our identity, the latter well hidden from the conscious, yet acting upon and subverting our behaviour. Sigmund Freud believed that the conscious allows us to perceive the external world, whereas our inner unconscious view is completely blocked from our conscious view through our defences, the most important of which is repression. This defence mechanism is “always intent on papering over the cracks and maintaining its own version of events at all costs” (Minsky, p. 28). It is required for us to be able to conform to the reality of the external world. However, the pain, desires and conflicts that reside in our unconscious can occasionally leak out and unfold through dreams or slips of the tongue or pen.

Freud elaborated a dynamic structural model of the unconscious comprising three main regions or strata of identity. The *id* is the place inhabited by our primal, inhibited drives and desires, well-hidden from the conscious. Freud described it as “a chaos, a cauldron full of seething excitations” (1933, p. 91). It does not care about reality or others; it simply wants to satisfy its basic needs and pleasures. The very fact that we have bodies and basic urges implies that we are among many other living and non-living entities, that there is a close link between our body and *id* and those of others, and that our bodies and basic drives must be directly influenced by socio-cultural processes and pressures such as socialization. If the notion that we have a social body is correct, it would follow that ongoing mediation and struggle must exist between the forces of the

inside and those of the outside through the *ego*, and that repression, or veiling, of our basic drives should ensue.

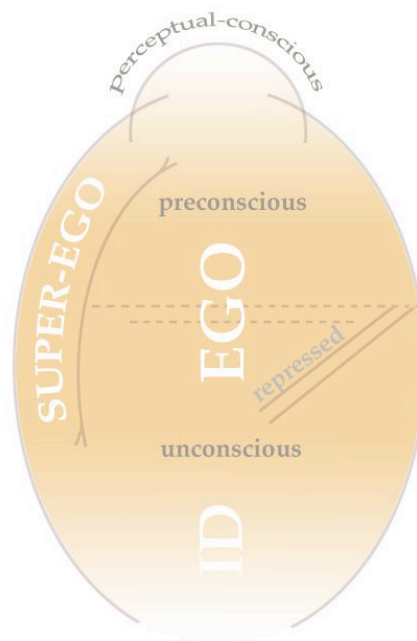
Our sense of identity or self is located in the realm of the *ego*. This is where our awareness of reality develops. The *id* is aware that others have needs and desires, but the *ego* must satisfy the needs of the *id*, while considering the reality of the situation. The *ego* is there to help mediate the basic drives of the *id* and our perceptions in the real world. The *ego* is primarily a bodily *ego*, an intermediary between the inside and outside, gathering impressions or sensations from the inside. At the same time, it inscribes these impressions onto the surface of our bodies (*skin ego*), reflecting societal and bodily expressions from the outside. The *ego* is like “an internal screen onto which the illuminated and projected image of the body's outer surface are directed” (Grosz, p. 37). “It is the site for the gathering together and unification of otherwise disparate and scattered sensations provided by the various sense organs, in all their spaces and registers. It is also a mapping of the body's inner surface, the surface of sensations, intensities, and affects, the ‘subjective experience’ of bodily excitations and sensations” (p. 37).

Guy Hocquenghem views this site of desire as a “universally distributed set of diverse and non-exclusive drives, of eroticism based on the plugging in of organs according to the ‘and-and’ rather than the ‘either-or’ mode” (1993, p. 117). His premise universalizes object-choice and the subject’s sexual nature and questions a basic tenet of Freudian psychoanalytic theory where homosexuality is relegated to the unnatural as it confronts the Oedipal conflict. Hocquenghem promotes the expression, as opposed to the repression, of various sexualities and a “polymorphism of desire” (p. 117).

The *superego* is the *ego*'s conscience, moulded from our childhood guilt and fears and protecting it so that it conforms to external cultural, ethical and moral obligations, to what is right and wrong.

In Freud's topographical model of human consciousness (see *Figure 4*), there is a link to the conscious world. This is the perceptual-conscious system, the portion of our mental apparatus closest to the external world and mediating our perception of it. It is a sense organ that receives sensations from the outside world as well as the mind, like a sensitive enfolding skin. In this model, the *ego* spans the conscious, pre-conscious and portions of the unconscious level, whereas the *id* is fully submerged below the level of awareness. The *superego*, locus of social and moral imperatives, spans both conscious and unconscious realms. Different levels of interaction and separation seem present in

the three realms of the psyche, evoking a structure based on interconnected folds. The conscious (connected to, and interacting with, the outside or external world) and the unconscious (connected to the internal or inside) are not directly related to one another: they do not necessarily communicate with one another, yet the inside informs the outside. The preconscious fold lies between the conscious and the unconscious, acting as the locus of exchange. The three domains of identity display another symbiosis. The *id*, the *ego* and the *superego* are separate, yet interconnected, entities that constantly influence one another.



© 2007, Dennis Humphrey.

Figure 4. Rendition of Freud's topographical model of human consciousness.¹⁰

Likewise, the structure of our body and our skin, the aesthetics of responsivity and experiential phenomenology display interrelated, yet distinct, folds that are often separated by a skin or membrane, an inter-space, exhibiting various qualities of transparency and porosity. These liminal spaces allow interaction and exchange with the other folds, inevitably affecting the status and composition of the others.

Our feeling of self, including our sexuality, depends on early childhood experiences and how successfully we manage to repress our desires and conform to behaviours condoned by society. Rosalind Minsky (1996) asserts that

Freud's theory makes possible a view of men and women which corresponds to the reality of the variety of identities we observe around us and the desires, conflicts and contradictions many people feel within themselves However, our variegated gender identities are frequently but not always veiled by our conformity with culturally condoned behaviour ... in gay and lesbian relationships, culturally forbidden desires are conscious rather than unconscious and the law of the father, that is culture, is rejected; bodies which are the same are desired rather than bodies which are different. (p. 65)

In a heteronormative culture, the acceptable model of sexual identity and sexuality revolves around the fact that a male may have a sexual relationship with a female. Deviations from the norm are not well tolerated.

Freud's theory makes it possible for us to view homophobia, ethnocentricity and racism, as well as sexism, as the unconscious expressions of those within patriarchal culture who are unable to cope with the meaning of difference except in terms of "inferiority," and "superiority," subjects and objects Within patriarchal cultures, the bearers of different forms of culturally perceived difference are designated inferior, even incompletely human, because they have, in effect, been "feminized" or manipulated into the other. (p. 71)

Gender roles, sexuality and sexual orientation, identity and eroticism, as well as Freud's concept of the primal drives, *pulsions*, desires and fears, and the defence mechanisms we adopt to cope with them, such as repression, projection, sublimation and suppression, are important underlying components of this research. Though one of the main research questions revolves around a responsive aesthetics through sensory perception, experiencing the skin-like responsive installation involves the body and the psyche, both of which help define our gender and sexuality. Consideration of some basic psychoanalytical notions are important for us to better understand the role they play in the conception of the responsive installation by the artist and in our understanding of responsivity itself, especially with regards to their resonance with engagent sensations as they experience an artwork.

The folds of the unconscious are interconnected; yet they vary in the degree of their porosity and connectedness with the visible and invisible worlds. Deep within these folds can be found liminal spaces that have a definite impact on our lived, embodied experiences, including the degree to which we can respond to artworks. I wove into the *sensate skins* responsive installation what I will call 'affective triggers': visual, sound and tactile elements that might serve to link with the engagents' inner *pulsions* and invite those to surface into the realm of self-awareness. The results of this

process of invoking and evoking are evident in the engagers' accounts of their felt experiences (see *Appendix 2*).

Sensing and perceiving skins

*Perception is in the flesh's reversibility, the flesh touching, seeing, perceiving itself, one fold ... catching the other in its own self-embrace.*¹¹

How do we physically perceive the world in and around us? What might occur physically and psychically when we experience it? The answers to these questions will help inform an understanding of responsivity and a responsive aesthetics.

The words we use to describe the way we engage with the inside and outside worlds have different meanings. For instance, "there are two different meanings of the verb *to sense*, first, *to detect something*, and second, *to have a sensation*. When the senses are considered as perceptual systems the first meaning of the term is used. In the second meaning of the term there is a vast difference between sensations and perceptions" (Gibson, 1966, p. 1).

Our senses make us feel and perceive. Perception is physically detecting something or feeling the world through our senses, whereas sensation refers to the feeling that goes along with a perception. Both occur together and at the same time. (Thomas Reid, 1785, as cited in Gibson, 1966, p. 1)

With sensation, we enter the realm of affect, "the conscious subjective aspect of feeling or emotion" (Merriam-Webster, 1989). According to Juhani Pallasmaa (2005),

all the senses, including vision, are extensions of the tactile sense; the senses are specialisations of skin tissue, and all sensory experiences are modes of touching and thus related to tactility. Our contact with the world takes place at the boundary line of the self through specialised parts of our enveloping membrane. (p. 11)

Touch is the first of our senses to develop. "The skin is the oldest and most sensitive of our organs, our first medium of communication, and our most efficient protector" (Montagu, 1971, p. 3). Touch, "the sensory mode that integrates our experience of the world with that of ourselves" (Pallasmaa, p. 11), is "the parent of our eyes, ears, nose, and mouth", the sense that "became differentiated into the others" (Montagu, p. 3). If the area of each body part were proportionate to its sensitivity, people would look very different. The hand, the foot, the lips and the genitals would be much

larger than many of the other body parts because of their respective sensitivity. The visible body parts sensitive to touch would appear more atrophied in relation to those tied to sight and hearing.

Primacy of touch

The haptic sense comprises the tactile, kinaesthetic and proprioceptive senses (Fisher, 1997, p. 2), offering possibilities for engagement that are qualitatively different from the capabilities of the visual sense. Whereas the visual sense permits a somewhat distant, disconnected viewpoint, the haptic sense operates by “contiguity, contact and resonance” (p. 2). The haptic sense “renders the surfaces of the body porous, being perceived at once inside, on the skin’s surface, and in external space [and] enables the perception of weight, pressure, balance, temperature, vibration and presence” (p. 2). Previously, the sense of touch was considered a “proximal” sense, capable of sensing objects that were in contact with the body, as opposed to vision and hearing, which were considered “distal” senses, capable of perceiving objects that were more distant from the surface of the skin (p. 2). Fisher finds it compelling that, “despite its categorization as a proximal sense [touch] is implicated in distal perception as well” (p. 2). It can sense temperature, presences, pressures and resonances. It is therefore a more qualitative and “affective touch”, different from physical contact. Interoception, an aspect of the haptic sense, perceives the “visceral workings and felt intensities” of our body’s interior. Fisher is interested in “clarifying how the haptic sense works with the visual sense in aesthetic experience, as well as understanding how both are implicated in each other”. “While the visual gives trajectories—sightlines—between the viewer and the surfaces of art, the haptic defines the affective charge—the felt dimensionality—of a spatial context”. Haptic visuality and synesthesia, discussed later in this chapter, provide possibilities for the intermingling of the touch and vision modalities.

In its most basic form, touch involves the contact of a sense organ with a touch object. The English language has several words that describe various types of touching. One can brush, caress, clench, clutch, explore, feel, flutter, fondle, glide or grasp; alternatively, one can grope, knead, massage, pat, pinch, prod, pull or puncture; as well, it is possible to roll, rub, scrape, scratch, smooth, spread, slide, stroke, tickle and twist. These verbs describe some of the touch actions performed by the fingers, the hands or other exposed skin surfaces of the body, such as the arms, feet, legs and lips.

Time, space, weight and flow are attributes that form the basis of the Laban effort-shape movement analysis (Laban & Lawrence, 1973) used to represent specific movements digitally in the Labanotation software. This system of representation was expanded by Thecla Schiphorst et al. (2002) to describe “the qualitative aspects of caress as a function of tactility” (2004) for the purpose of recognizing hand gestures on the surface of a tactile device. Various types of touches were identified and described: tap, pat, hold, touch, stroke, glide, jab, knock, slap, press, rub and knead, punch and flick. Parameters of these touches were described qualitatively, rather than quantitatively, as polarities on a continuum: pressure, size, speed, time, number, direction, as well as space, path, disposition of pressure and pattern. Using a fuzzy descriptive system of this kind, a “press” might be described as “strong, direct, sustained”, whereas a “flick” might be described as “light, indirect, sudden”.¹²

Based on a number of experiments and quantitative studies he conducted and documented, David Katz describes the qualities and identifying characteristics of touch, such as surface touch, immersed or space-filling touch, volume touch and touch-transparent film.

This research focuses on surface and volume touch since these are the types the participants in the *sensate skins* installation experienced. We experience surface touch when we feel and manipulate an object, touching a continuous area located at the surface of an object. The distance from the perceiver and orientation of this type of touch is located within the limits set by our physical body. Movement of the touch organ in relation to the object being touched is crucial (Katz, 1989, p. 79). By moving the hand or arm over the touched surface, one is able to discern qualities such as smoothness or roughness, which cannot be perceived when the touch organ is at rest. The qualities of surface touch describe the surface being touched in a range between hard-soft to rough-smooth (p. 55). Surface touch is one type of touch that engagers in the *sensate skins* installation experienced when their hands moved over and onto the surface of the fabric membranes in order to further engage with the piece.

In order to experience volume touch with a touched object, one is less aware of the surface of the filling material; it is almost as though it was not there (p. 52). Volume touch plays an important role in medical practice: when examining their patients, doctors routinely touch the internal organs by palpating through layers of skin and fat. Through practice, the fingers can accurately scan the position and shape of the organs as though there were no layers in between. When they palpated the shapes, contours and orifices of dimensional glandular fabric pods that dangled loosely in the installation

space, the engagents experienced volume touch, exploring the thickness, smoothness and malleability of the entity's flesh and organs.

Katz also introduces the notion of a tactual after-image (p. 62). The *sensate skins* engagents would have experienced this when they moved their hands over the skin fabric and suddenly stopped. The impression of the fabric would have persisted, though the hand was no longer moving. One would not be able to produce an after-image of this kind if the hand touching the material had remained stationary. Engagents in a haptic installation may experience a tactual after-image (or 'tactual after-feel', as it could be called), if their touching involved movement of the hand.

Visual crossovers

In contrast to optical visuality (a seeing which masters and represents), haptic visuality is tactile, kinaesthetic and functions like organs of touch.¹³

The hands want to see, the eyes want to caress.¹⁴

In our modern culture, the eye has become the dominant sense organ, followed closely by the ear (Pallasmaa, 2005, p. 18). There is an imbalance in our sensory system due to the dominance of the eye and the resulting suppression of our other senses. The eye is a distal sense, one of distance and exteriority; on the other hand, touch creates a sense of interiority, proximity and nearness (p. 33).

Juhani Pallasmaa states that a "remarkable factor in the experience of enveloping spatiality, interiority and hapticity is the deliberate suppression of sharp, focused vision" which enfolds the subject in space (2005, p. 13). Experiences outside the sphere of focused vision, occurring in the preconscious, perceptual realm, are just as important existentially as the focused image. "The very essence of the lived experience is moulded by hapticity and peripheral unfocused vision. Focused vision confronts us with the world whereas peripheral vision envelops us in the flesh of the world" (p. 10). Haptic visuality is present when an image has texture and is slightly out of focus, inviting us to touch with our eyes, to visually caress the image space, its lines and textures. It is not unlike the act of seduction.

Haptic perception is the "combination of the tactile, kinesthetic and proprioceptive, the latter referring to touch we experience both on the surface and inside our bodies" (Marks, 2002, p. 2). In haptic visuality, as opposed to optical or ocular

visuality, our eyes draw from other bodily and sensory experiences, primarily touch and kinesthetics, acting much like “organs of touch”. “Haptic images do not invite identification with a figure so much as they encourage a bodily relationship between the viewer and the image. Thus it is less appropriate to speak of the object of a haptic look than to speak of a dynamic subjectivity between looker and image” (p. 3).

Since it is informed by touch, haptic visuality has a “quality of visual eroticism” (p. 4), focusing the viewer’s look back to the surface of the image and enabling an “embodied perception”.

In the contemporary attention for the senses in cultural theory, the emphasis lies not in the separation, but in the meaningful relation between sense-making and our sensate bodies, the sensual foundations of consciousness. In cinema studies, too, there seems to be a tendency to re-think spectatorship in terms of the sensual and the mimetic (instead of in terms of the ocular and psychological). (Laine, 2006, p. 94)

There is no clear distinction between the inside and outside of our body: it is a “shared skin, an interface” (p. 92) “that moves *between* the inside and outside” (p. 97). Though skin is “primarily a membrane of separation between subject and object, inner and outer, the self and the world,” it is also “a medium of intersubjective connection” (p. 95). Sight and hearing are public senses related to reason, whereas smell, taste and touch are more directly related to the body (p. 94).

Laine considers the “surface of cinema” to be “bilateral” (p. 95). Whereas cinema is a perceptual surface that “travels through the senses, and between the senses and the world”, skin is both a boundary and a contact surface, making the border between visible and invisible less definable (p. 96). Skin can be seen as a “double interface between the subject and the world, which locates the profundity of the self, paradoxically, on one’s skin” (p. 98). The eye may be the organ that sees, but skin is the organ that perceives, “registering the action of the world upon the self” (p. 98) and “bridging the space between distance and proximity”, between inside and outside (p. 99). Through haptic perception, our shared skin both touches and is touched, revealing “the other’s skin as skin to myself and to the other.” Touching is “a mutual fascination, an exchange of similitude in the reciprocal act of shaping” (p. 99).

Laine’s statement that cinema, like our own skin, touches us both physically and affectively reflects Marks’ notions of the sensual nature of “haptic visuality” in film. These imply that there exists a cross- or multi-modal nature to our perception of phenomena that can bridge several senses. Though Laine and Marks focus on skin and

touch in discussing the cinematic experience, their experiential interskin metaphors have meaning for an artist exploring haptic responsiveness through the use of skin-like fabrics. Through them, notions of shared skins, double interface, cross-modality, inside and outside, distance and proximity, affect, reciprocity and exchange can be embodied and allowed to surface and to shape our lived experience.

In addition to haptic visuality in the design of *sensate skins*, this research is interested in the ambient interplay of light and shadow. Though we most often assume the presence of light in the act of seeing in our day-to-day, real world activities, the absence of light conjures up the viewing of things most often associated with another world. In a sense, the absence of full light, such as shadow or chiaroscuro (*clair-obscur*), accentuates properties of existing objects, all the while revealing more hidden properties in the shadows. "The shadow gives shape and life to the object in light. It also provides the realm from which fantasies and dreams arise. The art of chiaroscuro is a skill of the master architect too. In great architectural spaces, there is a constant, deep breathing of shadow and light; shadow inhales and illumination exhales light" (Pallasmaa, p. 47). Public spaces could be more enjoyable through a lower light intensity and its uneven distribution. This principle is easily transferable to space inhabited by a responsive art installation, where imagination and daydreaming could be stimulated by "dim light and shadows" (p. 46). Alluding to light, colour and transparency, Aristotle locates potential transparency in what is invisible or scarcely visible, or is "at one time darkness, at another light" (1986, p. 418b). "Some things are not seen in light, but produce the sensation in darkness" (p. 419a). These are things that embody the "presence of fire or something like it in the transparent" (p. 418b), things that might appear fiery or shining. In discussing the "indeterminacy of nocturnal space" (1998, p. 84), Cathryn Vasseleu affirms that night or dark is not empty, not an absence, but a presence "full of the nothingness of everything" (Levinas, as cited in Vasseleu, p. 84). Night or darkness can be considered as a lived space where things we experience in the outside world are subdued while inner, more affective things surface.

Brian McHale, in discussing postmodernist literature, introduces "flickering" in discussing Roman Ingarden's metaphors of "opalescence" and "iridescence" (Ingarden, as cited in McHale, 1987, p. 32):

Ambiguous sentences may project ambiguous objects, objects which are not temporarily but permanently or irresolvably ambiguous. This is not a matter, in other words, of *choosing* between alternative states of affairs, but rather of an ontological oscillation, a flickering effect, or to use Ingarden's own metaphor, an effect of "iridescence" or "opalescence."

And “opalescence” is not restricted to single objects; entire *worlds* may flicker. (McHale, 1987, p. 202)¹⁵

This metaphor of spectral flickering seems to imply a dynamic shift away from, towards or back to a given state—a “vacillation or ‘flicker’” (p. 202). It connotes animation (such as with the frames of a film or video flickering from black to light), or a change in state. In order for a flicker to occur, it would seem that a rapid movement is necessary; a state is either on or off. Iridescence and opalescence, on the other hand, seem to imply a melding or superposition of states, and the simultaneous presence of both states at once. I prefer to describe this effect as “shimmering”. The moment of transition between the projection of two static images, or the effect obtained when a lenticular image is moved, revealing another image, shows states in transition; they are not either / or, they are both. The notion of an ontological oscillation between worlds or states through shimmering, iridescence and opalescence, can apply to the folds and imagery of the *sensate skins* installation. Through responsivity, the engagents (both human and non-human) are in a constant state of vacillation, of input-output, within the folds of an intercorporeal engagement. The oscillation from a real or physical world, to a created or imagined world, evokes states of shimmering reciprocity or alternance. Shimmerings and other interplays of light and shadow evoke as well those intermingling states residing within undulating folds, where liminal elements are first hidden, then revealed, as in the pulsating luminescence of the firefly.

In the design of *sensate skins*, I explored the visual qualities of haptic visuality, chiaroscuro and shimmering. The installation’s fabric folds flutter, alternatively hiding and revealing different folded layers. Visually, the glimmering fabric panel’s folds evoke the metaphor of shimmering. Likewise, the metamorphic videos (from tree to human) allude to this shimmering effect, to alternative states; the slowly transitioning iridescent fold imagery shows alternating states, leaving traces of images, memories of the past and impressions of the future onto the skin of other semi-transparent panels that it traverses. A sense of ambiguity persists, since we are never sure which state is the one we should be witnessing, which one is “on”. Textural, slightly unfocused images of a tree and a male body were projected onto fabric skins. Since the skins installation was made up of several layers of semi-transparent folds, the image was further distorted and unfocused, penetrating the porous membranes, light and images leaking onto others. Fugitive images of a genderless body enfolded in a shimmering, opalescent fabric offered ephemeral glimpses of the subject, outlining fleeting shapes stretching and pressing against a chrysalis membrane, then lost again within its inner folds. The

moving images tantalizes our eye and hand, then morph or disappear before full contact. This flickering state of being echoes *sensate skins'* underlying notions of diversity, multiplicity, alterity or otherness. It is a place where bodies sense and feel, where entities meet, where worlds mingle and overlap, and where differences meld. The haptic image enhances the focus of the gaze on the body, inviting a tactile, sensual and intercorporeal encounter. The interplay of light and shadow, or chiaroscuro, also enhanced the installation space, focusing on both its interior and exterior, lending an ambience of intimacy and privacy to the space, inviting the participants to engage.

Sensory interminglings

What would be truly surprising would be to find that sound could not suggest colour, that colours could not evoke the idea of a melody, and that sound and colour were unsuitable for the translation of ideas, seeing that things have always found their expression through a system of reciprocal analogy.¹⁶

So far, I have discussed touch and visuality and the complicity of these senses in shaping a responsive artwork. Interestingly, all of our senses can conspire in shaping the perception and sensing of our experiences in a cross- or multimodal fashion. Synesthesia is a neurological condition, or ability, involving the intermingling of our senses, where “the stimulation of one sense stimulates another” (Ackerman, 1990, p. 290). Letters or words are associated with colours; sounds with colours, graphics or patterns; sounds with tactile experiences, and so on. Derived from the Greek *syn* (together) and *aisthanesthai* (to perceive), synesthesia is “a thick garment of perception ... woven thread by overlapping thread” (p. 290), “intersensory binding” (Cytowic, 2002a, p. 1), “joined senses (2002b, p. 13) or a “‘joined sensation,’ wherein two or more senses are coupled” (p. 8). Our sensory system is a “polyphony of the senses” where our senses are awakened and in harmony (Bachelard, 1971, p. 6). Affirmations of synesthesia can be found in Charles Baudelaire’s sonnet “Correspondances” in *Les fleurs du mal* (1857):

Comme de longs échos qui de loin se confondent
Dans une ténébreuse et profonde unité,
Vaste comme la nuit et comme la clarté,
Les parfums, les couleurs et les sons se répondent

Translation:

Like distant, long-drawn calls that seem to be
Obscurely, deeply blended into one—
Vast as the dark of night and day’s bright sun—

Sound, perfumes, hues echo in harmony.
(Beaudelaire, 1998, p. 13)

In his *Voyelles* sonnet, Arthur Rimbaud refers to his synesthetic perception of words and colours:

A black, E white, I red, U green, O blue: vowels
I shall tell, one day, of your mysterious origins.

Vivian Sobchak (2004) states, "we do not experience movies only through our eyes. We see and comprehend and feel films with our entire bodily being, informed by the full history and knowledge of our acculturated sensorium" (p. 63). In other words, we are able to experience the world, not only through each of our senses independently, but through an amalgamation or synchronization of our senses: synesthesia. This trans- or cross-modal aspect of our perception of the world allows us, for instance, to touch what we see, to see what we touch, and to view numbers and words as colours. "Haptic visuality", as defined by Marks (2002), is an example of synesthesia where "the eyes themselves function like organs", emphasizing "the viewer's inclination to perceive haptically"—a "dynamic subjectivity between looker and image" (p. 3).

Richard Cytowic (2002a) outlines five features or criteria for synesthesia. According to him, synesthesia is involuntary but elicited; it is spatially extended; percepts are consistent and discrete (or generic); it is memorable and emotional (or affect-laden) (p. 67). He suggests that our human limbic system may be the seat of synesthesia. It is in this area of our brain that sensory stimuli are given affective, emotional qualities—where an "emotional coloring of experience" takes place (p. 236). However, through human evolution, its role has been gradually superseded by that of the cortex, where incoming stimuli are categorized and re-directed to the different sensory modalities of the brain. The experiences of synesthetes "may be the result of vestigial reassertion of the limbic system, in which the cortex briefly ceases to function in the modern manner, permitting the senses to join" (1988, p. 37).

The qualities of hapticity, visuality and cross-modality discussed in this chapter permeate the folds of sensuality, eroticism and mystery. These qualities, like swirling incense, cross the folds of our lived, phenomenological experience, caress our psychic folds and intermingle. They stimulate our senses, awaken our inner *pulsions*, and evoke unspoken memories and hopes of passion, making them rise to the surface. It is in this way that we experience our worlds, real and imagined, through our senses and ourselves.

This chapter provided an overview of concepts and approaches to the body, the psyche and sensory perception that were relevant to the design, experience and analysis of *sensate skins*. In the next chapter, I discuss elements of responsivity that form the warp of an affective responsive aesthetics based on experiences lived through the body and the senses.

Chapter Four: Responsive skins – theories of interactivity and responsivity

Responsive aesthetics

*How would the painter or poet express anything other
than his encounter with the world?¹⁷*

Responsivity between participants and an artwork is an encounter with the world. The creation of art that is responsive involves the artist negotiating a balance between art and technology. Both positions are important concepts to consider when discussing responsive installations that make use of media and technology.

In this section, I offer glimpses of what literature in the areas of philosophy, aesthetics, human-computer interaction, art criticism and human perception reveal about interactivity and responsivity and the qualities inherent in a responsive piece that intermingle and inform what occurs between the engagers and the artwork. These elements of responsivity will help to articulate the responsive aesthetics offered in this thesis.

Various models of interactivity or responsivity have been proposed in literature as “responsive aesthetics” (Krueger, 1977), “poetics of interactive forms” (Laurel, 1993), “ethical-interactive aesthetics” (Gigliotti, 1995), “poetics of interactivity” (Morse, 2003), or “poetics of responsivity” (Kozel, 2007). The position proposed here is that Aristotle’s *Poetics* seems a more formalized account of poetry, a more narrative (spoken or written) form of creative expression, whereas the term “aesthetics” seems more closely related to the senses, perception and experience. Kimmel (2000) posits that “the philosophical idea and tradition of aesthetics (from the Greek ‘aesthesis,’ sensuous apprehension) suggests that art, in whatever form, comes together in the immediacy of the sensuous, in the sensuous grasp of immediacy” (p. 8). Fisher’s (1997) view supports Kimmel’s in that he encourages us to recuperate the term “aesthetic” and “to pose a more immanent and relational aesthetics ... which refers to experience as well as objects.” In doing so, we will recover “a sensorially nuanced aesthetics in order to understand art’s practiced realms of the experiential and the beholder’s sensory production of knowledge.” Since I

consider my physical installation work grounded more in the felt, intuitive, sensory realm, I use the term “responsive aesthetics” when discussing the interrelated elements of responsivity.

Shaping such an aesthetics is not intended to define a topology of responsivity that would be used to measure or evaluate the qualities of a responsive artwork. It is to gain insight into the pertinent elements that might help shape an affectively embodied model of responsivity, thus informing my own artmaking and providing appropriate precepts, concepts and terms to describe and situate the *sensate skins* prototype installation. I will focus on responsivity as it pertains to a user’s physical interaction with a physical installation, within an actual physical space.

Contemporary artists and writers offer various perspectives on interaction in physical, virtual, video and film, sonic, human-computer and physical environments. My research interest focuses on embodied, unencumbered human interaction with a physical installation within a physical environment. Ritter (1998) states, “if interactive art is going to become an influential and cultural medium, the entire body—and not just the index finger—must be involved in the interactive and aesthetic experience.” Wilson echoes the need for extending the interface between digital systems and persons beyond the keyboard and mouse into human life by “read[ing] human actions such as motion, gesture, touch, gaze, speech, and interactions with physical objects” (Wilson, 2002, p. 729). This is an open invitation for us to rethink the definition of what constitutes a responsive experience in a physical environment. Experiential philosophy also offers insights to help clarify important elements of embodied experience and responsivity.

We have heard of, or experienced, artworks and environments that are interactive, participatory, immersive, responsive, experiential, augmented, embodied, affective, intimate, or sensate. These terms are sometimes used interchangeably in contemporary writings and it is becoming increasingly difficult to discern what exactly is meant when one describes, or reads about, such an artwork. There is a need for greater clarity. Over the past several decades, we have witnessed different types of interactive artworks, some providing experiences for a single interactor, others involving several interactors, sometimes engaging with each other. These experiences range from interaction without the use of computers, to interaction with a computer program using the hand, a mouse or other input device and a screen, interaction with elements of a virtual world using head-mounted displays, data gloves or other devices, and interaction with a responsive physical installation using one’s body. Since my intent is to identify and clarify the various elements of responsivity, as well as sketch the

framework of a responsive aesthetics, it is important to consider what the literature reveals about interaction and responsivity in both the “real” and “virtual” realms. Though the devices, environments and interactions can range from the simple to the more complex, the basic scenario in all cases is that I do something, from simply being present to initiating an action, and something happens or responds to me or to my action.

The discussion of the elements that follows contributes to the elaboration of a responsive aesthetics outlined in this thesis. Each element informs and enhances the ones that precede or follow it, and all are in this way interconnected and play a critical role in ensuring the dynamic qualities of responsivity. They are porous folds that diffuse or inherit traits from the others and, if a particular fold becomes less transparent, or more translucent, unable to reveal itself, it has a qualitative impact on the dynamics of the responsive aesthetics.

Originators

In developing a responsive aesthetics related to an art installation, one must consider the originators of the artwork that will eventually be experienced by the engagers. The realization of a responsive piece can involve a team of persons, such as artists, programmers and other individuals. Sometimes, though, the team may be small and comprise a single artist assisted by others at various phases. In the case of *sensate skins* and the related research, the artist was the originator; the piece evolved through the eyes of the artist who first developed its conceptual framework for the piece and ensured that it was carried out. The expertise of a programmer, seamstress, technician, builder and handy man were required at the conceptual and production stages, and a technician and participants were needed at the exhibition and research study phase.

In 1977, Myron Krueger wrote about responsive environments, using the metaphor of a musical composition to describe the relationship between the artist, the engager and the responsive artwork:

The participant provides the direct performance of the experience. The environmental hardware is the instrument. The computer acts much as an orchestra conductor controlling the broad relationships, while the artist provides the score to which both performer and conductor are bound (2003, p. 387).

The artist is “composing a sequence of possibilities, many of which will not be realized for any given participant who fails to take the particular path along which they

lie" (p. 387). Even though the artist may have a conscious or unconscious intention when he creates an artwork, he may not be present when the engagents actually experience the work. Once a work of art is offered or released for others to experience, it then represents the originators. The perception and interpretation of the artwork by the engagent through his interactions with it may differ from the original intent of the artist, but the aim is to offer an open piece that permits the engagents to form their own interpretation of, or shape their own personal, authentic meaning from, that experience. The experience is a catalyst for, or may provoke, a change or transformation in the way the engagent sees himself and the world.

The work is an invitation to become "the other," what, in the actuals and factials of the everyday world, is not possible. The artist's work brings the moment of creative possibility to life for the respondent. (Kimmel, p. 7)

Thus, the originators become the shapers of the artwork and the experience that will inform its responsivity for the engagents, providing "a different space and perspective, better eyes and ears, with which, through which, from which to see and hear, to touch and smell the world" (p. 7).

Engagents

The players involved in a responsive work include the person who conceptualizes and creates the piece, the originator of the artwork. Then, there is the human recipient of the artwork, often referred to in the literature as the audience, viewer, visitor, user, player, participant, interfacier, actor, interactor, performer, agent, respondent or engagent. The other crucial player is non-human: the physical artwork itself, the technical components that form its sensing or responsive system, and the space or environment created by the artist to enable an encounter between the human and non-human engagents. Throughout this thesis, I use the term "engagent" when referring to human participants using computer input devices such as a mouse, keyboard or data glove with a computer-based interactive work displayed in a virtual world generated by a computer by means of a computer screen or a head-mounted display. I also use this term to signify the material players, both human and non-human in a physically based responsive installation.

The fabric of interface

In order for events to unfold in a responsive installation, the environment needs an interface of some sort to allow the engagent to communicate with the system in a meaningful way. In the case of a physical installation, the interface in question might involve communication by the engagent's body through optic, sonic or touch sensors that can detect varying degrees of presence, movement or pressure. These sensors connect to a software system, programmed by or for the artist, to activate time-based media responses or outputs, such as the display of images, the playing of sounds or the activation of movement. One could reduce these inputs and outputs to a fundamental notion of responsiveness (action-response) or an encounter between the engagent and the installation as entity. One might ask, though: Is the engagent responding to the piece or is the piece responding to the engagent? Can both the engagent and the installation provide inputs and outputs? Is the technical system working transparently in the background also an engagent? If so, what parts of the installation become the interface between the two players?

Carol Gigliotti (1995) recommends a framework of five factors to consider for interactivity in a virtual world. These form the basis of her "ethical interactive aesthetic". Reflecting on Brenda Laurel's statements from *The Art of Human-Computer Interface Design* (1990), Gigliotti says "the interface must reflect—since it will also direct—our sense of wholeness as physical beings and our trust in our ability to make judgments (p. 294)."

In order for an encounter to occur between the engagent and the artwork, both located in the physical world, an interface is required (Morse, 2003, p. 19). The interface is "the consummate arena for exploration and play with the enigmas of persona—including gender—and the mysteries of life and death" (p. 21). Though in industrial applications, there is a wish to design an interface that is transparent and offers the interactor a more intuitive experience, "there is a problem in achieving such aims of immediacy, since interactivity is a level of expression that is not likely to be wished away from conscious awareness" (p. 19). I concur with Margaret Morse that interactivity needs to involve "decision-making or the *active participation* of the user" (pp. 19-20).

I believe that the physical artwork itself in its totality, including the material and technical components, the space or environment, as well as the sensory stimuli, comprise the interface to a lived experience by engagents.

The environment, “includes the space in which the world exists and all the identifying physical qualities of that world.” Gigliotti adds that the environment determines the participant’s relationship with the world and that the participant should be able to mold or change the environment in order to “map meaning on the world” (p. 294).

In discussing the differences between art and pragmatic forms of design, Jay David Bolter & Diane Gromala posit that “every digital artifact oscillates between being transparent and reflective” (Bolter & Gromala, 2003, p. 6), evoking their use of the ‘windows and mirrors’ metaphor in the book title. They believe that “digital art can be understood as a form of interface design.” I agree with their statement since it also applies to responsive physical art installations, and to *sensate skins* more specifically. A responsive artwork is in itself an interface between the piece and the engagers, as well as between the engager and herself or the world that surrounds her. In the case of *sensate skins*, porous, semi-transparent fabric folds offer the engager both the transparency of the window and the self-reflective nature of the mirror, engaging responsiveness. As the computer screen can be seen as an interface, a window or mirror, the fabric folds of *sensate skins* can be viewed as interskins, offering a window onto which digital images are projected, sometimes traversing several layers. It can also be seen as a mirror, reflecting both the non-human and human entities and eliciting interconnectedness, a perception of other worlds, inner and outer, visible and invisible, through physical contact and encounter. This responsiveness slips and slides on and along interfacial contact surfaces of folds, as well as through them, simultaneously reflecting and traversing them, offering the engager multiple points of presence and being. However, instead of flat screens, mirrors or windows, we can think of *sensate skins* as offering enfolding and unfolding veils, presenting a more corporeal and dimensional presence. “We should be able to enjoy the illusion of the interface as it presents us with a digital world. But if we cannot also step back and see the interface as a technical creation, then we are missing half of the experience that new media can offer” (p. 27).

The senses perceiving

Perception involves determining how close the world is to human perception, such as sight, touch, smell, hearing and kinesthesia, as well as the level of control afforded the participant over those perceptions (Gigliotti, 1995, p. 294).

Touch, affect and intimacy are important elements for the artist to consider when designing a responsive artwork, since responsiveness not only involves physical perceptions, but also more subjective sensations. Touch is the absence of proximity, the only one of our senses that involves direct physical contact. For this reason, there are often limitations in galleries regarding the experience of the viewer. Most often, there is usually little or no allowance for a gallery-goer to interact with an art piece other than through the eyes. Pedrosa (2002, p. 79) discusses intimacy and evokes the importance of touch:

Intimacy is private, restricted, reduced and deep. It is very close to us, usually inside closed spaces. Intimacy is familiar, affective, sheltering, it makes us feel good, at home. We always expect intimacy to provide us with some kind of complicity or confidence. Sometimes, we find sexual or love traces in intimacy, like in intimate relationships, for example, and hence the need for caresses, tokens of love and penetration, intimacy always requires touching.

When it comes to works of art in public spaces, the notion of intimacy is not often encouraged. In fact, there are usually regulations against intimacy and touch. We are not usually allowed to touch works of art, nor to remain alone with the artwork. “More or less intimate activities, personal or domestic, are generally excluded from exhibition areas” (p. 79). For example, in an exhibition entitled *Rites and Passages* held in April 2004 at the Simon Fraser University Art Gallery, Miles Lowry, a British Columbia artist-sculptor, exhibited life-size fibre cast body sculptures. Though the works, because of their raw organic textures, innately invited a touch experience, a note posted prominently at the entrance to the gallery cautioned the viewers:

Why Works of Art Should Not be Touched

Works of art are unique and fragile.
Touching even lightly, a painting, object or sculpture causes damage,
especially when this gesture is repeated hundreds of times.

Touching a work of art can understandably pose a problem for the curator whose role it is to present an artist’s work in a public gallery setting, then to return it intact to the artist. Touching a work of art may also present a problem for the viewer or interactor, especially when it involves touching a real person, or even a representation of a human. Even though touch can be controlled in a gallery setting, responsive works encourage touch because they want the engagers to “engage” in an experience. Jean Dubois, a Montréal artist who creates interactive works using touch-screen technology, “exploits the touch screen’s tactile potential in order to create a setting in which the

viewer is plunged into a state of intimacy” (Parent, 2002). His works enhance the visual through the tactile because “one must touch to see.” The artist contrasts closeness and distance, embarrassment and desire, all the while exploring intimacy, human interaction, communication and encounter through various states of embodiment. Sylvie Parent summarizes participants’ uneasiness when experiencing tactile installations:

One of the most troubling aspects of these works is that the viewer is invited to lightly stroke (the image of) another person, to touch (the image of) an individual’s body. These acts run contrary to social convention, as such behaviour does not normally have a place in public spaces. The viewer’s hesitation is so real that a notice must constantly accompany the work: ‘Touch me,’ reads a sign beside the installations. Once this social and psychological barrier has been crossed, the participant remains possessed by a kind of tension linked to the intimacy of the interaction. Viewers become aware of their own reactions, which oscillate between embarrassment and desire, between the wish for closeness and the wish for distance.

During the public exhibition of the *second skins* installation in 2004, one participant did not wish to proceed once inside the fabric panel structure when confronted with the prospect of a tactile engagement with the piece. For whatever reason, the installation did not resonate with the engager nor did it seem to promote a desire for intimacy through touch. Since tactility is our most primal, private and intimate sense (Montagu, 1971, p. 3) and since engagers may refuse to respond by touching the piece, the artist needs to take special care in designing and exhibiting installations that rely on direct haptic responses by participants, especially if the artwork involved touching representations of the human body, as was the case with *sensate skins*. The artist should expect and respect the fact that some participants may have very personal reasons not to engage with some pieces, perhaps related to deep, private *pulsions*.

Representation

In her seminal work on interface design, *Computers as Theatre*, Brenda Laurel (1993) proposes a “poetics of interactive form”, a “framework of dramatic theory”, inspired by Aristotelian poetics, for “designing human-computer experiences”. She defines poetics as “a term used to describe a body of theory that treats a poetic or aesthetic domain” (p. 35).

The most basic measure of interactivity within a computer representation is, “you either feel yourself to be participating in the ongoing action of the representation or you don’t” (Laurel, 1993, p. 20). Interactivity is the “ability of humans to participate in

actions in a representational context” (p. 35). It can “distinguish the shadowy realms of art and human-computer activity from phenomenal reality ... Mimesis is a made thing, not an accidental or arbitrary one” (pp. 45-46). In its simplest context, mimesis means “imitation or mimicry” (Merriam-Webster), “a form of representation based on getting close enough to the other thing to become it” (Marks, 2002, p. xiii).

The *sensate skins* installations, as well as the images projected onto the fabric skins, do not “represent”, nor do they want to imitate, original entities found in the real world. They evoke or “re-present” realities or abstractions of reality that may or may not exist in tangible form, and are not intended to duplicate reality, nor to fool (to trump or *tromper*) the engager into believing that the real thing appears before them. The engagers are aware that they are not engaging with real bodies and skins; the felt entities are from a self-created world. They should not, like Narcissus admiring himself in the surface of the water, take the seen, felt artifacts as originals or representations. In fact, the imitation evokes fragments of the original, thus becoming a new reality, engendering what can be called “completed mimesis” (Beyst, 2005).

“Art does not render the visible, but makes visible” (Paul Klee, as cited in Beyst). The *sensate skins* piece attempts to render the invisible visible by evoking a membranous entity, by stimulating an intercorporeal encounter with an inanimate, yet corporeal being, and by allowing deep, inner impulses to surface. It also tries to make visible the invisible by projecting images of an undefined body moving within the folds of an opalescent skin fabric. Though it does this in a fragmentary fashion, “it suffices to provide the appearance for one sense to produce the illusion that the whole thing [is] there in flesh and blood”; “the rendering of a part does not fail to suggest the presence of the whole” (Beyst).

In the late 1960s and the 1970s there was an awakening of interactivity in the arts. During that period, artists focused more on the participatory experience of the spectator or audience in art events, from happenings to closed-circuit and recorded video installations, a “kind of presentational relation of the artwork to the public as a *fiction of presence* to be distinguished from the fictions of the past—of theatre, novel, film, painting, sculpture, and other representational arts” (Morse, 2003, p. 31, Note 2).

Enveloping folds of immersion

Immersion is a necessary component of a responsive installation, whether it occurs in an actual or virtual world.

We seek the same feeling from a psychologically immersive experience that we do from a plunge in the ocean or swimming pool: the sensation of being surrounded by a completely other reality, as different as water is from air, that takes all of our attention, our whole perceptual apparatus. (Murray, 1998, p. 98)¹⁸

In clarifying what comprises an immersive environment, as opposed to a virtual reality environment, Victor Lombardi (1994) distinguishes them as follows:

The machinery should not be strapped to the person's body, but instead should surround the user naturally, as in a room of one's house. These interfaces are referred to as 'immersive environments'.... The primary functional difference between body-mounted VR schemes and immersive environments is that VR tries to replace conventional perceptual input with alternate, computer-supplied perceptual material, where immersive environments endeavor to complement the conventional environment, or at least to replace particular objects and actions within the present environment.

Individuals have experienced immersion for thousands of years, not simply to escape their perception of reality, but perhaps to change it. In his discussion of the immersive environments created by cave painters 30,000 years ago, G.H. Hovagimyan (1997) states that the cave "was an area removed from the daily occupations of life. It was made to be preserved, and one was immersed in an experiential/symbolic environment". He speculates, "The intention is to alter the awareness of the group or individual. The result occurs not in the immersive space but upon return to normal life. It is an imprint and it is permanent." It could be said, therefore, that, rather than facilitating a new awareness through a participant's 'suspension of disbelief'—as is traditionally expected when speaking of a virtual world—immersion or enfolding facilitates this new awareness in a physical world through a "suspension of belief", and offers the possibility of enhancing our consciousness. In discussing this notion, Janet Murray says that we "actively create belief" rather suspend disbelief. "Because of our desire to experience immersion, we focus our attention on the enveloping world and we use our intelligence to reinforce rather than to question the reality of the experience" (1998, p. 110).

Contact and encounter

Through our senses, "we behold, touch, listen and measure the world with our entire body existence, and the experiential world becomes organised and articulated around the centre of the body" (Pallasmaa, 2005, p. 64). Pallasmaa expands on the

importance of corporeality in interaction by stating that the encounter of any work of art implies a bodily interaction and that a work of art functions as another person, with whom one unconsciously converses. When we engage with a work of art, we project our emotions and feelings onto it. A curious exchange takes place: “we lend the work our emotions, whereas the work lends us its authority and aura.... eventually, we meet ourselves in the work” (p. 66).

The human engager and his or her sensing apparatus and conscious system are one embodied entity; in many cases, several engagers interact with or among other human engagers, adding a social dimension to the interaction. The artwork as co-engager in an experience is also an embodied entity comprised of the physical installation itself, the sensors and other technical apparatus, including the software system that works in the background. Responsivity in its most basic form occurs when both human and material entities are able to acknowledge, through their respective sensory apparatus, the presence of the other. Though the exchange may be simple and short-lived, each engager is in fact “responding” to the other’s presence.

In discussing the existence of a relation between human and non-human subjects, raised by Margaret Morse in her poetics of interactivity, Susan Kozel posits a construction of corporeality relevant to reversibility, where “the duality between machine and human, between object and subject is muddled, and the space between human and system is brought to life. What matters is not whether the computer is a tool or a person, what matters is whether the engagement is humanizing or dehumanizing” (Kozel, 2007, p. 22).

A responsive artwork implies interplay between the engager and the piece within the spatial environment. Allowing the engagers to explore the piece through touch, speech, movement, sight, sound and, where possible and relevant, through taste and smell, provides the engager an opportunity to experience the piece’s many facets and to engage with it in a more intimate and dynamic way. This notion of encounter is echoed in the experience of art, where a peculiar exchange takes place: “I lend my emotions and associations to the space and the space lends me its aura, which entices and emancipates my perceptions and thoughts”. The experience “incorporates and integrates physical and mental structures, giving our existential experience a strengthened coherence and significance (Pallasmaa, p. 12).

If an artwork invites both the engager and the responding artwork to meet through a reciprocal, dynamic relationship, it initiates a type of responsivity that

resonates with the notion of reversibility where “my body simultaneously sees and is seen” and “that which looks at all things can also look at itself and recognize, in what it sees, the ‘other side’ of its power of looking. It sees itself seeing; it touches itself touching; it is visible and sensitive for itself ... a sense, therefore, that is caught up in things, that has a front a back, a past and a future (Merleau-Ponty, 1964, pp. 162-163).

The computer cannot be reduced to a medium of communication between human subjects. Its very capacity to give feedback and the immediacy of its response lends the quality of “person” to what is a computational tool. This responsiveness allows it (and the virtual entities it displays) to pose or function as subjects—however, partial, quasi, imaginary, and virtual—who are involved in the interactive exchange. (Morse, 2003, p. 20)

Margaret Morse states, “the boundaries between hard and soft are fluid” and “the relation between the machines and humans is *virtual*, as is the muddle of subjectivities involved” (Morse, p. 22). Kozel (2007) describes the *trajets* kinaesthetic responsive installation, proposing a phenomenological poetics of responsivity that is informed in part by, and extends, Morse’s poetics of interactivity. Kozel’s poetics incorporates experiential concepts drawn from Gaston Bachelard, Maurice Merleau-Ponty and Gilles Deleuze, among others. Her contemporary perspective offers elements to consider when we discuss responsive installations grounded in the real world. “The need to speak in terms of responsivity emerges at the same time as the need to speak phenomenologically from multisensory lived experience” (p. 20). She finds that “the most significant distinctions to be made between a poetics of interactivity and one of responsivity relate to the nature of action [and] the construction of subject” (p. 20). Her poetics regroup interconnected elements around three concepts: the dynamics of the body, reconstruction of physicality, and extrapolations from the body onto other social constructions or groupings (p. 19). If we extend the usual subject-object dichotomy to favour instead an intercorporeal model of engagement, we could concur, as Kozel suggests, that “agency might be spread across a range of human modalities, distributed across bodies, and across materialities” (p. 21). I concur with Kozel’s statements regarding the melding of human and non-human engagents in a “concrete moment of experiential encounter” (p. 19). As stated previously, a human engagent can engage meaningfully with a material installation. This mutual engagement can be described as an ecological system in which a non-human entity, usually not identified as a viable partner in an exchange, is capable of responding in its own way, using its own embodied living system, to human and non-human engagents, both of whom are material, embodied and corporeal.¹⁹ Kozel discusses the notion of an ecosystem, saying

“the ecosystemic or eco-philosophical approach is based on an understanding that we are located within a system, rather than on the initiating end of a chain of actions and decisions beginning with the self and radiating outward” (p. 37). She states, “the poetics of responsivity needs to account for, not just a reworking of the self from the decisive subject in the interactive relation to the self interrupted by her engagement with otherness in a system, but also for a responsive situation which may be spread across a community of variously constructed bodies” (p. 37).

For Kozel, the *trajets* responsive kinaesthetic installation embodies three ecosystemic concepts. It is “a convergence of parts into a networked whole according to complex choreographies of mutually interactive elements”; “visual and kinetic mappings of the whole are generated and networked into different locations”; “it has a contained and otherworldly feel” which can “enact a shift upon states of the body and consciousness” (p. 39). For both Morse and Kozel, it is important for the human engagent to be aware of “mediation and its sensory material of expression”. The human subject should not expect interactivity to be invisible, but should be aware of his state during the engagement. “The structure of a responsive work is such that we are made aware *that* we are responding *while* we are responding, that we are playing a role in a greater system of responsivity beyond our isolated subjective choices. This takes some of the control away from us: we do not control, we respond” (Kozel, p. 23). Collapsing the limits of corporeity, decision-making and control is crucial to a better understanding of the subtle poetics of responsivity. A participant may feel he and the responding work are communicating and exchanging. For the engagent to perceive an engaging relationship as authentic, the artist may try to ensure that the outputs from the piece (such as visuals, sounds and speech), triggered by the proximal haptic inputs of the engagent, can be authentic and meaningful for the engagent. Hapticity and movement are the more proximal senses; incorporating them into a sensorial experience may augment the feeling of closeness between the engagents.

Engagency within the folds

Engagement seems to go one step further than simple interaction. In my view, it denotes the ability for the human engagent to sustain responsivity, perhaps developing a growing sense of meaning in this mutuality. It is not unlike a conversation between two persons. If the human engagent finds the exchange meaningful by satisfying a need (curiosity, becoming aware of, and exploring a concept, obtaining useful information, finding meaning or resonance), the interaction may be prolonged. In this case, a

sustained responsivity, or what Morse describes as “mutuality and reciprocity” (p. 17), leads to engagement and agency, what I refer to as “engagency.” The human engagent feels engaged in an experience of reciprocity with an organic or inorganic engagent, discovers that he or she has a role and a purpose in this interaction, can effect change and desires to prolong the encounter, but only if the experience holds meaning for the engagent and motivates him to prolong his engagement with the piece. According to Gigliotti, the content of a virtual world is what it “purports to be about—its meaning”. She goes on to say that the participants must be able to define the content, “its meaning then reflecting the context of their physical reality”, and that “engagement should not take precedence over the knowledge offered in meaning” (1995, p. 294). In other words, the meaning of a piece (the why), as opposed to the physical engagement (the how), should be the primary goal. She also states that it should also be clear to the participants how and why they are interacting with and in the virtual or actual world, on what their behaviour depends, how it affects others, and what the consequences of their behaviour are in the virtual and real worlds. I believe that engagents should be able to derive meaning from their sensorial, embodied engagement with a physical installation, but that the meaning must be theirs to construct and, as such, can be very personal and affective. Gigliotti goes on to define plasticity as “moldable, flexible and pliable.” It should “push back” and “give back” to the engagent, reflecting how or why we act (p. 294). In other words, “a tension between conscious intentions and unconscious drives is necessary for a work in order to open up the emotional participation of the observer” (Pallasmaa, p. 29). The tension alluded to could be nurtured by excitement, anticipation, reciprocity, between oneself and another empathic entity, a dance, a caress, a playful and seductive discovery of minds and bodies through sensory systems.

According to Janet Murray, we experience agency “when the world responds expressively and coherently to our engagement with it” (p. 10). Michael Mateas describes it as “the feeling of empowerment that comes from being able to take actions in the world whose effects relate to the player’s intention” (2004, p. 21). If the participant’s actions have no effect on the experience, or if the effect of his actions does not relate to his own intentions, then development of a sense of agency will be disrupted. Mateas affirms, “agency is a necessary condition for immersion” (p. 26).

“Technology mirrors our desires; interactive technologies, in particular, reflect our desire to feel engaged” (Rokeby, 1995). In Rokeby’s “transforming mirror” interaction model, the work reflects the interactors or engagents back to themselves. According to him, interactive work involves a dialogue between the interactor and the

system making up the artwork. The interactive system responds to the interactor, who in turn responds to that response, “The medium not only reflects back, but also refracts what it is given; what is returned is ourselves, transformed and processed, providing us with a sense of the relation between this self and experienced world” (Rokeby, 1995).

Rokeby’s mirror metaphor evokes Merleau-Ponty’s phenomenological notion of reversibility, to which we have already alluded. It also seems to imply a self-transformation through the experience of interaction.

Unfolding change through felt sensations

Awareness, change and transformation are important components of responsiveness and can also represent fulfilment or culmination of a responsive experience. Roy Ascott comments, “interactive art always involves the user or viewer in an intimate process of transformative action” where “the consciousness of the viewer is transformed (1999, p. 1).

Additional insight into the notions of human change, awareness and transformation resulting from human experience can be found in transformative learning. This theory centers on the meaning of the learners’ experiences, where “individuals change their frames of reference by critically reflecting on their assumptions and beliefs and consciously making and implementing plans that bring about new ways of defining their worlds” (Mezirow, 1997). Other proponents of this learning theory (Boyd & Myers, 1998) place greater emphasis on intuition and emotion. E. O’Sullivan (2003) describes it as

a deep, structural shift in the basic premises of thought, feelings, and actions. It is a shift of consciousness that dramatically and irreversibly alters our way of being in the world. Such a shift involves our understanding of ourselves and our self-locations; our relationships with other humans and with the natural world; our understanding of relations of power in interlocking structures of class, race and gender; our body awarenesses, our visions of alternative approaches to living; and our sense of possibilities for social justice and peace and personal joy.

In reading O’Sullivan’s interpretation, there seems to be resonance between the process of learning and that of engaging with a responsive artwork in that the product of both experiences might encompass a transformation of consciousness, one’s “way of being in the world.” Through his interaction in a responsive environment, the engager’s awareness of himself, others and the world can be enhanced, his consciousness can be somewhat altered and unconscious dimensions can surface,

sometimes changing or reconfiguring the conscious, to which I have alluded when discussing psychoanalytical theory.

Such changes might simply be to notice, as with *sensate skins*, that digitally projected images could be touched, that fabrics responded to my touch, that the colour red evoked concern or passion, that moving images projected onto fabric panels invoked a sense of vertigo, to realizing that touching my own hand was a sensate experience, that I felt inside another entity, that I was left with a more sensitive image of mankind, or felt the vulnerability and sacredness of the material world—and everything in between. This is what experiencing is all about: finding out who and why we are, what the world is and how two entities have the potential to influence one another.

Responsibility

An important consideration for artists involved in interaction design and the creation of responsive art is a sense of ethics, judgment and responsibility. The notion of imbuing an artwork with affect resulting in engagent self-awareness, change or transformation is in itself risky and, as Rokeby (1998) states, showing sensitivity and accepting responsibility are central to interactivity:

Responsibility means, literally, the ability to respond. An interaction is only possible when two or more people or systems agree to be sensitive and responsive to each other. The process of designing an interaction should also itself be interactive. We design interfaces, pay close attention to the user's responses and make modifications as a result of our observations. But we need to expand the terms of this interactive feedback loop from simply measuring functionality and effectiveness, to include an awareness of the impressions an interaction leaves on the user and the ways these impressions change the user's experience of the world.

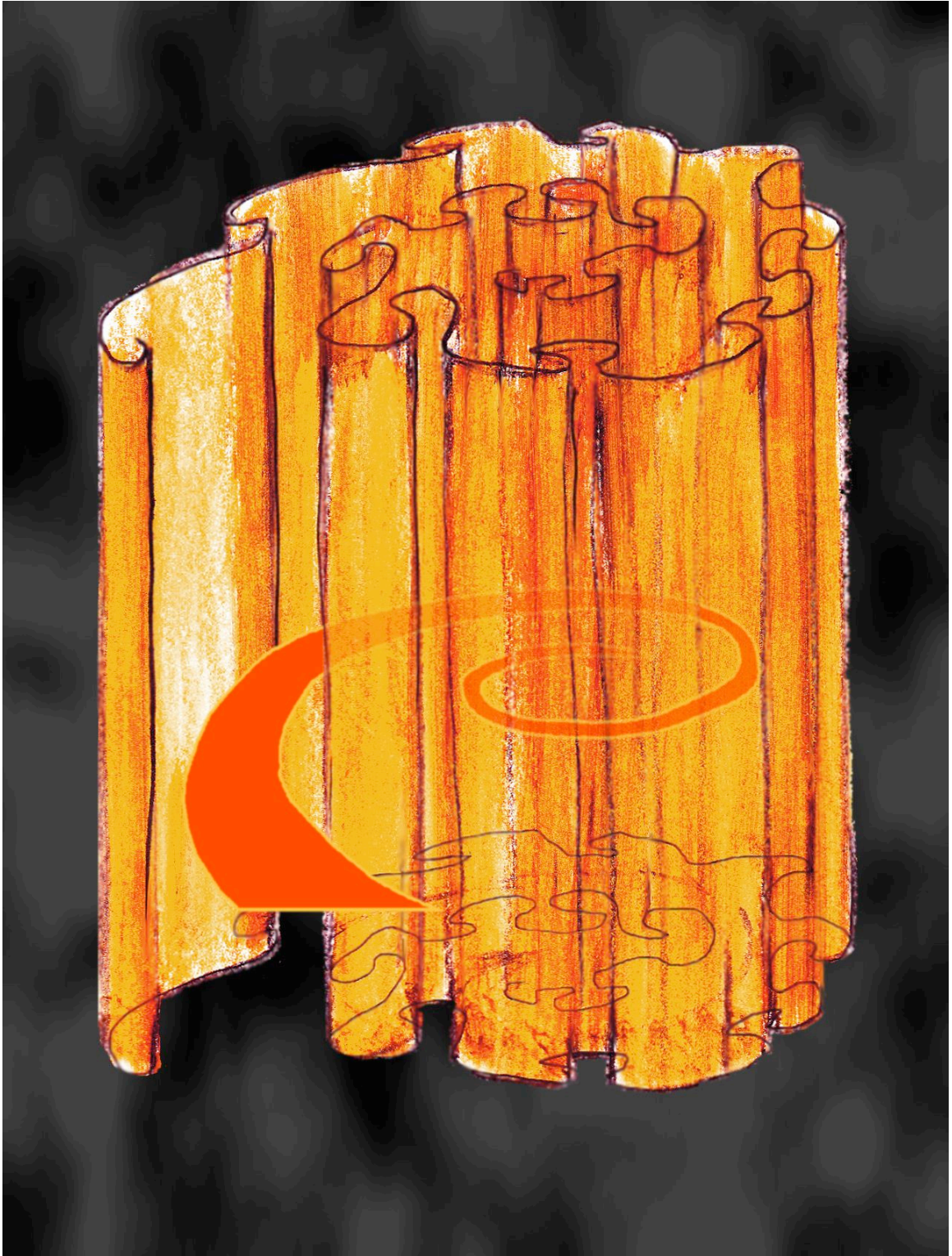
Rokeby's concern with the affective, rather than the effective, qualities of an interactive work on the engagent, and with the responsibility of the artist in this regard, is echoed by Gigliotti (1995). Within each of the identified factors in her ethical-interactive aesthetic, she has embedded ethical elements that offer important precepts also applicable to responsivity in a physical environment. She underlines the importance for us to understand the historical connection between ethics and aesthetics by stating that "this connection has had, and will continue to have, great impact on how technology defines and is defined by culture." (Gigliotti, 1995, p. 293). In discussing ethical and aesthetic issues, from Aristotle to post-modernism, she says "one way to

transform the limits of our ethical thought to include the right of every sentient being to have his or her difference respected is to transform the aesthetic” (p. 291).

Most important for artists to remember is that the development of a responsive aesthetics should involve taking “responsibility for their actions and their world”. In conceptualizing, designing, producing, installing and exhibiting responsive artworks that engage humans, the originators have the responsibility to exercise judgment and consider the ethical implications of their artwork on the engagers and the world.

Unfolding an affective responsive aesthetics

The elements outlined previously permit me to reflect on my own work and to propose a responsive aesthetics. The responsive aesthetics in question embodies physical interaction between human and non-human engagers, providing the opportunity for the human engager to respond dynamically to an entity and to further shape his own experience. It presents a non-threatening interface to mediate between human and non-human systems, ensuring that the non-human system can sense human inputs through direct touch and provides meaningful real-time aural or visual outputs through the processing of generative, context-sensitive algorithms. The artwork is flexible enough to allow meaningful engagement through an intercorporeal experience triggered by sensory perceptions that invoke affective sensations. One can enhance self-awareness and a sense of being in that world through change or transformation of one’s point of presence or perspective, both at the visceral, pre-reflective level and the rational, reflective level, over time. The lived responsive experience sustains engagercy so that personal meaning can be derived. In this responsive aesthetics, the artist ensures that the design respects the engagers and, once the piece is given life and is offered to the engagers, the artist steps back from the folds and provides an opportunity for them to share their affective experiences, thereby informing the design of future responsive artworks.



© 2007, Dennis Humphrey.

Figure 5. Enfolded model of responsibility.

I use the term 'enfolding' to suggest that the progression towards the inner structure of the incursive folds of responsivity can be seen as moving the engagent towards a state of deeper immersion and awareness. An engagent's journey through these inwardly spiralling folds begins by contact with an interface through the senses, moves on to feeling sensations, initiating meaningful encounters with the artwork, and culminating in awareness or change. In this inward progression, immersion is enhanced if a sense of agency and engagement (engagency) is sustained.

The following chapter presents selected physical responsive artworks that show evidence of the responsive aesthetics discussed in this chapter.

Chapter Five: Felt skins — haptic responsive installations

In the first part of this chapter, I present installation works created by artists with whom I find affinity and resonance, since their work focuses on the sensory experience (more specifically, hapticity), immersing the engager in a rich environment that nurtures engagement, awareness of oneself, one's body and the world. These artists incorporate in their work key elements of the responsive aesthetics.

In the second section, I introduce my own prototype haptic installation, *sensate skins*, exhibited to a group of engagers who shared their experiential accounts.

Touched and felt responsive installations

Brazilian neo-concrete art

Interactivity in art is not unique to the electronic age. In 1959, the *Neo-Concrete Manifesto* advocated a return to humanism where one's relationship to art should be subjective and organic. The artists sought to create three-dimensional art, movement within their work, and interaction with the spectator. Through their new vision of art, Ferreira Gullar (1959), a Brazilian poet, along with others, including Lygia Clark and Hélio Oiticica, sought to break away from the Brazilian Concrete movement which, according to its promoters, focused too much on the mechanical and scientific. Proponents of the Neo-Concrete movement conceived of a work of art, not as a machine or an object, but as a "quasi-corpus" or body that can only be understood phenomenologically through the reality of the living being or "aesthetic organism" (Gullar, 1959).

Lygia Clark and Hélio Oiticica, two artists who collaborated closely in the development of the Brazilian Neo-Concrete Art movement in the 1960s and 1970s, de-emphasized visuality while promoting the experiential aspect of viewer participation, and centering on the participant's exploration of haptic spaces through the senses. Their early works are important to our discussion of responsivity because they focus on physical pieces, with an emphasis on participant interaction and lived sensory

experiences. As well, their work promoted an integration of the body-mind dichotomy through exploration of phenomenological concepts.

Clark's work is situated within a corporeal, experiential, phenomenological context. Her experiences merge "the body's interior and exterior spaces, stressing the direct connection between the body's physical and psychological dimensions" (Osthoff, 1997). Clark's simple propositions "confront viewers, however, with very complex issues about art, perception and body/mind relations." She considered the participants as "subjects-in-process" and her work involved the restructuring of the self (p. 283).

Oiticica's penetrables, object-containers and wearable capes also invited active participation by the viewers. His creations "expanded upon Clark's paradoxical explorations of aspects of the body's internal external space. He created interrelations around the sensual body and the many spatial forms it interacts with *Crelazer*, one of Oiticica's neologisms meaning 'to believe in leisure,' was for him a condition for the existence of creativity and is based on joy, pleasure and phenomenological knowledge." He was also motivated by the "Supra-Sensorial", wishing to promote "the expansion of the individual's normal sensory capacities in order to discover his/her internal creative center" (p. 284).

Ernesto Neto sculptures

a place of exchange and continuity between people, a skin of existence and relationships.²⁰

Ernesto Neto, a contemporary Brazilian artist who has developed an international reputation, continues in Lygia Clark's and Hélio Oiticica's neo-concrete tradition. Though Clark's, Oiticica's and Neto's creations do not feature the use of technology, they provide an interface for interaction between the embodied objects and the participant. Because of his treatment of space, touch, intimacy and interaction, Neto was an inspiration when I was searching for an organic structure that might be suitable for an interactive haptic installation evoking the body and skins.

His skin-thin diaphanous structures "imply an entrance and an exit, they are penetrable or, better still, 'navigable' ... places of shelter, to soothe the body, inside which we can rediscover the foetal position from the early moments of life, or the stimulus of repose which allows us to feel like a small part of a dynamic whole" (Jiménez, 2002, p. 211). His large, organic, vessel-like series of lycra sculptures evoke an epidermis, warm and flexible skin, inviting the participant "to touch, to overcome

barriers, in order to feel its real weight, its lightness, its way of occupying the space, its insistence on breaking down spaces” (Fernandez-Cid, 2002, p. 29). In Neto’s later work, a tension is produced by the “unexpected possibility of a direct encounter with an inner unknown, by the body’s journey beyond (inside) the visible boundaries of the sculpture” (Fortin, 1999, p. 58). His previous work—incorporating spillage, impact, gravity, outward transgression of boundaries, and an overwhelming smell of spices—is the manifestation of a more masculine impulse. His recent works embody more feminine, internal and fertile qualities—enclosed, mobile spaces of adventure. Neto’s aesthetic promotes the creation of experiential situations, actively stimulating many of the engager’s senses, calling upon both mind and body, and empowering the surfacing of subjectivity and a sliding between masculinity and femininity along the poles of gender and sexuality. His use of skin-like fabric and gendered fabric components stimulate touch through engagers’ hands and feet as well as through vision and physical immersion. His work makes strategic use of malleability and vulnerability, all the while eliciting pleasure to reframe interpretation as a desiring, eroticizing and obliquely sexual exchange (p. 58). Neto’s recent sculptures and installations “combine playfulness and irreverence with a sophisticated use of art historical references”, soliciting “embodied, particular and engaged subjects inextricably created through the process of experiencing and made responsible for the effects of their perceptions and interpretations” (p. 59).

Responsivity is important for engagers as an experiential device to invoke the inner self and learn about oneself. As discussed in the previous chapter, a responsive installation can become the embodied locus and catalyst for encounter, change and transformation, echoing multiple elements of a phenomenological experience.

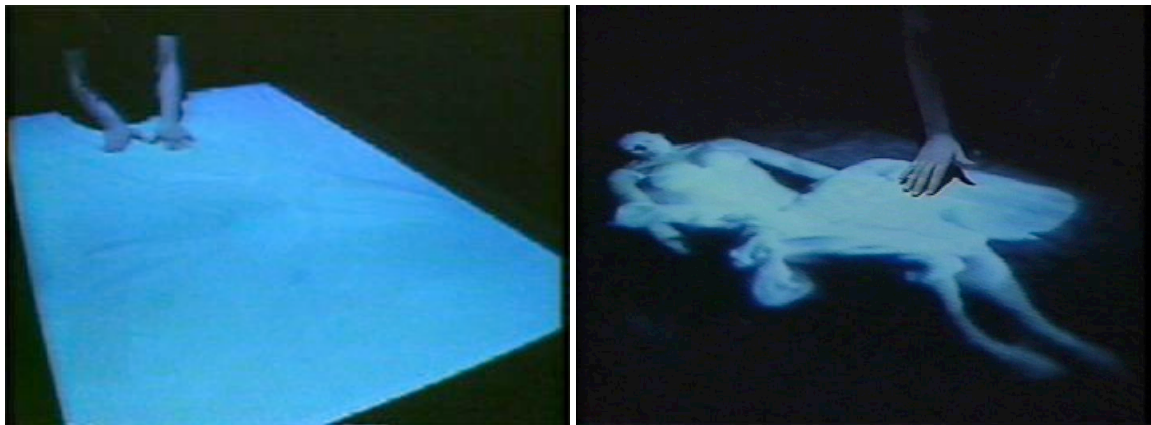


Courtesy of Tanya Bonakdar Gallery, New York, by permission.²¹

Figure 6. Ernesto Neto, *Navedenga*, 1998.

Thecla Schiphorst installations

Thecla Schiphorst is a computer media artist, educator, computer systems designer, choreographer and dancer based in Vancouver. Over the last decade, she has explored the notions of body and intimacy through the sense of touch through two responsive haptic installations.



© 1996, Thecla Schiphorst, by permission.

Figure 7. Thecla Schiphorst, *Bodmaps: Artifacts of Touch*, 1996.

sound ... water is mixed by the proximity and energy of the gesture ... in the other's absence, can we listen to the surface ... of our own skin? (Schiphorst, 1996b)

In *Bodymaps: Artifacts of Touch* (1996), engagers were invited to move their hands close to and touch video images of bodies projected onto a white velvet surface. The hand movements affected sensors that triggered sound and videodisk image changes projected onto the table from the ceiling. Body states invoked include gravity, coma, weightedness, sleep and imprisonment. The white, velvet, sensate surface upon which are projected videos "yearns for contact and touch. Its rule base is complex and subtle, impossible to decode" (Schiphorst, 1996a). She elaborates on the "disturbing, erotic, sensual and subjective" experience she envisioned:

Interactivity is activated by the viewer's proximity to the image. The body lays breathing. The viewer entering the installation space, moves closer to the container, enters the field of consciousness of the body, where the body's image becomes aware of the viewer's gaze and physical presence. The body stirs, the image shivers. The viewer/voyeur becomes participant, strokes the image of the body or presses the image of the container, places herself at the boundary.

Bodymaps: Artifacts of Touch "belongs to that tradition of electronic works, somewhat rare, wherein the viewer's experience derives from concrete immersion in a highly poetic interactive environment" (Raymond, 2002).



© 1998, Thecla Schiphorst, by permission.

Figure 8. Thecla Schiphorst, *Felt Histories*, 1998.

In Schiphorst's *Felt Histories* (1998) piece, the image of an older woman, her back to the engager, was projected onto a screen covering the opening of an old doorframe.

As one approached, the image moved slightly; if the engagent touched the image, the older woman moved even more. Captured images of the participant in real time appeared in the doorframe. In this piece as well, Schiphorst relied on the intensity of the “felt” or “tactile” experience of the engagent to invoke curiosity, empathy, and personal memories.

Neto’s and Schiphorst’s works centre on embodied experiences within a constructed world. Though the type of responsive aesthetics differs for these artists, both involve an intercorporeal experience, through touch, with a constructed non-human entity that adopts an organic or human form. The pieces offer the potential for affective engagency and a sense of immersion, no doubt evoking feelings of empathy, proximity and reflectivity. The possibility for engagents to effect change in their perception of themselves and the world seems imminent.

Haptic responsive installation project — *sensate skins*

In this section, I provide a comprehensive description of the design and construction of the *sensate skins* responsive installation, including use of media and programming. I discuss its dynamics from an artistic and reflective point of view and attempt to situate the piece within the responsive aesthetics.

This installation was designed, constructed and presented to a group of engagents in December 2006. My aim was to explore some elements of responsivity with actual human engagents and to allow crossovers between my research, artistic inquiry and written reflection.

Prototype installation

sensate skins was a prototype haptic responsive installation that focused on the sensuous, bodily perspective. Earlier iterations in the skins series informed it; these can be found in *Appendix 1*. Malleable, responsive skin-like fabric membranes shaped spaces that participants could enter and explore. Through tactile, visual and sound elements, they invited interaction in an intimate space. *sensate skins* was about touch, body and space—about change, generative poems and transforming images, from tree to human, from the outside to the inside of folds.

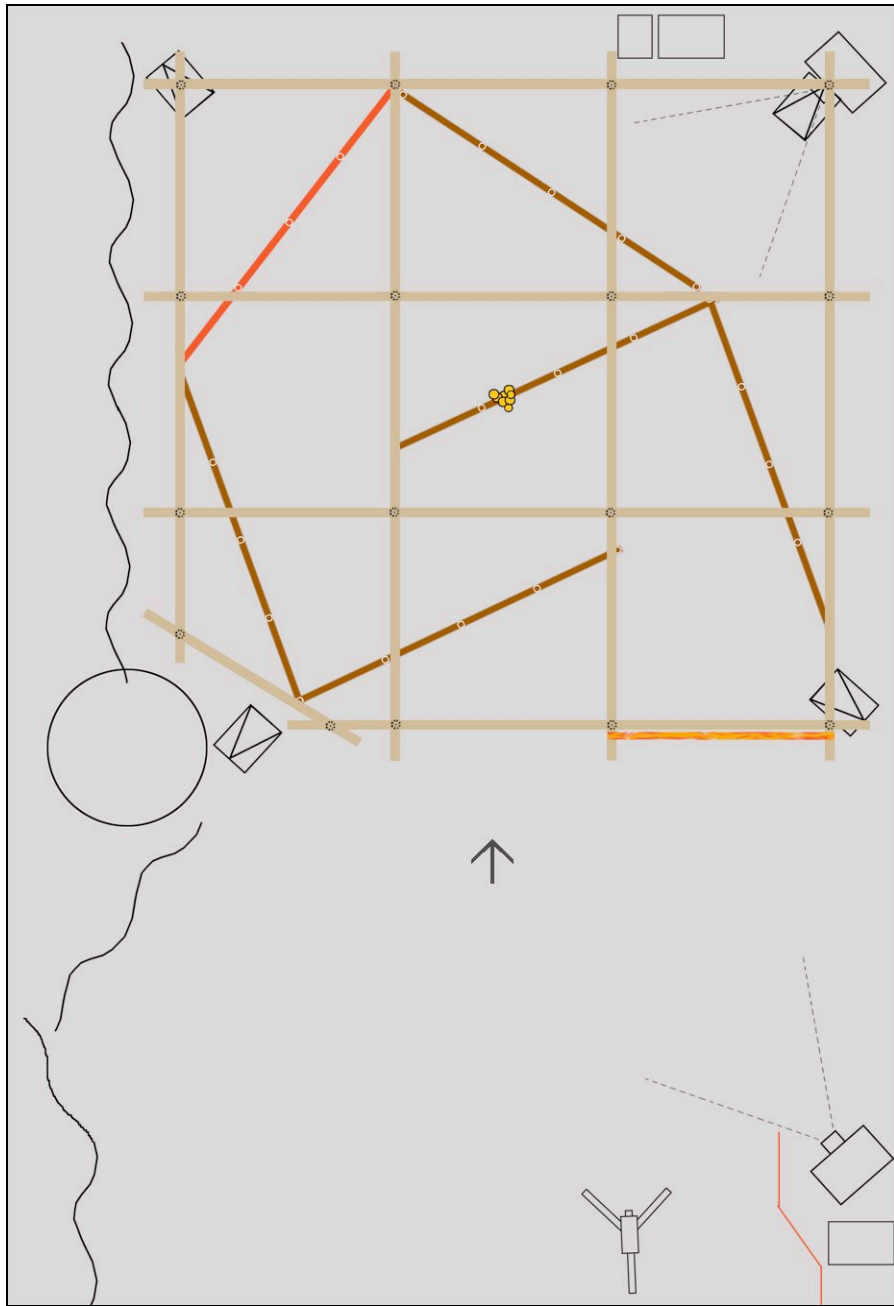
Touching the skins breathed life into the installation, awakening it from a dormant state where a projected image pulsed, like a heartbeat and one heard the mournful sounds of a lone shakuhachi flute. Bell sounds triggered a responsive state,

where images and sounds invited the participants to experience the skins, to merge with them. In addition to exploring the materiality of the body, skin and folds, as well as tactility, in a multisensory environment, the *sensate skins* installation provided an opportunity for engagents to interact through touch with the piece in a non-inhibiting space. The notion of bodily folds was incorporated into the skin-like epidermal panels. Gendered elements were provided for the touch experience: dimensional pods filled with rice were shaped into incurvate, curvilinear forms not unlike bodily organs, and suspended from the overhanging grid; a red fabric panel incorporated female elements.

How could the experience permit engagents to explore and express (as opposed to repress) fundamental drives and urges? The skin-thin panels of *sensate skins* allude to basic *id* forces encased inside the skin structure, influenced by socio-cultural forces outside the bodily entity, evoking the *ego*. One's urges and instincts have been folded inward, veiled within the pleats. Through the act of touching and unfolding of the pleats, a symbolic surfacing of basic libidinal drives can take place. We can explore and perhaps free them and act upon them momentarily, if we so desire. *sensate skins* presented sensual images, spoken words and sounds that evoked eroticism. The engagents were immersed in a close, pre-reflective touch-based encounter with a responsive skin-thin entity, basic feelings and desires might rise to the surface. In a later, reflective phase, engagents might accept an expression of gender and sexuality that is different from, or similar to, their own.

Installation design and construction

A 10-foot by 10-foot bamboo grid was suspended with nylon cables from an existing twelve-foot ceiling grid to lower the height to eight feet in order to accommodate the height of the skin panels. From this bamboo grid, five by six foot lycra panels were fixed to the grid, as well as long lycra appendages filled with rice. Half-inch wooden poles were attached to the base of each skin panel; lycra rice pods were also attached to each end of the fabric panel bases. These helped to stabilize and weigh down the panels, ensuring that the fabric remained as taut as possible during manipulation by the engagents.



© 2007, Dennis Humphrey.

Figure 9. Plan (top view) of *sensate skins* installation.

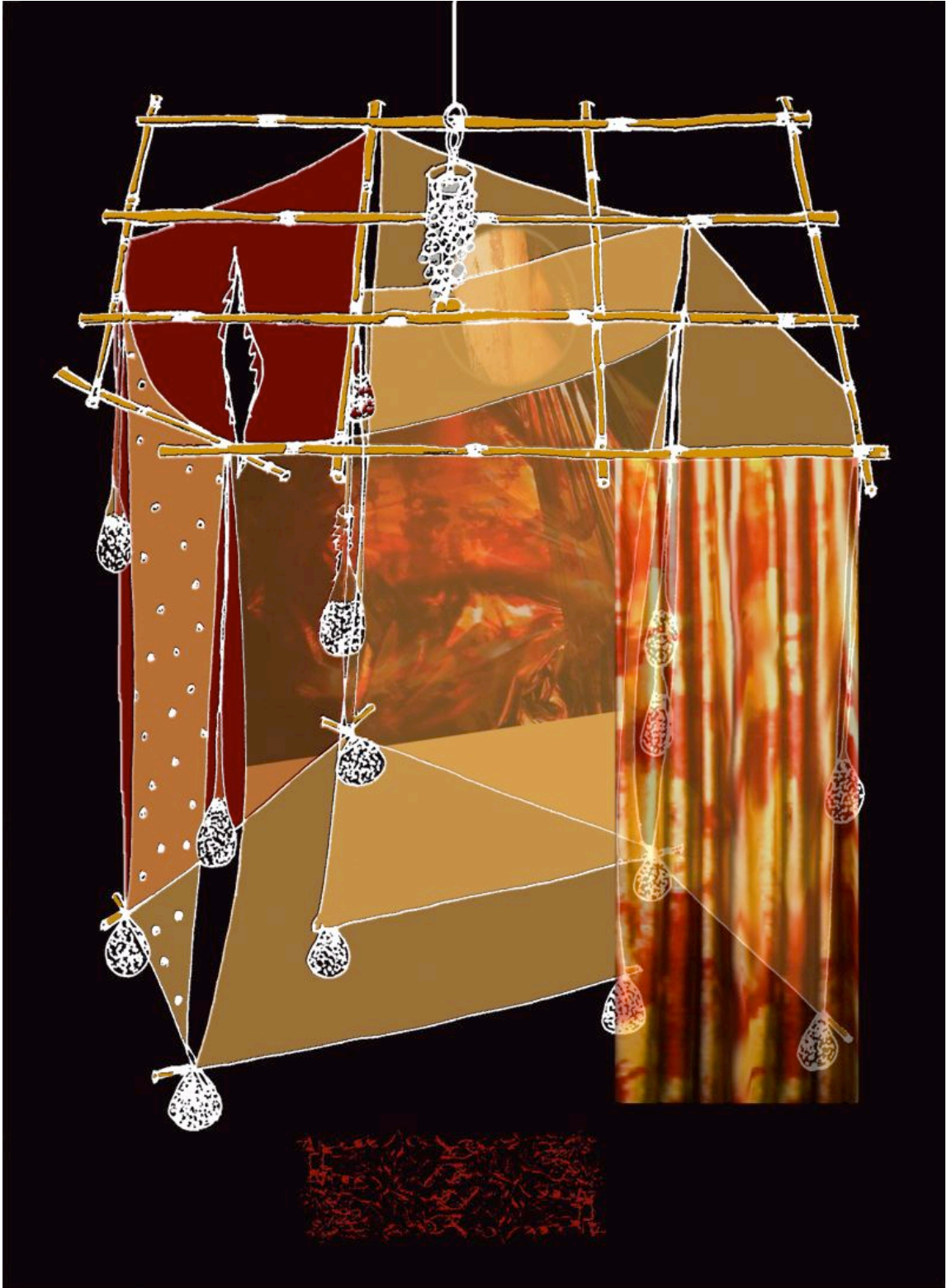


© 2007, Dennis Humphrey.

Figure 10. *sensate skins* installation setup.

Five nylon filaments were sewn vertically in each of the fabric panels and extended from the top of the panels; they ran to metal eyehooks located near the central bamboo grid, where they were tied to an elastic strip, each of which was connected to the sounding mechanism consisting of a cluster of bells suspended from a ceiling cable. A small microphone was suspended from the bell cluster.

This haptic sensing mechanism was designed so that, when an engagent touched the skin panels, it would pull on the nylon filament, which would in turn activate the bell cluster, making the bells jingle. If calibrated correctly, the microphone would detect the bell sound, triggering a multimedia event (projection of transformation video and playing of generative poem). Though the sensor apparatus was rudimentary, it did serve the aim of this prototype installation that was to provide a private, non-threatening environment for engagents to live a haptic responsive experience.

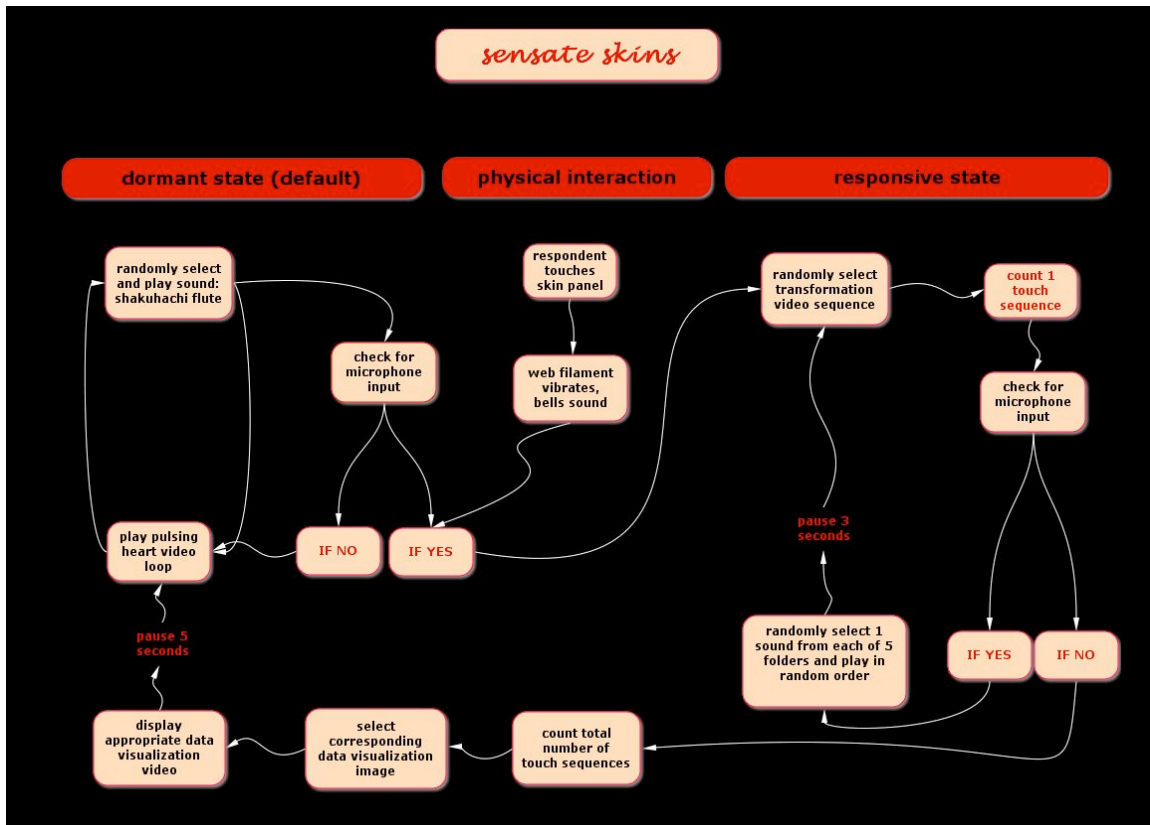


© 2007, Dennis Humphrey.

Figure 11. Representation of the *sensate skins* prototype installation.

Physical interaction

The time-based nervous system was designed for the installation in Cycling 74's MAX-MSP/MSP-Jitter, a programming environment for responsive multimedia installations. The following figure identifies the engaging inputs anticipated by the program to trigger the required multimedia outputs.



© 2007, Dennis Humphrey.

Figure 12. *sensate skins* physical interaction flowchart.

Equipment and media

Two digital projectors, two Macintosh laptops and a multi-channel sound system were used. The main projection used to create an ethereal ambiance and to provide more ambient lighting for the darkened exhibition space consisted of a looping video clip showing sixty-three cross-dissolved images of shiny fabric draped over a human figure; the fold images melded continuously and were projected on the outside surface of a fabric skin panel, leaking onto other fabric skin layers inside. These fabric fold patterns evoked porosity, transparency and the intermingling of light and shadow. As well, they

represented those inner *pulsions* and their struggle to escape the confines of an inner world.



© 2007, Dennis Humphrey.

Figure 13. *chrysalis folds* main video projection.

I prepared a series of transformation videos from still photos taken of a male model and of arbutus trees in the Vancouver area. The trunk and peeling layers of arbutus tree bark evoked human skin. The backgrounds of the selected arbutus tree photos were masked so that the images that would make up the transformation videos would isolate the trunks and allow a more effective superposition of the human bodies that had been photographed against a black background. All the transformation image sequences were enclosed within a simple circular red frame to avoid a formal rectilinear image, since they would be projected against the more organic, curvilinear fabric panels. These transformative videos not only showed similarities between the tree and human representations, they embodied progressive states of intercorporeality, encounter and change through digital superposition.

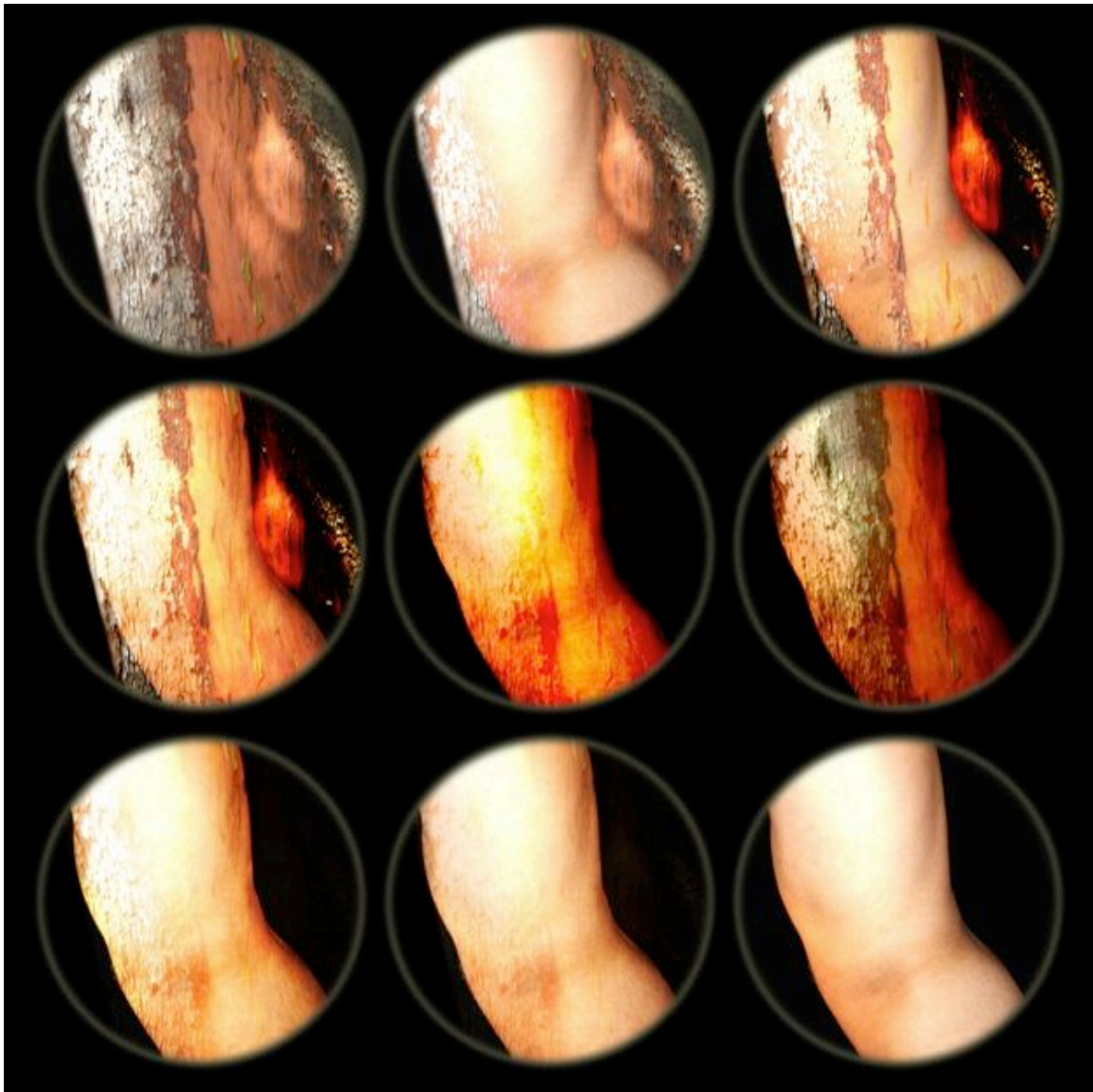


© 2007, Dennis Humphrey.

Figure 14. Digitally unprocessed photo of an arbutus trunk.

The videos were projected onto the lycra skin panels during the awakened state of the piece, as the interactors passed through the space. They showed corporeal transformations from tree (bark) to human (skin).

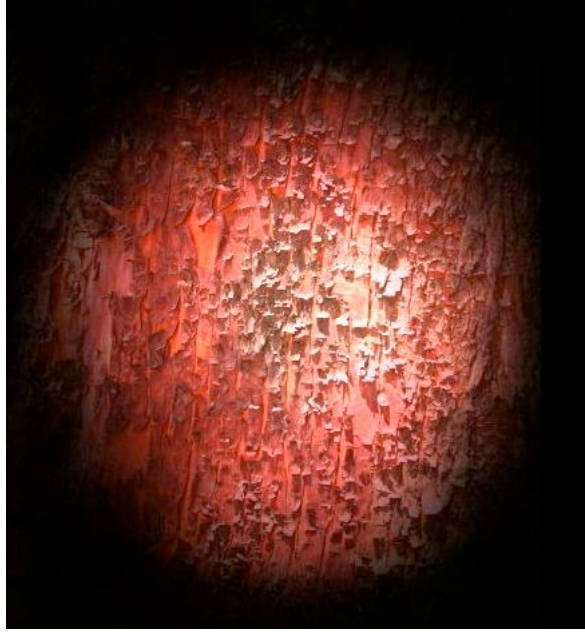
The transformations showed the peeling skin of the arbutus tree progressively superimposed on the model's trunk, layers of skin transforming slowly to reveal sensuous, colourful, tactile textures, trunk on trunk.



© 2007, Dennis Humphrey.

Figure 15. Sequence of stills from one of the nine *transform* videos.

The soundscape included twenty-two short shakuhachi flute clips (Nyogetsu Seldin, 2002) that played during the installation's dormant state, as the piece waited to be awakened by the touch of a human engagent. The system randomly selected a flute clip, played it, then selected another; this audio sequence continued until a haptic event was triggered by touching a skin panel. During this dormant state, one could view a looped video of a pulsing red tree trunk projected onto the fabric, evoking a throbbing heart.



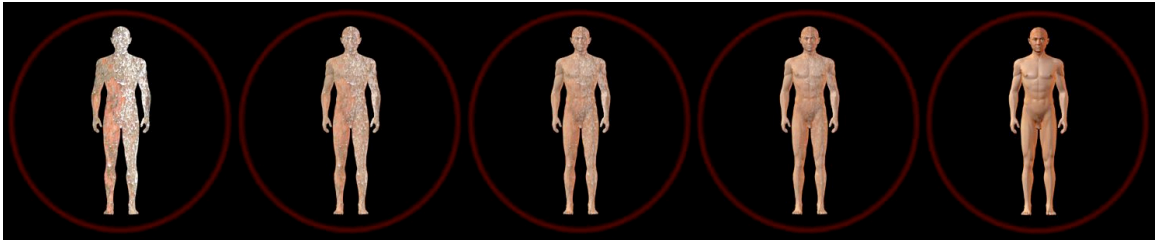
© 2007, Dennis Humphrey.

Figure 16. Image from the *throbbing heart* video sequence.

The lone dormant tree was thus awakened and embodied, taking on a more human form. When an image is textured and slightly out of focus, it seems to invite us to touch with our eyes, to visually caress the image space, its lines and textures, a visual-tactile seduction. I was interested in exploring this visual tactile quality and inviting complicity between tree and human through hapticity. Awakening the tree through touch signalled the beginning of the engagent's experience through the spiralling, enveloping folds of responsivity. If an engagent touched one of the fabric skin-like panels, movement of the fabric was detected by the thin nylon filaments connected to each panel and to a chime suspended above the skin structure. The mechanism was activated by the engagent's touch, the resulting sound detected by a microphone placed in proximity to the overhanging metallic bell structure. When the microphone detected a sound, the piece progressed to its awakened state.

During the piece's awakened state and during the playing of the generative poem, a transformative video, selected randomly by the system from nine possible videos, was projected onto the fabric skins. Each of these videos showed a sequence of transformation from tree to human. If additional haptic events were detected during the awakened state, new generative poems and transformation videos were selected and played by the system.

When no further haptic event was triggered, the piece showed a data visualization video based on the cumulative number of haptic events that had occurred since the beginning of the installation's life. The selected video displayed another transformative sequence where a human icon progressed through various stages, from textured tree bark to human skin. In this way, quantitative data was represented visually, without breaking the qualitative ambiance of the installation.



© 2007, Dennis Humphrey.

Figure 17. Sequence of stills from *data viz* video.

The piece finally reverted to its dormant state, waiting to be touched again, waiting to begin another awakened, conscious, responsive loop.

Several hundred sounds were recorded for the generative poems activated through touch, seemingly emanating from the anthropomorphic tree entity. Once the installation was awakened from its dormant state by a haptic event, a single sound from each of the following five categories was selected randomly by the MAX program and played sequentially as a generative audio poem, with a brief silence inserted between each sound. The first numbers appearing in parentheses for each of the following sound types represents the actual number of sound clips loaded into the MAX program for *sensate skins*, compared to the total variations recorded.

Touching sounds (11/77): 3 possible types: human-human (24); human-tree (32); tree-tree (11). These included recordings of skin on skin, skin on bark, bark on bark and twigs cracking.

Touch - human vocalizations (13/80): 8 possible types: ahh! (5); breath (13); gasp (20); mmm! (11); moan (14); sigh (11); surprise (4); whisper (2)

Touch words - body (10/69): 8 possible types: bodies sleep (1); bodies touch (9); hands reach (10); limbs entwine (10); skins meld (10); skins peel (10); trunks stretch (10); trunks strip (9)

Touch words – qualifiers (7/48): 6 possible types: again (9); hard (5); quickly (9); slowly (7); softly (8); tenderly (10)

Touch words – effects (12/86): 14 possible types: cavernous depths (1); cool nights (1); dark to light (10); deep folds (1); light to dark (9); night heat (12); playful shadows (7); shadows darken (2); shadows deepen (4); shadows lengthen (2); spaces empty (3); spaces fill (10); touch me (11); warm nights (4)

It was theoretically possible, then, for the system to generate thousands of different poems. One possible poem generated randomly could have been:

[sound of skin rubbing against skin]

“ahh!”

“bodies touching”

“softly”

“shadows deepen”

sensate skins expanded on earlier *skins* work. An enhanced physical interaction system was created that facilitated a tighter responsive loop between the haptic inputs and the sonic and visual outputs. More importantly, the *sensate skins* haptic responsive installation allowed further exploration of the notions of embodiment, intercorporeity, encounter, engagement and change.

Under normal circumstances, the originators of an artwork do not know what engagers did, felt and thought when experiencing their piece; mechanisms may not have been in place to gather such information and they may not even be present throughout the event. If the artist was present, some engagers may have shared their impressions orally, or through entries in a guest book, but these accounts might consist of cursory comments. The research study discussed in the next chapter provides a privileged look at what several engagers actually perceived and felt when experiencing the *sensate skins* installation, offering more than a glimpse of their inner, affective worlds.

Chapter Six: Engaging skins — engagent impressions

This chapter describes the purpose of the study as well as the methodology used to undertake it and to gather participant impressions. I discuss the *sensate skins* responsive event itself, as well as the engagents' impressions revealed through their spoken, written and illustrated comments.

Gathering engagent impressions

Invitations were mailed electronically to a group of sixty prospective participants, providing them with information on the study and inviting them to attend the exhibition on the afternoon of December 11, 2006 and provide feedback on their experience of the piece.

Fifteen engagents participated in the *sensate skins* exhibition and participated in the study. Occupations represented by the engagents included graduate student, university instructor, researcher, instructional consultant, artist, media designer, videographer and systems consultant.

The ambiance of the space itself was staged to immerse the participants in a dark, quiet and inviting surrounding from the onset. Participants first entered the large i-Lab blackbox where two large spaces were delimited using black curtains. To the left of the entrance was the larger space that comprised a small table where engagents sat and were briefed; a large *sensate skins* poster and floating string of lights was also visible. At another table with five chairs, engagents could sit and quietly record their impressions after the viewing; rice-filled lycra pods similar to those in the exhibit were placed on the table to provide a tactile experience; another table was set up with a few chairs for light refreshments: cranberry juice and sushi. The whole space was bathed soft light from overhead spotlights.

The second, smaller space was separated from the first by a black curtain. This is where the installation was set up. The whole space was permeated with soft sounds coming from the exhibition space: shakuhachi flute and generative poems. Upon first entering the installation space, one noticed the dynamic images of repeating folded

fabric projected on one of the fabric panels. Other images were projected in a porthole fashion onto a panel located inside the installation, yet visible through the semi-transparent fabric. A draped panel of shiny mottled gold and red fabric hung to the right of the entrance to the installation itself, bathed in diffused light from an overhead spot.

After signing the consent forms, participants in the study were instructed on the procedure. They were asked to first read the instructions found inside the impressions booklet (see *Appendix 2*). They would then enter the installation itself and experience it; they were provided with bells to wear on the wrist of their dominant hand and were told this might be used to interact with the piece. Once they were finished experiencing the installation, they would proceed to the table outside the exhibit to handwrite their impressions using the booklet and pencil provided or record their impressions using the audio recorder, which they would hand over to myself. After completing these tasks, they could partake of cranberry juice and sushi provided at another table, nearer to the entrance. They were then escorted to the exhibition area and told to step on the red carpet in order to avoid the cables running under it. They were also advised that a video camera would be recording their movements while they were inside the installation space.

Fourteen engagents recorded their impressions by writing and drawing on the blank, unlined pages of their booklet; one preferred to make use of the voice recorder. *Appendix 2* presents full transcriptions of their impressions and reproduces as faithfully as possible any special formatting used in their accounts, including accompanying sketches. It is interesting to note that several engagents adopted a poetic or telegraphic style when writing their impressions, perhaps echoing the style of the instructions.

Treatment of engagent impressions

I looked for two types of statements from the data, across the subjects. First, I looked for qualitative physical descriptors related to the engagents' perceptions of their touching, seeing and hearing experience; these statements represented more objective descriptions of the external sensory stimuli, as witnessed by the engagents. Secondly, I extracted statements related to the thoughts, feelings and sensations those sensory perceptions evoked in the engagents; these statements were more subjective in nature. Engagents made ample use of rich metaphors to describe the experiences they felt.

For the data on sensory qualifiers or descriptors, I made use of Creswell's phenomenological methodology, discussed earlier in *Chapter 2 (Procedural considerations)*,

attempting to horizontalize the data, looking for common statements across subjects, and organized them into thematic clusters: seeing, touching and hearing. I added sub-categories, where appropriate, to clarify the specific elements being described; for example, under “seeing”, I created the sub-category “main video projection” to cluster the visual descriptors or qualifiers that were related to that fabric panel. Each statement was used but once; for instance, if three engagents said the fabric was “soft”, it was listed once in the “touching” mind map. Mind maps summarizing engagent statements related to their sensory perceptions, clustered thematically under seeing, touching and hearing, are found in *Appendix 3* (see *Figures 23-25*).

For the data describing what engagents felt or thought, I proceeded in a similar fashion, horizontalizing the statements and clustering them under five common themes: space, sensuality, responsivity, relationships and other states. These types of statements tended to be longer, since many engagents used rich metaphors to describe their felt experiences. As well in *Appendix 3*, mind maps summarizing statements related to their felt experiences can be found, clustered thematically under space, responsiveness, encounters, sensuality and other states (see *Figures 26-30*).

Rather than display the engagent information in tables, I opted for a more organic visualization of the engagent data through the use of mind maps, echoing the format of their metaphorical impressions. These thematic groupings provide a starting point for my discussion of the findings.

Insight from engagent impressions

There were, in some cases, commonalities related to the engagents’ physical, sensory perceptions (e.g., touching, seeing, hearing); these are their perceptions of a visible outside world. As well, there were some common descriptions related to related to their feelings or thoughts. Mostly, though, the statements provided by the engagents of their individual experiences were private, personal and subjective, reaffirming for themselves what they felt and providing a “what it was like” aspect (Nagel, 1974) for readers who may not have experienced the installation. These were internal perceptions revealing what they felt inside. Their impressions were freely expressed in the spirit of sharing, showing a high level of trust in the process and the artist-researcher, as well as a desire to better understand responsivity.

Sensory perceptions

Sensory perceptions: touching

The skin-like fabric panels, described as membranes, were soft and cool to the touch for most, or rough for one; one engagent said the fabric was “silky like the sheet of a lover’s bed.” The surface was drum-like and malleable. The torn red panel was described as feminine, a large, gaping hole. Both the fabric panels and the shiny draped curtain invited touch. The hanging gendered fabric sacs were referred to as masculine soft and hard skin and bits, long balls, or breasts, whereas the panels with the beaded dimensional nubs were felt as soft, male-female skin and bumps, like nipples. Referring to these gendered elements, one engagent wanted to “put them together.” The nylon trigger lines sewn into the fabric panels were described by some as tactilely interesting and prompting touch, whereas others indicated that they were distracting, not interesting or that they were “snared” by them.

Sensory perceptions: seeing

Engagents described their visual perceptions of the main video projection (*Figure 13*) and the porthole projections (*Figure 15*). Generally, the visuals had a painted, abstract quality and were warm and soft, passionate and bold, the layered colours having a rich palette and a pleasing contrast of primal colours, red being described as passionate and bold. The moving qualities of the unclear images were qualified as mutating, evanescent, overlapping, ever-changing layers of colour, with no real start or end, like sheets billowing around them. Similar metaphors were used to describe the egg-like porthole visuals showing body, trunk and limbs transitioning from abstract to concrete and back again. These were also found to be attractive, showing soft, melding lines, from light to dark, and evoking the notion of culmination. Some engagents stated they were distracted by the visibility of the technology; for instance, they tended to look up at the nylon filaments and bells.

Sensory perceptions: hearing

The shakuhachi flute sounds that played during the dormant state were found to be sad, soft, warm and flowing. The spoken word and sound audio clips that comprised of the generative poems played during the awakened state seemed soft, warm, rich, guiding and embracing. The deep voice, speaking in a whispered tone, seemed to long for physical contact. For one engagent, however, the spoken words and sounds had an

air of 'installation,' so they were ignored. As for the wrist bell most of the engagents wore on their wrists, one engagent liked the combination of this sound with that of the flute; another could not determine the cause-effect relationship between the sound of the wrist bell and the piece. One other was distracted by the sound of the rope that suspended the bamboo grid as it swayed slightly.

In general, it appears that the engagents found the elements they perceived by touching, seeing and hearing to provide a favourable sensory experience. The basic haptic quality of the fabric could be further enhanced by sewing the nylon filaments into fabric layers, making it more discreet and less disruptive to the experience. Their descriptions of the visual, auditory and haptic qualities of the piece resonate with the intent of the artist who wanted to imbue the piece with a certain sense of drama and to provide sensory catalysts for encounter, engagement and transformation.

Felt experiences

This section delves more deeply into these rapports by examining the way the engagents were affected by the sensory stimuli, how their sense perceptions triggered more affective, "felt" sensations. Engagent statements related to their felt experiences were clustered loosely under space, sensuality, responsiveness, encounters and states of being. These statements reflect what individual engagents felt as a result of their sensory perceptions. It is relatively easy to cluster thematically statements dealing with the engagents' sensory perceptions, since these are mostly descriptive in nature and relate directly to the physical senses. As for clustering statements related to felt sensations and experiences, it is more difficult to do so, since engagents tended to adopt a more affective, metaphorical language to capture their thoughts and feelings. For these reasons, a certain transparency, folding and overlapping is to be expected in the thematic clusterings. The themes for these clusters were established based on the frequency of related statements in the overall set of accounts; all engagent impressions appear in one of the clustered themes. Most of their statements were written in spurts of metaphors, often adopting a verse-like poetic style, with a spacing of text elements that exploited the use of punctuation, page orientation (horizontal or vertical, white space and inclusion of small sketches. Using these structural elements would allow a more rapid recording of their impressions as they recollected the events they had just experienced. Their accounts were transcribed as faithfully as possible in *Appendix 2*.

Felt experiences: space

Some engagents described the space as “visually forceful, a “fold within a yet bigger fold” or a “layer in yet a larger series of layers,” whereas others felt confined, yet safe in the space. Some felt anxious, boxed-in or cornered within a small space, “trapped in a maze with no way out.” Another described the installation as “small yet expansive, minimal yet complex, obscure yet grounded, yearning yet tangible.” In reacting to viewing the moving images constantly projected onto the main panel, some engagents experienced a sense of vertigo, though it was not always unpleasant, describing the feeling as “all fabrics coming to me,” or “lost my balance on the moving images.”

The space provided for the installation may have been too small; it was set up in the corner of a room, providing no access by the engagents to the outside layers. It would have been more effective, as was originally intended, to be displayed centrally so that engagents could walk around the structure and explore the outer walls of the fabric installation. Most engagents were able to experience the installation individually. For some, the space may have felt too confining since they experienced the piece with another person.

Felt experiences: sensuality

Very private, subjective and revealing statements were made by the engagents related to the sensual qualities of *sensate skins*. Many described what they felt using terms such as gentle and sensual (or extremely sensual), passion, arousal, taboo, voyeuristic, curiously sexual, sexual provocation, or mildly homoerotic. One person wondered whether they should be hearing the generative poems. “Lost in a world of desire and desperation,” or “in a world of pleasure,” were some of the statements recorded by engagents. One engagent wondered if he himself or others were experiencing his sensuality, who would “have compatible sensuality,” and whether he wanted to “revive” himself. Other impressions included references to the “sensual emergence of indulgence” and the “permeability of expectations.”

It seems clear from the above accounts that the responsive installation had a more affective impact on the engagents than those related to space which were more physical in nature. The sensual nature of images, sounds and touched elements may have triggered entrance into deeper realms of the self, where thoughts and sensations surfaced and they were able to reflect on some of these felt experiences. In this way, perhaps the installation played some role in exteriorizing their interior states, perhaps

even initiating self-awareness or a minor change or transformation in perception or perspective. Unless verbalized in a nurturing environment, these states may not usually be expressed to others or to oneself, nor perhaps consciously felt by the engagers.

Felt experiences: responsiveness

Engager responses indicate that the piece was appropriately responsive and that it prompted or invited touch; one person said that it was “open and welcoming”, another commenting on the fact that the piece did not present touch boundaries, as might be the case in other exhibitions. The narration seemed to capture engager interest, some wanting to hear more. They were not sure whether sound or touch activated the response, or noted that the fabric responded to touch, but the images or sound did not respond to stimuli. One person was quite surprised when he elicited an audio response; some paired engagers wondered what responses they may have triggered individually, as opposed to their partner, or how the experience might have been if they had experienced the piece alone rather than as a twosome. One respondent enjoyed bouncing the hanging appendages off the adjoining skin panels, feeling a sense of control. One respondent would have preferred to experience the piece in silence, without the narration, which he felt was telling him what to do; he also noted that the pad of paper he was holding was a “constant reminder that the experience was purposeful”.

The prototype installation seems to have offered a favourable responsive experience for most of the respondents.

Felt experiences: encounters

Several accounts allude to feelings related to encounters or relationships of various kinds with the artwork. There was a sense of agency with the content; it was described like an entity, calling or drawing them to “come by and experience.” For others, it felt like touching a body, like being inside someone’s organs or another body, or touching one, or like “entering a large womb.” It also felt like being in a cavern with rocks and stones. Some felt “companionship and comfort in a friend nearby,” or concern and nervousness about pushing the skins too far for fear of puncturing or damaging the membranes. Another felt it would be disrespectful to go too far with the manipulation of the gendered elements. One person felt initial concern or alarm when viewing the images projected on the porthole panel, possibly because of the reddish colour or the

sensual, textured bodies. For another, the porthole videos were not as engaging as the main panel projections.

It seems evident from the above statements that most of the engagers did feel as though they were interacting empathically with a non-human entity that had organic, human-like characteristics and, in some cases, feelings of its own. These reflect the notion of intercorporeity. The engager statements relating to sensuality in the previous section also support this notion.

Felt experiences: states of being

Other states of being were felt by the engagers, in addition to space, sensuality and relationships. Some of these could have been categorized under the sensory perception clusters, but it was decided that, if the engager used more subjective terms to describe a sensory perception, the statement would be included under one of the “felt experiences” thematic clusters. For instance, the term “felt soft” describes the physical quality of touch, whereas “felt bewitching” or “was impressed by the sound of the flute” are more affective and evoke “felt” qualities more generally related to one’s state of being or overall feeling. The former would be listed under *Sensory perceptions: touching*, whereas the latter would appear under *Felt experiences: states of being*.

Statements related to physical feelings included a warm sensation on the back, relaxation, or a sense of flow; others described a choking feeling as the images drew closer, repulsion from sudden changes in the video images, getting a headache, feeling skin pores breathing, or being interested in leaving. Some engagers felt a sense of flow or timelessness, they were floating, they felt relief from daily worries, or their “brain was so busy and everything was awakened.” One engager said it was a great 3D experience. The sound of the flute was calming, impressing, slowed some of them down; for others, it was provocative or they were touched. Other descriptions related to experiencing the piece included: ritual-like, fascinating, bewitched, meditative, mesmerizing, very transcendental, enhancing (“is it ok if I stop thinking?”). More existential states were evoked in descriptions such as “touching my own hands through the skins was extremely sensate,” “felt a spirit beyond everything,” “took me to a space beyond flesh,” birth, mankind, destruction and construction, “felt vulnerability and sacredness of mankind,” “left with a sensitive image of mankind,” “reality returns and then vanishes — touch frees them all,” or “felt a bit better about the decay of flesh as in death.”

The impressions shared by the engagers on their experiences described sensory perceptions related to touching, seeing and hearing—experiences related to the visible, external world that can be physically witnessed by other engagers. Other accounts related to feelings they experienced regarding the installation space, responsiveness, sensuality, encounters with the installation and other states of being. These were more affective impressions that revealed internal worlds, usually more private and invisible, worlds invoked through a lived, responsive experience with an artwork.

So far, I have examined notions and approaches to the body and the psyche, and how we can perceive the external world through our senses. I have also examined elements and models of responsivity and shown examples of haptic responsive installations. I have unfolded a responsive aesthetics that informed the design of *sensate skins*, a prototype haptic responsive installation. Finally, impressions collected at the exhibition using phenomenological methods provided evidence of inner, affective worlds revealed by engagers as they experienced the piece. This has further informed the artist-researcher's understanding of responsivity.

In the final chapter, I provide concluding remarks regarding the methodologies used, how the installation could be further enhanced, what other domains could be explored and whether or not I was able to find answers to my research questions.

Chapter Seven: Folding skins – discussion and future explorations

Methodologies

As the artist and researcher in this research, I used artistic as well as phenomenological methodologies. The purpose of the study involving engagents was not to gather quantitative data from them in order to confirm the elements of a universal aesthetics of haptic responsivity. Its intent was to have engagents experience a prototype responsive installation and invite them to share their first-person accounts describing “what it was like” for them to experience *sensate skins* on that day, at that time, as they were on that day and time. It was an attempt to open up the folds of experience, demystify a work of art, probe into the process of interaction and get a privileged glimpse of what they lived both physically and affectively. My role as artist-researcher was to lend meaning and interpretation to their accounts through a second-person methodology; it was not to psychoanalyze their impressions. This phenomenological approach provided rich content most relevant to the development of a responsive aesthetics that informs an art installation. I propose this method to all artists interested in finding out what types of experiences are triggered through sensory contact with their responsive works since these accounts can further enrich their art practice and ensure a higher degree of responsivity between originator, artwork and engagent.

Installation enhancements

Engagents suggested ways of improving the hapticity of the fabrics, including sandwiching the nylon trigger lines between two sheets of fabric or using a softer fabric. One person felt that the setup of the space was too small, triggering anxiety. A few persons also suggested that the addition of a subtle smell or incense would enhance their experience.

Based on my observations of the findings as artist and comments suggested by the engagents, I would focus on specific enhancements to the installation itself, if another iteration of the piece were to be exhibited at a later date. I would design a larger, less confined installation. Rather than install it in a corner, it would be located centrally in a large room, allowing engagents to walk around it and explore its outside

dimensions. This would allow the installation to be perceived from the inside and the outside as a whole entity. As well, I would embed the nylon lines between two layers of fabric so as not to interfere with the engager's tactile sensation or interrupt the tactile experience. More research would also be required to find inexpensive, innovative tactile sensors that could be embedded into the fabric, or a skin-like fabric incorporating sensors; this would actually rely on tactile input (rather than sound) to trigger the media events. It would be important to design a responsive installation that was collapsible, portable and non-site specific, allowing for faster setup time. The inclusion of smell as another sense to be experienced by the engagers would need to be considered (e.g., musk perfume or cedar oil). However, one must in mind the potential negative impact of using smell because of allergies and the fact that smell triggers memories, sometimes negative, that could interfere with the overall experience. The outputs or responses should be more relevant and contextual to the engager haptic inputs; this would require more robust programming; one might also consider the possibility of having the engagers speak to the entity, triggering a response, and possibly enhancing the sense of agency, dialogue and encounter with the piece. It would be important to ensure that only one engager enters the installation at a time and that he or she has sufficient time to experience the piece.

Future explorations

This research has unfolded a number of areas to further our understanding of responsivity. The following questions provide food for thought:

- How could an understanding of proxemics enhance the design, construction and installation of a responsive piece with regards to personal and social spaces?
- Do different types of sensory stimuli (haptic, visual, auditory) trigger different types of felt experiences in engagers?
- How can interactive electronic textiles provide a skin-like, malleable haptic interface between the engager and the art installation?
- How could descriptions of touch-effort based on finger, hand, arm and body gestures be adapted from the Laban Movement Analysis system to better describe recorded engager actions in a responsive space? As well, how could the use of an infra-red video camera aid in detecting and tracking engager movement in a responsive installation space?

- Can a conceptual *rapprochement* between phenomenological and psychoanalytic perspectives better inform our understanding of an affective responsive aesthetics that focuses on the senses, consciousness, the body, gender and sexuality?
- Can neo-baroque aesthetics and sensibility inform a folded view of responsivity, knowledge and research?

Review of research questions

The questions that initially guided this research were as follows:

- What is responsivity and how can its qualitative elements contribute to the elaboration of an affective responsive aesthetics?
- How do the concepts of self, the body, the interface, encounters, intercorporeity, agency and change inform the dynamics of a responsive experience?
- How can the senses, more specifically touch, facilitate a personal, reciprocal engagement between the engagent and the artwork?
- Can a responsive installation evoke in engagents the surfacing of unconscious responses through sensory perception, and invoke a greater conscious awareness of ourselves, others and the world?

The first two questions were addressed in *Chapter 4, Responsive Skins — theories of interactivity and responsivity*, through the discussion of various models of responsivity and the elaboration of a responsive aesthetics of affect and lived experience. *Chapter 3, Experiential Skins — theories of the body and perception*, introduced theoretical concepts related to phenomenology and psychoanalytic theory that informed the second question. *Chapter 5, Felt Skins — haptic responsive installations*, also shed light on the first question by providing concrete examples of effective responsive artworks exhibited by other artists.

The third question related to the senses and haptics was discussed in *Chapter 3, Experiential Skins — theories of the body and perception*. Visuality and audition, as well as the more primal and proximal qualities of touch can trigger encounters between an engagent and an artwork.

The fourth question dealt with the surfacing of *pulsions* and a resulting awareness or change in the way we perceive ourselves and the world. This notion was

confirmed by engagent impressions describing their felt experiences, as discussed in *Chapter 6, Engaging skins – engagent impressions*.

Responsivity is a dynamic process that mediates between engagent and artwork, traversing layers of consciousness and visibility, and revealing transparencies, and porosities. In so doing, it facilitates sensory crossovers and the surfacing of affect through deepening, enveloping folds. Though much has been done in the last decade to identify elements of responsive aesthetics pertaining to computer interaction and virtual reality, more exploration is needed, using appropriate methodologies, to articulate a haptic, responsive aesthetics that focuses on embodied, lived experiences involving humans engaging physically and affectively with an actual artwork.

Notes

¹ Dick Higgins, *A Dialectic of Centuries*, 1978, as cited in McHale, 1987. Note that my use of “liminal” or “floating” citations of this type is not in strict compliance with the APA style to which I have tried to adhere in writing this thesis. Usually found at the beginning of a chapter or section, these right-justified, italicized citations are intended as visual elements for the reader’s reflection. So as not to detract from the reading experience, the author, year and page number references are not embedded in the body of the text, but provided in these notes. Another divergence from the APA style will be noticed in the Bibliography where each author’s full given name is included, when available.

² Throughout this thesis, I use the term “engagent” when referring to human participants using computer input devices such as a mouse, keyboard or data glove with a computer-based interactive work displayed in a virtual world generated by a computer by means of a computer screen or a head-mounted display. I also use this term to signify the material players, both human and non-human in a physically based responsive installation.

³ Kimmel, 2000, p. 6.

⁴ Varela & Shear, 1999, p. 14.

⁵ Page numbers for this work refer to an unpublished draft provided by the author and currently in print for Fall 2007.

⁶ Elkins, 1999, p. 42.

⁷ Lupton, 2002, detachable front/back cover strip.

⁸ Pallasmaa, 2005, p. 11.

⁹ Zidianakis was artistic director of *Ptychoseis = Folds + Pleats*, an exhibition held in conjunction with the *Pleats and Folds, Multiple Meanings* conference in Athens in 2004. Both focused on drapery from ancient Greece to contemporary fashion. See <http://ptychoseis.snp.gr/>

¹⁰ This is my rendition of the black and white line sketch included in Freud’s original 1932 work. In referring to his diagram, Freud cautions: “You must not imagine sharp dividing lines such as are artificially drawn in the field of political geography. We cannot do justice to the characteristics of the mind by means of linear contours, such as occur in a drawing or in a primitive painting, but we need rather the areas of colour shading off into one another that are to be found in modern pictures. After we have made our separations, we must allow what we have separated to merge again. Do not judge too harshly of a first attempt at picturing a thing so elusive as the human mind.” Freud further states that we should imagine the space occupied by the id as “incomparably greater” than that of the ego or the preconscious (p. 98). I was initially interested in Freud’s sketch as a model for the design of the *sensate skins* environment, but decided to focus instead on a more open architecture. See <http://www.marxists.org/reference/subject/philosophy/works/at/freud2.htm> for a full-text version of his original “Lecture XXXI (1932), The Anatomy of the Mental Personality”, including the diagram in question.

¹¹ Grosz, 1999, p. 154.

¹² This type of notation would be useful in a research study intended to describe various qualities of hand, arm and body gestures or movements. In the case of this research, however, the source of data is the engagents’ personal accounts of their individual sensory experiences.

¹³ Marks, 2002, as cited in Laine, 2006, p. 94.

¹⁴ Johann Wolfgang von Goethe, as cited in “Not Architecture But Evidence That It Exists: Lauretta Vinciarelli Watercolors”, Brooke Hodge (Ed.), p. 130.

¹⁵ According to McHale, Ingarden also uses the term “ontic spheres” when describing these worlds.

¹⁶ Beaudelaire, 1964, p. 116.

¹⁷ Maurice Merleau-Ponty, as cited in Levin, p. 1.

¹⁸ Murray further clarifies on p. 99 that, in a participatory medium, immersion “implies learning to swim, to do the things that the new environment makes possible.”

¹⁹ It would seem that the non-human engagent’s responsiveness would require that a human entity first perceive it.

²⁰ Ernesto Neto, as cited in Art Gallery of New South Wales, 2002.

²¹ Stocking, styrofoam and sand. Approximately 12 ft high x 15 ft wide x 21 ft long.

Bibliography

- Ackerman, Diane. (1990). *A natural history of the senses*. New York: Random House.
- Aristotle. (1986). *De anima (On the soul)* (Hugh Lawson-Tancred, Trans.). London & New York: Penguin Books.
- Art Gallery of New South Wales. (2002). *Ernesto Neto: A new work created for the art gallery of New South Wales*. Retrieved December 14, 2006, from http://www.artgallery.nsw.gov.au/media/archives_2002/ernesto_neto
- Ascott, Roy (Ed.). (1999). *Reframing consciousness*. Bristol: Intellect.
- Bachelard, Gaston. (1964). *The poetics of space* (Maria Jolas, Trans.). Boston: Beacon Press.
- Bachelard, Gaston. (1964). *The psychoanalysis of fire* (Alan C. M. Ross, Trans.). Boston: Beacon Press.
- Bachelard, Gaston. (1971). *The poetics of reverie*. Boston: Beacon Press.
- Bataille, Georges. (1986). *Erotism: Death and sensuality*. San Francisco: City Lights Books.
- Baudelaire, Charles. (1964). *The painter of modern life and other essays* (Jonathan Mayne, Trans.). London: Phaidon.
- Baudelaire, Charles. (1992). *Flowers of evil and other works* (Wallace Fowlie, Trans.). New York: Dover Publications.
- Baudelaire, Charles. (1998). *Selected poems from Les fleurs du mal: A bilingual edition* (Norman R. Shapiro, Trans.). Chicago: University of Chicago Press.
- Beesley, Philip, Hirosue, Sachiko, & Ruxton, Jim. (2006). Toward responsive architectures. In Philip Beesley, Sachiko Hirosue, Jim Ruxton, Marion Traenkle & Camille Turner (Eds.), *Responsive architectures: Subtle technologies 2006* (pp. 3-11). Cambridge, ON: Riverside Architectural Press.
- Beilharz, Kirsty. (2004). *Interactively determined generative sound design for sensate environments: Extending cyborg control*. Paper presented at the IE 2004 Australian Workshop on Interactive Entertainment, University of Technology, Sydney, Australia.
- Beyst, Stefan. (2005). *Mimesis: Reconsideration of an apparently obsolete concept*. Retrieved October 21, 2006, from <http://d-sites.net/english/mimesis.htm>
- Biggs, Michael A. R. (Ed.). (2000). Editorial: The foundations of practice-based research. *Working papers in art & design*, 1. Retrieved January 13, 2006, from <http://www.herts.ac.uk/artdes1/research/papers/wpades/vol1/vol1intro.html>
- Biggs, Michael A. R. (Ed.). (2002). Editorial: The concept of knowledge in art and design. *Working papers in art & design*, 2. Retrieved January 26, 2007, from <http://www.herts.ac.uk/artdes1/research/papers/wpades/vol2/intro02.html>

- Blaser, Werner von, & Müller, Lars (Eds.). (2001). *Habit-habitat: Christa de Carouge*. Baden: Lars Müller Publishers.
- Boff, Kenneth R., Kaufman, Lloyd, & Thomas, James P. (Eds.). (1986). *Handbook of perception and human performance: Cognitive processes and performance* (Vol. 2). New York: Wiley.
- Bolter, Jay David, & Gromala, Diane. (2003). *Mirrors and windows: Design, digital art, and the myth of transparency*. Cambridge, MA: MIT Press.
- Boyd, Robert D., & Myers, J. Gordon. (1988). Transformative education. *International Journal of Lifelong Education* 7, 4(October-December), 261-284.
- Braddock Clarke, Sarah E., & O'Mahony, Marie. (2006). *Techno textiles 2*. New York: Thames & Hudson Inc.
- Brougher, Kerry, et al. (2005). *Visual music: Synesthesia in art and music since 1900*. Washington, DC. Thames & Hudson.
- Buisson, Dominique. (2003). *Japan unveiled: Understanding Japanese body culture*. London: Hachette Illustrated UK.
- Butler, Judith. (1990). *Gender trouble: Feminism and the subversion of identity*. New York: Routledge.
- Butler, Judith. (1993). *Bodies that matter: On the discursive limits of "sex"*. New York: Routledge.
- Butler, Judith. (2004). *Undoing gender*. New York: Routledge.
- Carter, Rita. (1998). *Mapping the mind*. London: Weidenfeld & Nicolson.
- Classen, Constance. (2005). *The book of touch*. Oxford: Berg.
- Connor, Steven. (2004). *The book of skin*. Ithaca, NY: Cornell University Press.
- Creswell, John W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage Publications.
- Cytowic, Richard E. (1988). Tasting colors, smelling sounds. *The Sciences*, 28(September/October 1988), 32-37.
- Cytowic, Richard E. (2002a). *Synesthesia: A union of the senses* (2nd ed.). Cambridge, MA: MIT Press.
- Cytowic, Richard E. (2002b). Touching tastes, seeing smells—and shaking up brain science. *Cerebrum*, 4(3), 7-26.
- Deleuze, Gilles. (1993). *The fold: Leibniz and the baroque* (Tom Conley, Trans.). Minneapolis, MN: University of Minnesota.
- Dennett, Daniel C. (1991). *Consciousness explained*. Boston: Little, Brown & Co.
- Dennett, David. (1988). Quining qualia. In A. J. Marcel & E. Bisiach (Eds.), *Consciousness in contemporary science*. Oxford: Clarendon Press.

- Depraz, Natalie, Varela, Francisco J., & Vermersch, Pierre (Eds.). (2003). *On becoming aware: A pragmatics of experiencing*. Philadelphia, PA: John Benjamins Publishing Company.
- Diller, Elizabeth, & Scorfido, Ricardo. (1994). *Flesh: Architectural probes*. New York: Princeton Architectural Press.
- Douglas, Anne, Scopa, Karen, & Gray, Carol. (2000). Research through practice: Positioning the practitioner as researcher. *Working papers in art & design*, 1. Retrieved January 13, 2006, from <http://www.herts.ac.uk/artdes1/research/papers/wpades/vol1/douglas1.html>
- Doy, Gen. (2002). *Drapery: Classicism and barbarism in visual culture*. London: I. B. Tauris.
- Elkins, James. (1999). *Pictures of the body: Pain and metamorphosis*. Stanford, CA: Stanford University Press.
- Ettling, Dorothy. (2006). Ethical demands of transformative learning. *New directions for adult and continuing education*, 109(Spring 2006), 59-67.
- Fernandez-Cid, Miguel. (2002). Thin sculptures. In Centro Galego de Arte Contemporanea (Ed.), *Ernesto Neto: O corpo, nu tempo* (pp. 29-31). Santiago de Compostela, Spain: Xunta de Galicia.
- Field, Tiffany. (2001). *Touch*. Cambridge, MA: MIT Press.
- Fisher, Jennifer. (1997). Relational sense: Towards a haptic aesthetics. *Contemporary Art Magazine*(87), 4-11.
- Flynn, Bernard. (2004). *Maurice Merleau-Ponty: Ontology of the flesh*. Retrieved August 12, 2006, from <http://plato.stanford.edu/entries/merleau-ponty/#7>
- Fortin, Simone. (1999). Ernesto Neto: Bonakdar Jancou gallery, New York. *Parachute*(94), 58-59.
- Fortunati, Leopoldina, Katz, James E., & Riccini, Raimonda (Eds.). (2003). *Mediating the human body: Technology, Communication, and Fashion*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Freud, Sigmund. (1933). *New introductory lectures on psycho-analysis* (W.J.H. Sprott, Trans. & James Strachey, Ed.). New York: W.W. Norton & Co.
- Gibson, James Jerome. (1966). *The senses considered as perceptual systems*. Boston: Houghton Mifflin.
- Gibson, James Jerome. (1986). *The ecological approach to visual perception*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Gigliotti, Carol. (1995). Aesthetics of a virtual world. *Leonardo*, 28(4), 289-295.
- Gigliotti, Carol. (2003). *Women and the aesthetics of new media*. Retrieved July 17, 2006, from <http://tracearchive.ntu.ac.uk/Opinion/index.cfm?article=71>
- Graham, C.E. Beryl. (1997). *A Study of audience relationships with interactive computer-based visual artworks in gallery settings, through observation, art practice, and curation*. Unpublished Ph. D. thesis, University of Sunderland, Sunderland, UK.

- Grosz, Elizabeth. (1994). *Volatile bodies: Toward a corporeal feminism*. Bloomington and Indianapolis: Indiana University Press.
- Grosz, Elizabeth. (1999). Merleau-Ponty and Irigaray in the flesh. In Dorothea Olkowski & James Morley (Eds.), *Merleau-Ponty: Interiority and exteriority, psychic life and the world* (pp. 145-166). New York: State University of New York Press.
- Gullar, Ferreira. (1959). *Neo-Concrete manifesto*. Retrieved July 14, 2006, from http://www.coleccioncisneros.org/st_writ.asp?ID=10&Type=2
- Hall, Edward T. (1959). *The silent language*. Garden City, NY: Doubleday.
- Hays, K. Michael. (1998). Not architecture but evidence that it exists: A note on Laurretta Vinciarelli's watercolors. In Brooke Hodge (Ed.), *Not architecture but evidence that it exists: Laurretta Vinciarelli watercolors*. Princeton: Princeton Architectural Press.
- Heyrman, Hugo. (2005). *Art and synesthesia: In search of the synesthetic experience*. Paper presented at the First International Conference on Art and Synesthesia, Universidad de Almeria, Spain.
- Hisamatsu, Shinichi. (1982). *Zen and the fine arts* (Gishin Tokiwa, Trans.). Tokyo: Kodansha International.
- Hocquenghem, Guy. (1978). *Homosexual desire* (Daniella Dangoor, Trans.). Durham, NC: Duke University Press.
- Hovagimyan, G.H. (1997). *Notes on immersion*. Retrieved November 26, 2002, from <http://artnetweb.com/port/immersion/>
- Imel, Susan. (1998). *Transformative learning in adulthood*. Retrieved August 22, 2006, from <http://www.calpro-online.org/eric/docgen.asp?tbl=digests&ID=53>
- Ingram, Jay. (2005). *Theatre of the mind: Raising the curtain on consciousness*. Toronto: HarperCollins Canada.
- Ishioka, Eiko. (1990). *Eiko on Eiko: Eiko Ishioka, Japan's ultimate designer*. San Francisco: Chronicle Books.
- Ishioka, Eiko. (2000). *Eiko on stage*. New York: Callaway.
- Jimenez, Jose. (2002). The cosmos in the skin. In Centro Galego de Arte Contemporanea (Ed.), *Ernesto Neto: O corpo, nu tempo* (pp. 209-211). Santiago de Compostela, Spain: Xunta de Galicia.
- Jones, Amelia. (2004). Televisual flesh: Activating otherness in new media art. *Parachute*, 113(Jan/Feb/Mar), 71-91.
- Jones, Carolyn A. (Ed.). (2006). *Sensorium: Embodied experience, technology, and contemporary art*. Cambridge, MA. MIT Press.
- Katz, David. (1989). *The world of touch* (Lester E. Krueger, Trans.). Hillsdale, NJ: Lawrence Erlbaum Associates.

- Kimmel, Lawrence. (2000). Paradox and metaphor: An integrity of the arts. In Marlies Kronneger (Ed.), *The orchestration of the arts - a creative symbiosis of existential powers: The vibrating interplay of sound, color, image, movement, rhythm, fragrance, word, touch* (Vol. 63, Analecta Husserliana: The yearbook of phenomenological research, pp. 5-16). Dordrecht, Netherlands: Kluwer Academic Publishers.
- Koren, Leonard. (1994). *Wabi-sabi for artists, designers, poets & philosophers*. Berkeley, CA: Stone Bridge Press.
- Kozel, Susan. (2007). *Closer: performance, phenomenology, technologies*. Cambridge, MA: MIT Press.
- Kozel, Susan, & Schiller, Gretchen. (2006). *passus: A choreographic system for kinaesthetic responsivity*. In Philip Beesley, Sachiko Hirose, Jim Ruxton, Marion Traenkle & Camille Turner (Eds.), *Responsive architectures: Subtle technologies 2006* (pp. 98-101). Cambridge, ON: Riverside Architectural Press.
- Kristeva, Julia. (1982). *Powers of horror: An essay on abjection*. New York: Columbia University Press.
- Krueger, Myron. (2003). Responsive environments. In Noah Wardrip-Fruin & Nick Montfort (Eds.), *The language of new media* (pp. 377-387). Cambridge, MA: MIT Press.
- Kubota, Itchiku. (1984). *Opulence: The kimonos and robes of Itchiku Kubota*. Tokyo: Kodansha International.
- Lacan, Jacques, & Miller, Jacques-Alain. (1981). *The four fundamental concepts of psychoanalysis* (Alan Sheridan, Trans.). New York: W. W. Norton & Company.
- Laine, Tarja. (2006). Cinema as second skin. *New review of film and television studies*, 4(2), 92-106.
- Laurel, Brenda. (1993). *Computers as theatre*. Reading, MA: Addison-Wesley Publishing Co.
- Laurel, Brenda (Ed.). (2003). *Design research: Methods and perspectives*. Cambridge, MA: MIT Press.
- Léon, David de. *The qualities of qualia*. Retrieved January 6, 2007, from http://www.lucs.lu.se/ftp/pub/LUCS_Studies/LUCS58.pdf
- Levin, David Michael (Ed.). (1993). *Modernity and the hegemony of vision*. Berkeley and Los Angeles: University of California Press.
- Lévinas, Emmanuel. (1978). *Existence and existents* (Alphonso Lingis, Trans.). Dordrecht, Boston, London: Kluwer Academic Publishers.
- Lombardi, Victor. (1994). *Virtual reality vs. immersive environments: Choosing the right computer interface for the future*. Retrieved November 8, 2002, from http://www.noisebetweenstations.com/personal/essays/evol_of_tech.html
- Lovejoy, Margot. (2004). *Digital currents: Art in the electronic age* (3rd ed.). London: Routledge.
- Lupton, Ellen. (2002). *Skin: Surface, substance, and design*. New York: Princeton Architectural Press.

- Malinowski, Bronislaw. (1962). *Sex, culture, and myth*. New York: Harcourt, Brace & World.
- Manen, Max van. (2002). *Phenomenology online*. Retrieved February 6, 2004, from <http://www.phenomenologyonline.com/>
- Marks, Laura E. (2002). *Touch: Sensuous theory and multisensory media*. Minneapolis, MN: University of Minnesota Press.
- Mateas, Michael. (2004). A preliminary poetics for interactive drama and games. In Noah Wardrip-Fruin & Pat Harrigan (Eds.), *First person: New media as story, performance and game* (pp. 19-23). Cambridge, MA: MIT Press.
- Matthews, Eric. (2006). *Merleau-Ponty: A guide for the perplexed*. London & New York: Continuum.
- McHale, Brian. (1987). *Postmodernist fiction*. New York: Methuen.
- Merleau-Ponty, Maurice. (1962). *Phenomenology of perception* (Colin Smith, Trans. 2nd ed.). London: Routledge.
- Merleau-Ponty, Maurice. (1964). *The primacy of perception*. Evanston, IL: Northwestern University Press.
- Merleau-Ponty, Maurice. (1968). *The visible and the invisible* (Alphonso Lingis, Trans.). Evanston, IL: Northwestern University Press.
- Merleau-Ponty, Maurice. (1969). Phenomenology and psychoanalysis: Preface to Hesnard's L'oeuvre de Freud. In Alden L. Fisher (Ed.), *The essential writings of Merleau-Ponty* (pp. 81-87). New York: Harcourt, Brace & World.
- Merriam-Webster. (1989). *Webster's New Collegiate Dictionary* (Ninth ed.). Springfield, MA: Merriam-Webster Inc.
- Milner, Marion, & Field, Joanna. (1983). *On not being able to paint* (2nd ed.). New York: International Universities Press.
- Minsky, Rosalind. (1996). *Psychoanalysis and gender: An introductory reader*. London: Routledge.
- Miyake, Issey. (1998). *Issey Miyake making things*. Paris: Fondation Cartier pour l'art contemporain.
- Montagu, Ashley. (1971). *Touching: The human significance of the skin*. New York: Columbia University Press.
- Morris, Desmond. (1971). *Intimate behaviour*. New York: Random House.
- Morris, David. (2004). *The sense of space*. New York: State University of New York.
- Morse, Margaret. (2003). The poetics of interactivity. In Judy Malloy (Ed.), *Women, art and technology* (pp. 16-33). Cambridge, MA: MIT Press.
- Munster, Anna. (2006). *Materializing new media: Embodiment in information aesthetics*. Lebanon, NH: University Press of New England.
- Murray, Janet H. (1998). *Hamlet on the holodeck: The future of narrative in cyberspace*. Cambridge, MA: MIT Press.

- Murray, Janet. (2004). From game-story to cyberdrama. In Noah Wardrip-Fruin & Pat Harrigan (Eds.), *First person: New media as story, performance and game* (pp. 2-18). Cambridge, MA: MIT Press.
- Nagel, Thomas. (1974). *What is it like to be a bat?* Retrieved January 4, 2007, from http://members.aol.com/NeoNoetics/Nagel_Bat.html
- Norman, Donald A. (2005). *Emotional design: Why we love (or hate) everyday things*. New York: Basic Books.
- Nyogetsu Seldin, Ronnie. (2002). *Sleep dance (Heart of zen: Simplicity)* [CD-ROM]. Hamden, CT: The Relaxation Company.
- O'Loughlin, Marjorie. (1995). *Intelligent bodies and ecological subjectivities: Merleau-Ponty's corrective to postmodernism's "subjects" of education*. Retrieved August 1, 2006, from http://www.ed.uiuc.edu/EPS/PES-Yearbook/95_docs/o'loughlin.html
- O'Sullivan, E. (2003). Bringing a perspective of transformative learning to globalized consumption. *International Journal of Consumer Studies*, 27(4), 326-330.
- O'Sullivan, Edmund V., & Taylor, Marilyn M. (2004). Glimpses of an ecological consciousness. In Edmund V. O'Sullivan & Marilyn M. Taylor (Eds.), *Learning toward an ecological consciousness* (pp. 5-23). New York: Palgrave Macmillan.
- Osthoff, Simone. (1997). Lygia Clark and Hélio Oiticica: A legacy of interactivity and participation for a telematic future. *Leonardo*, 30(4), 279-289.
- Pallasmaa, Juhani. (2005). *The eyes of the skin: Architecture and the senses*. West Sussex, England: John Wiley & Sons.
- Parent, Sylvie. (2002). Touch to see. *HorizonZero*(04).
- Paterson, Mark. (2000). *How the world touches us: Everyday embodied tactile-spatial experience*. Retrieved January 3, 2005, from <http://www.ggy.bris.ac.uk/postgraduates/ggmp/touches.htm>
- Pedrosa, Adriano. (2002). Intimate sculptures. In Centro Galego de Arte Contemporanea (Ed.), *Ernesto Neto: O corpo, nu tempo* (pp. 79-86). Santiago de Compostela, Spain: Xunta de Galicia.
- Penney, Simon. (1996). *Embodied agents, reflexive engineering and culture as a domain (A postscript on the emerging aesthetics of interactive art)*. Retrieved August 17, 2006, from <http://www.adaweb.com/context/events/moma/bbs5/transcript/penney16.html>
- Pereira, Cecilia. (2002). The fragility of the world. In Centro Galego de Arte Contemporanea (Ed.), *Ernesto Neto: O corpo, nu tempo* (pp. 301-312). Santiago de Compostela, Spain: Xunta de Galicia.
- Perry, Gill (Ed.). (1990). *Gender and art*. New Haven, CT: Yale University Press.
- Phelan, Peggy. (1993). *Unmarked: The politics of performance*. London & New York: Routledge.
- Polaine, Andrew. (2005). The flow principle in interactivity, *Proceedings of the second Australasian Conference on Interactive Entertainment* (pp. 151-158). Sydney, Australia: Creativity & Cognition Studio Press.

- Puckette, Miller, & Zicarelli, David. (2004). MAX/MSP (Version 4.3) & Jitter (Version 1.2): Cycling '74/IRCAM.
- Randolph, Jeanne. (2002). Artifacts of touch. *HorizonZero*(04).
- Raymond, Eric. (2002). Bodymaps. *HorizonZero*(04).
- Reilly, Linden. (2002). An alternative model of 'knowledge' for the arts. *Working papers in art & design*, 2. Retrieved January 12, 2007, from <http://www.herts.ac.uk/artdes1/research/papers/wpades/vol2/reilly.html>
- Relph, E. (1976). *Place and placelessness*. London: Pion.
- Ritter, Don. (1998). *My finger's getting tired: Unencumbered interactive installations for the entire body*. Retrieved August 19, 2006, from <http://aesthetic-machinery.com/articles-myfinger.html>
- Robbins, Brent Dean. (1999). *On Maurice Merleau-Ponty (1906-1961)*. Retrieved August 4, 2006, from <http://www.mythosandlogos.com/MerleauPonty.html>
- Robertson, Lynn C., & Sagiv, Noam (Eds.). (2004) *Synesthesia: Perspectives from cognitive neuroscience*. Cary, NC: Oxford University Press.
- Rokeby, David. (1995). Transforming mirrors: Subjectivity and control in interactive media. In Simon Penny (Ed.), *Critical Issues in interactive media*. Albany, NY: State University of New York.
- Rokeby, David. (1998). The construction of experience: Interface as content. In Clark Dodsworth (Ed.), *Digital illusion: Entertaining the future with high technology*. Reading, MA: Addison-Wesley.
- Scarry, Elaine. (1987). *The body in pain: The making and unmaking of the world*. New York: Oxford University Press.
- Schechner, Richard. (1985). *Between theatre and anthropology*. Philadelphia: University of Pennsylvania Press.
- Schiphorst, Thecla, Lovell, Robb & Jaffe, Norman. (2002). Using a gestural interface toolkit for tactile input to a dynamic virtual space. *CHI '02 Extended Abstracts on Human Factors in Computing Systems* (pp. 754-755). Minneapolis, MN: ACM Press.
- Schiphorst, Thecla, Lovell, Robb & Jaffe, Norman. (Unpublished). *The meaning of touch: a tactile taxonomy based on Laban effort/shape analysis*.
- Schiphorst, Thecla. (1996a). *Bodymaps: Artifacts of touch (The sensuality and anarchy of touch)*. Retrieved October, 2002, from <http://www.art.net/~dtz/schipo1.html>
- Schiphorst, Thecla. (Producer). (1996b). *Bodymaps: Artifacts of touch* [VHS video].
- Schutze, Bernard. (2006). The skin of the sculpture: Inside and outside Ernesto Neto. *Espace*(75), 25.
- Seamon, David, & Mugerauer, Robert. (1985). *Dwelling, place and environment: Towards a phenomenology of person and world*. New York: Columbia University Press.
- Shozo, Tsurumoto. (1983). *Issey Miyake bodyworks*. Tokyo: Shogakukan.
- Silverman, Kaja. (1996). *The threshold of the visible world*. New York & London: Routledge.

- Sobchak, Vivian. (2004). *Carnal thoughts: Embodiment and moving image culture*. Berkeley, CA: University of California Press.
- Stroll, Avrum. (1988). *Surfaces*. Minneapolis, MN: University of Minnesota Press.
- Tanizaki, Junichiro. (1977). *In praise of shadows*. Stoney Creek, CT: Leete's Island Books.
- Taylor, Mark C. (1997). *Hiding*. London: Columbia University Press.
- Thomsen, Christian W. (1997). *Sensuous architecture: The art of erotic building*. New York: Prestel.
- Toop, David. (1995). *Ocean sound: Aether talk, ambient sound and imaginary worlds*. New York: Serpent's Tail.
- Vande Moere, Andrew, & Beilharz, Kirsty. (2004). *infosense: Interaction design for sensate spaces*. Paper presented at the 38th Australian & New Zealand Architectural Science Association (ANZAScA) Conference, University of Tasmania, Hobart, Australia.
- Varela, Francisco J., & Shear, Jonathan. (1999). First-person methodologies: What? why? how? *Journal of Consciousness Studies*, 6(2-3), 1-14.
- Vasseleu, Cathryn. (1998). *Textures of light: Vision and touch in Irigaray, Merleau-Ponty and Levinas*. London: Routledge.
- Wada, Yoshiko I. (2002). *Memory on cloth: Shibori*. Tokyo: Kodansha International.
- Wada, Yoshiko I., Rice, & Barton. (1997). *Shibori: The inventive art of Japanese shaped resist dyeing*. Tokyo: Kodansha International.
- Wardrip-Fruin, Noah, & Montfort, Nick (Eds.). (2003). *The new media reader*. Cambridge, MA: MIT Press.
- Wardrip-Fruin, Noah, & Harrigan, Pat (Eds.). (2004). *First person: New media as story, performance, and game*. Cambridge, MA: MIT Press.
- Waterworth, John A. (c1996). *Creativity and sensation: The case for 'synaesthetic media'*. Retrieved October 1, 2006, from <http://www.informatik.umu.se/~jwworth/sensedoc.html>
- Weeks, Jeffrey. (2002). Sexuality and history revisited. In Kim M. Phillips & Barry Reay (Eds.), *Sexualities in history: A reader* (pp. 27-41). New York: Routledge.
- Wenger, Eric. (1999). *Metasynth (Version 2.6)*. San Francisco: U&I Software LLC.
- Wilson, Stephen. (1993). *The aesthetics and practice of designing interactive computer events*. Retrieved August 16, 2006, from <http://userwww.sfsu.edu/~swilson/>
- Wilson, Stephen. (2002). *Information arts: Intersections of art, science, and technology*. Cambridge, MA: MIT Press.
- Winkler, Todd. (2000). *Audience participation and response in movement-sensing installations*. Paper presented at the 2000 International Symposium on Electronic Art (ISEA), Paris.
- Zimmerman, Eric. (2000). Against hypertext. *American Letters & Commentary* (Nº 12).

Appendices

Appendix 1: Earlier responsive installation work

Following is a summary of the skins series of prototype installations completed during the coursework for my Master's degree. Each iteration was progressively enhanced to include notions of the body, skin and fold, to integrate media, technology and physical interaction, and to focus on engagers' haptic perception and responsivity through individual or collaborative lived experiences.

Installation title	<i>kine[s]kins</i>
Date	November, 2003
Installation space	Alexandra Studio, Powell Street, Vancouver
Responsivity	guided kinesthetic and haptic responsivity: individual and collaborative
Concepts explored	personal, intimate spaces and shared, collaborative spaces; relationships between inner and outer body spaces; kinesthesia, touch; proximity, engagement, encounter, complicity
Skin interface	wearable spandex fabric skin membrane; bolt of skin-coloured spandex fabric
Media	Visual: random dynamic projection of photos of human body; bodies wrapped in diaphanous fabric; impressionistic photos of droplets of water, tree bark, branches and coloured leaves; glow sticks Sonic: Ambient music
Hardware	stereophonic sound system; digital video projector; Apple Macintosh G4 Powerbook computer
Software	iTunes; screensaver
Artifacts	



© 2007, Dennis Humphrey.

Figure 18. Participant engaging with *kine[s]kins* personal, wearable skin.



© 2007, Dennis Humphrey.

Figure 19. Participants engaging with *kine[s]kins* collaborative skin.

Installation title	<i>[s]kinaesthesia</i>
Date	December, 2003
Installation space	Classroom 300, Betaspace, SFU Surrey
Responsivity	haptic responsivity: individual
Concepts explored	personal, intimate space: inner-outer; open-closed; relationships between engagent and fabric skin membranes; touch; physical interaction; haptic visuality; proximity, engagement, encounter, complicity
Skin interface	ceiling suspension grid; spandex fabric structure comprised of skin-like panels and hanging spandex appendages weighted with rice; basic physical interaction involving touch and sound
Media	Visual: random dynamic projection of photos of human body; bodies wrapped in diaphanous fabric; impressionistic photos of droplets of water, tree bark, branches and coloured leaves Sonic: Internet-broadcast ambient music
Hardware	Stereophonic sound system with woofer; digital video projector; Apple G4 Powerbook computer
Software	iTunes; screensaver

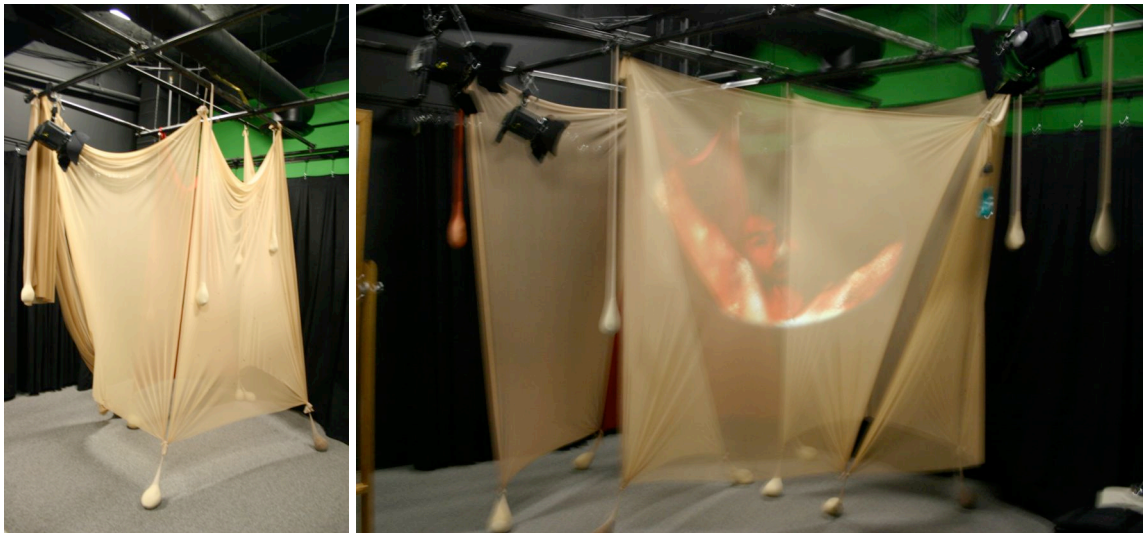
Artifacts



© 2007, Dennis Humphrey.

Figure 20. *[s]kinaesthesia* installation.

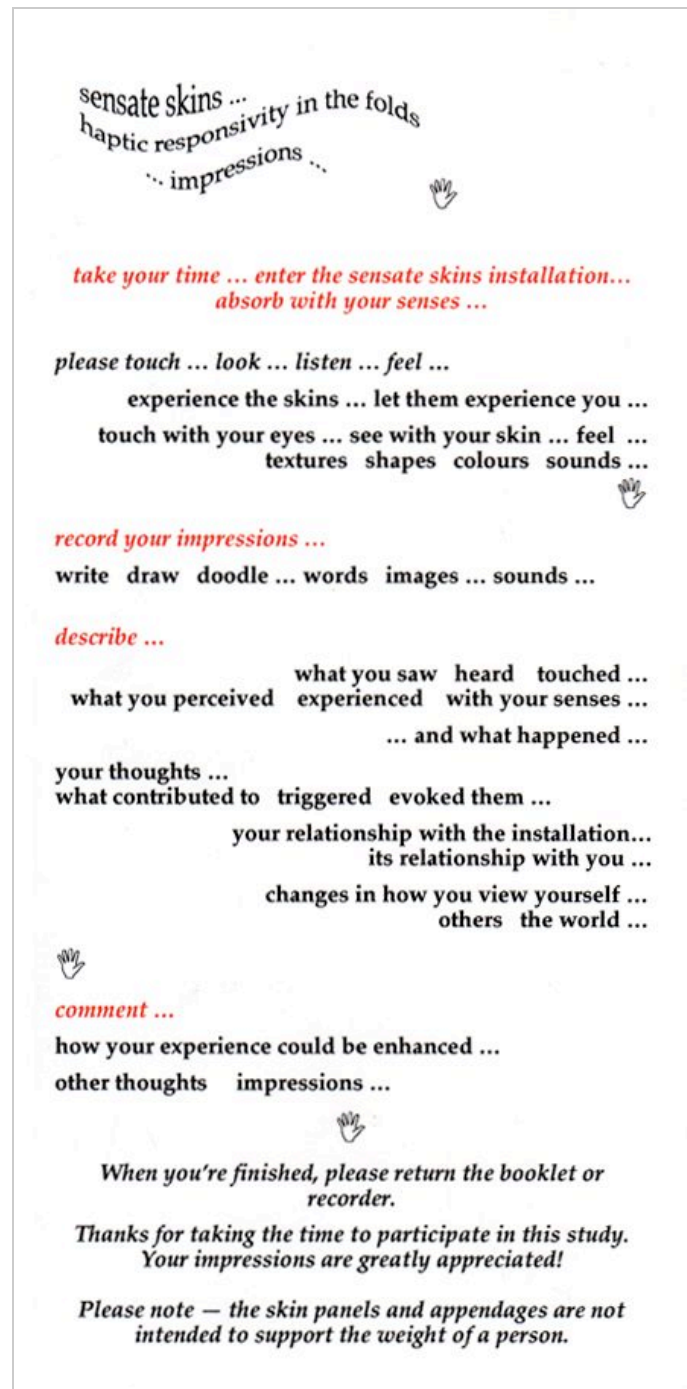
Installation title	<i>second skins</i>
Date	October, 2004
Responsivity	haptic responsivity: individual and group
Installation space	2004 New Forms Festival, Yaletown, Vancouver
Concepts explored	personal, intimate spaces; relationship between inner and outer body spaces; touch; haptic visuality; proximity, engagement, encounter, complicity; data visualization
Skin interface	bamboo suspension grid anchored to top of movable walls; spandex fabric structure comprised of skin-like membranes and hanging appendages weighted with rice; physical interaction involving touch and sound
Media	Visual: random video clips showing transformations from tree to human body Sonic: random shakuhachi flute sound clips; randomly generated recorded touch sounds, human vocalizations and generative poems on tree-human transformation
Hardware	Four-point audio system; digital video projector; tubular bell chime; Apple G4 Powerbook computer
Software	MAX/MSP-Jitter
Artifacts	



© 2007, Dennis Humphrey.

Figure 21. *second skins* installation.

Appendix 2: Engagant impressions



© 2007, Dennis Humphrey.

Figure 22. Instructions to engagents.

Transcription of engagers' written and audio impressions after experiencing the *sensate skins* exhibit, December 11, 2006.

Engagent 1

This is ... I'm just going to put down some impressions of the experience here. The first thing that really struck me about it was the womb-like nature of the piece. It has an ... a definite... ambiance as you enter into it that feels like you're entering into some sort of large womb. The membranes, the transparent membranes of the projections, were projected onto, were very inviting to touch but the first reaction I had to them was one of concern that I was going to puncture them or damage the membranes.

Also, the presence of the lines running through them was tactilely interesting to me, but it, to a certain extent, it kind of interfered with my ability to immerse myself in the space because it put me into an analytical mindset where I was figuring out their function in the experience, that it kind of created boundaries through the membranes, where, as you're feeling tactilely across them, they kind of demarcate internal boundaries to a surface that visually appears to be unbroken and smooth. And, so that I mean they're, they definitely evoke a response. I don't know if it's necessarily, that a response, that's an aesthetic choice or a functional choice, but I didn't find them to be an interesting aspect of the installation.

The audio definitely worked harmoniously with the visuals to create an overall mood and atmosphere for the space, and there is definitely a sense of vertigo that you get in there after a couple of minutes — I say a couple of minutes realizing that there is certainly a timeless aspect as well; I can't necessarily say how much time I spent in the space.

It definitely invites touch, which I found really interesting, actually, because there is a boundary usually when you enter into an exhibit, or in kind of interaction with piece of art where you don't want to touch it, you don't want to break into its personal bubble of touch, the personal space, and so in that sense, it's very successful.

And those are my first impressions. I'll put down more as they come to me.

I also want to note that it does introduce a kind of floating, meditative state, almost instantaneously. The act of passing through the membranes of the skins puts you into a different space, a different time, very effectively. I found myself in a much more reflective mindset than I was entering into the exhibit; I had arrived in a somewhat bad mood from paper-writing and end of semester stress and I find that the experience has definitely pacified that for me, which I really appreciate. And so, yes, it's a very enjoyable work in that respect.

Engagent 2

Auditory experience

exotic

asia

music/sad

soft voice

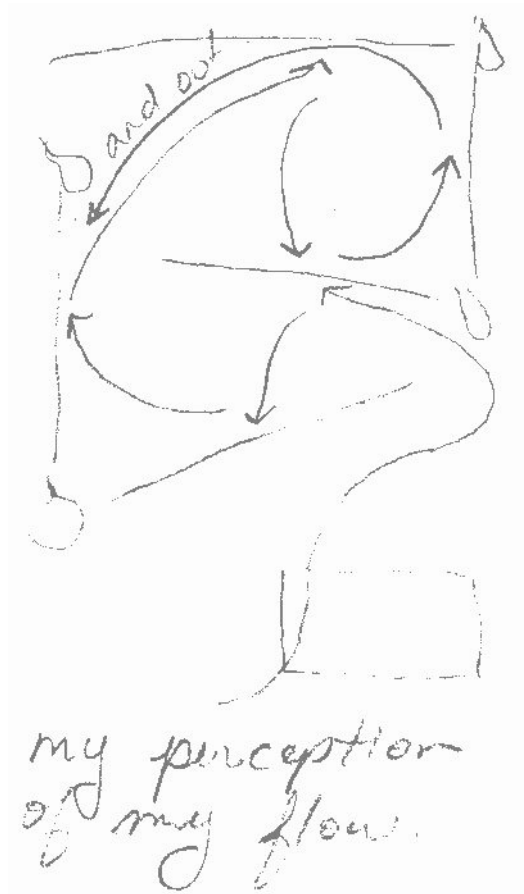
longing and spoken in a soft wispered [sic] tone.

“touch” breath

“Light to dark”

Deep voice

verse



A very immersive interactive experience. Felt a sense of agency with the content. Left me wanting to see more.

like a labrynth [sic] of touch experience.

Sensors responsive and appropriate for the interactor.

Fishing wire occasionally snared me. Not sure if it was part of the experience

Visually stunning

the colour red passionate and bold.

touched a person that needed to be touched.

Lost in a world of desire and desperation.

Voice rich and embracing. Longing for physical contact. A lost world of pleasure.

the skin was soft and cool to the touch
the experience voyeuristic [sic] and taboo [sic]. Fabric. silky like the sheets of a lover's bed.
the more I interacted with the exhibit the more agitation you could sense from the exhibit [sic].
Like arousal.
Like passion.



- Sensual.
- exotic
- remote
- vulnerable.
Longing
Tabu [sic]
Denied.
Forsaken.

enhancement

Have you considered sandwiching the fishing wire between two (2) sheets of fabric? I found that the wires distracted me from true engagement w/ the interactive.

Engagent 3

touching the images had a rough haptic feedback

I could [sic] the light when I passed the skin walls and distorted the images
when I triggered the video I became uncomfortable
I felt that I wasn't with another body, that I was inside one
I was immersed inside different skin walls

I felt
like I was touching
a
body
layers of skin
pores

microscopic organic forms
macroscopic fabric walls

I tried touching everything I could
so I could feel the other body

Engagent 4

On the way in, I almost tripped on the different floor levels. In the first area, past the curtain and inside, I felt a little anxious, like I was trapped in a maze with no way out. The shot that was projected, slowly zooming in gave me a feeling of vertigo.

Pushing on the screen, I discovered that the fabric was broken up by clear fishing line.

I stayed in the first area, waiting for the other person to experience it. The images were painted, abstract, including mildly homoerotic images of a young man.

I pushed on the image of the egg, once inside the second chamber, which was less anxiety producing than the first.

The voice over, images and fabric trapped me, in a sense, and I didn't get the impression that the images and sound were responsive to my touch. Just the fabric responded.

I didn't see how the tactile elements connected to the images and sound – maybe they weren't supposed to.

The other person who was inside the installation seemed to be enjoying it, but to me, I felt anxious and trapped, so wasn't really able to relax in there.

The long hanging balls were nice to touch, felt textured inside. But they didn't really work to swing onto the hanging fabric. Maybe they are some kind of counterweights that held the installation in place. Bamboo formed the frame that the tactile fabric was hung from.

The fabric worked well as a projection surface and I was able to change shapes of the image – like the eggs –

Other times, the human combined with image created a kind of mottled skin in the human that looked like a little decay.

Overall, I liked the images and how they worked and liked touching the skins, especially the appendages. But the setup of the space – too small. no escape made me anxious

Engagent 5

sensual – extremely
sense of flow

I actually felt my head go woozy as the projected images came closer; when standing between folds, the projected images appear to be approaching me no matter which fold I'm in.

Extremely sensate was the experience of touching my own hands through the skin.

The panel with the "beads" or "nubs" felt very much like nipples.

The red panel looked very female to me. The hanging rice-filled sacks very masculine. I wanted to put them together.

Lost my balance on the moving images.

The gestalt is very well done. The sound, the visuals, the touch all work well together to create a space so sensual that I almost didn't think. Instead, I was in a 'just sensing state' for bursts of time. (This is very unusual for me – I usually can't get past my head. From an outside observation I might have appeared stiff though. In terms of my own body, I experienced with my eyes, ears, hands mostly. I am not a very kinaesthetically aware person.

I liked experiencing the folds from different perspectives.

Feeling inside out, upside down and yet something in the experience is constant from within each fold. What is it?

Changes in how you view yourself:

I usually can't get past my head (thinking). For short periods of time I was able to just sense ("listen" with all the senses). This was amazing to me.

Relationship with the installation:

I had urges to manipulate the pieces/to bring together the male/female. At some other level, though, the installation felt like an entity of some kind, and it seemed disrespectful to go too far with the manipulation.

Engagent 6

Music Flows

Vision Mellows

Skin Tingles

Movement Vanishes

Curiously sexual

At first

Sensual Emergence of Indulgence

A little later

Cornered

Boxed In

Drawing Close

Colour Chokes

Reality Returns & then Vanishes

Touch Frees Them All

Touch Tingles

Squeeze Tingles

Breath slows down

Then awakens to

Jingles

Which one to choose

They all squeeze so good

Best ones did bring out

memories of love

& its making

Companionship with

Comfort in a friend nearby

Nipples are so beautifully soft

Speaking to me in deep voices

Wanting me to come back

Pushing me away when it is not too much

Am I here experiencing

or

They experience my sensuality

Repulsion to sudden changes

Too bright too Quick

Hits my lids and I wince

I like the silence touch

Many soft breasts to fondle with

So soft So very soft

So Smooth yet hard

It is a sexual provocation

Uncontrolled but for the depth of exploration

A certain longing for the Expectant Smell

I miss the Smell

So much

Is it OK if I stop thinking?

~~I let my body sleep~~

The colours are bewitching

They overlap on me

They didn't stop

The skins didn't stop

Who will have compatible sensuality?

Will I ever find her?

Will the installation help me find her?

The permeability of light is bested only by the permeability of the expectations

Can I remain dead in this world? How long?

Do I want to revive myself?

Enhancing Experience.

I want more people in here – touching, feeling,

I want to Smell.

Smell deep red.

Words of Encouragement

to be bold: to let go;

the light is still all seeing

Colours matter less now

Now that voices have taken in charge

Why didn't they co-exist

co-experience

co-enhance?

The person I went through the installation with remarked that the only thing missing was smell. (I also felt a warm sensation on my back as I stood looking into the inner folds of the installation.)

"Taste" is provided at the end of the experience...

Engagent 7

TOUCH...	LOOK...	LISTEN...	FEEL...
- curtain fabric beauty prompted touch	narration rich palette	quiet captured	intimate
- hanging nylon squishy sounds	open welcoming	my interest 	
- screen of images – soft drum-like texture		wanted to hear more + trying to bring narrative into space	

The colour red on body initially alarmed me but as it evolved along with narration, my fear subsided ... then hearing the narration 'sigh' + the use of the word 'hard' created a sense that I was experiencing something perhaps that I shouldn't be hearing but then the sound of the flute? again relaxed me ... I went in and out feeling relax to feelings of alertness to images - to sounds of narrations – to music

Overall, the piece was not aesthetically pleasing when I stood at the entrance (mat area) and looked through the layers of skin images, resulting in last image (central) at back. The layers were very meditative + here is where I felt most relax ... in contrast, going inside stirred feelings as mentioned above.

Personally, I wonder if more soft fabric could be used vs nylon would feel nice on the skin but then there maybe trade offs for projecting images on. The visuals were softer looking than the 'touch'.

Engagent 8

layers of colour, light,

rich, mutating
effanescent [sic]

bark, water, metal, fire, skin

vulnerable

cover, layer, coating, skin, epidermis, leaf

close, touch, brush, tender, light, care,

focus, warmth, source

warmth of flute, voice, colour, light

softness of flute, voice, colour, fabric, light

confined yet safe

small yet expansive
minimal yet complex
obscure yet grounded
yearning yet tangible



Engagent 9

- I was slightly distracted by the feel of the fabric itself: I tend to find I can feel every fibre & pay a lot of attention to it.
 - After I “figured out” where the “trigger” wires were, my geekiness lead me to look for the triggers. I’d probably have been more “explorative” if I hadn’t made that connection
 - Similarly, I was distracted by seeing the technology – wondering how the equipment was being used – tracing the wires to the bells above
 - I found myself fascinated by the distortion effects of moving skin on which the video was played – then experimenting with how my touch affected the other projections
 - When I first got a reaction from the audio in response to the touch I was surprised and quite intrigued
 - Maybe even shocked in some way
 - I wonder how my experience might have varied had I gone through alone rather than as part of a twosome
- I tended to lose my own thoughts in wondering what I might have triggered vs my partner
- I was curious about the hanging objects but I never made a connection to what they interact with
 - I wondered about the expression on the man’s face – it LOOKED relaxed and peaceful but the colours and patterns felt like something “opposite” to that were being felt by him.
 - I wanted to see what the initial curtain did and again I found myself looking for triggers, but not finding any, I didn’t experiment much – but I wonder?
 - I never determined the cause/effect relationship with “my” bell – but I liked the sound the Japanese flute in combination
 - WAS REALLY curious how much the skin needed to “react” but I found myself a little “nervous” about pushing them “too far” so I may have been “too gentle” at times
 - I am probably far too ADHD to avoid looking at the flashing lights of the computer equipment so I think I approached the installation as more of a puzzle when I started noticing it – I think I’d need to have more – separation from the visibility of the “toys” to have a deeper experience with the other components
 - The consistency of the theme/ colours throughout the introductory materials and in the exhibit had a very “complete” feeling.
 - The interesting thing to me is that my first impression was of warmth and “opulence” [sic] but on seeing the man’s expression in the video I felt ... I’m not sure – not sad – maybe more like concern?

- A different emotional target I guess?

Engagent 10

sound
ritual

feeling to touch flesh
may be because of the color?

layered images
layered – life

inside of someone's organ

looking at my mind
hearing voice from
inside my body gives meditative states

Journey of death
some energy flows to my body

From the first glance, the installation looked really ritual.
Sound was very provocative.
Before starting any touching.

I was already touched, impressed.

I feel like I'm ready for some kind of journey,
Outside of this installation.

I was struggling with all kinds of daily worries.
From now on, I forget everything.
Something (I don't know what it is) is inside my mind.

It draws me for this journey
It seems like the piece is calling me "come by & ... please experience."

Once, I touched the skin (of the installation), it was so soft.

Images, projected on the fabric, were not clear. I couldn't really see what they are. But it gives me a sensual feeling.

I couldn't touch the one on the screen, but I could touch it by my mind.

All fabrics are coming to me. I'm in the jail. My space is getting smaller.

My skin poles [sic] are breathing.
They want to move, talk to the world outside of my body.
They are awoken [sic].

I stand here for them to breathe.

After this journey,
My brain is so busy.
Every thing is awoken [sic]
Everything is try [sic] to say something
It gives me headache.

I am floating

Engagent 11

second projection

was more interested in light leaks looking like folds than in the vid content. spoken words have air of "installation" so got ignored
wanted to explore without being told to.
interested in the experience of leaving. really felt the carpet and drape

noticed I had put bell on dominant hand so it rang whenever I touched anything. at one point forced myself to touch with non dominant hand so as to touch in silence.

also – pushing on fabric made structure move – made sound from rope.
- having the pad of paper was a constant reminder that the experience was purposful [sic]

- I was marking.

comes across very unified in texture
the bell sound work with the flute. the reflection of light of the drape echoes the projection of light. color is a major part of the experience

- played with strings with in cloth
wanted to find on [sic] not vertical
everything seems to go up – found myself looking up a lot. ended up looking at the way strings ran to the bells

one pendulum seemed to swing in time to sound
- noticed I was looking for connections

light reflection of drape

very unified
- one pendulum swings in time to sound

light can look like folds

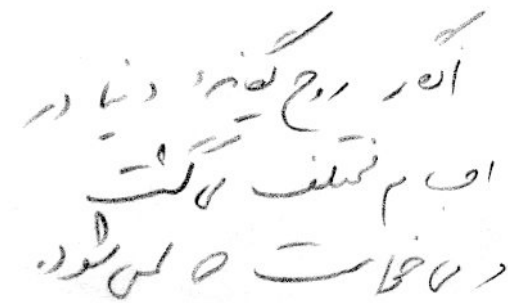
looking up a lot

entering [sic]/exit very different feel/noticed
sound of rope on bamboo

Snd video not as engaging
sound words not [sic]
switched hands to touch (bell)

Engagent 12

It was



transcental [sic] –

as if the one soul of the universe wondered in different physics and wanted to be touched

It was very transcendental.

I saw fleshes – and spaces beyond them.

I felt a bit better toward the decay of flesh as it happens in death.

This has been my constant torture since the death of my brother.

I felt a spirit beyond everything and the vulnerability and sacredness of the material world in all its forms.

What triggered most of my emotional feeling was the transformation of the almost crucified body to a tree to fire & to just a wooden cellular structure.

I loved the red oval

My relationship with the other screens was vague. I felt they take my [sic] into the space beyond flesh.

It was a great piece.

thanks

Dennis.

Engagent 13

One of the most forceful physical effects I found in the space occurred when I was looking through one screen at the image on another screen. As the video image zoomed in & out, it felt like the sheets themselves were billowing around me even though there was no actually [sic] movement. This created a sense of vertigo, but not unpleasantly so.

Although most of the imagery was of flesh and cloth, many of the colors + textures reminded me of rocks + stones, turning the space into a cavern of sorts. This was a [sic] interesting contrast to hold in mind while feeling the silky softness of the sheets

Engagent 14

IMPRESSIONS

Softness

Fluid

CONTRAST

Melding

Permiable [sic] barrier

Layers, upon layers ...

Life

... Darkness

Absence

Stillness ...

Barriers, lines, ends & starts

Intermingling

~ flow ~

Presence + absence

Tranquility ...

Care

Malleable

- flexible, yet there ... a barrier of sorts

Solitude, then togetherness

Merging ...

Yielding.

Unknown to known

- CHANGE -

Organic & primal

DESCRIBE

- saw a wonderful contrast of primal colours

- layers within and each another layer of a larger whole

- overlapping – no real start or end

- initial attempt at trying to “see” the picture

- stopped after being mesmerized by the ever changing pattern and folds

- non-specific patterns

- visually attractive

- soft lines and melding

- saw the body – trunk, limbs, transition from the abstract to the concrete and then back again.

- light and then darkness – life and then a void or an even stronger feeling of absence

- images gave a sense of beginning and then “nothing”

- not a feeling of negativeness or death, but of “absence” at times

- for the most part, a feeling of gentleness + sensual – soft sounds, melding images

- soft slightly yielding surfaces

- then a sudden contrast – voice or change in touch – a hard nub, opening or wire

- closed eyes to focus on touch – experiencing the feel of the fabric

- it’s softness and how it yielded

- music added to this by slowing one down

- calming effect

- wanted to proceed slowly as a result

- looked up + down, moved – top see what was there and what would happen

- was curious to whether my touching or making sounds would result in something – such as the voice
- was curious to how far the experience went
- such as how much was the installation a fold in yet a bigger fold – a layer in yet a larger series of layers
- definite sense of “being” – the masculine and feminine components
- body parts – through the woods heard, the feeling and touching of the hanging skin and bits
- sack – moving + malleable – man
- skin + bumps – nipples? (both sexes)
- large and gaping hole – woman – this also led to further examination – to see how it fit with what I had already seen, heard and felt
- the last layer or set of images seemed to be a culmination – like an end point or experience to bring it all together – perhaps that was the purpose as this was the only time where something was clear – a more definite set of images – of a whole person (and pieces leading up to it)
- I watched this for a while to see how it would progress or start over

I got the sense that it “started” over again – going back to the abstract

- One thing I quite enjoyed was the patterns
- when I whacked the “skin” it vibrated or pulsated – adding more life to the experience

I felt like the voice and words were more guiding – bringing the experience together in a more understandable form.

- I was cautious, but more inquisitive over time – spending time to re-line and look at the pieces in a different way –

1st – more visual, then more by touch and hearing, moving backwards as well

Very calming yet “alive” experience.

The only thing I’d add is perhaps smell – some scent to go with it.

- though I’m not too sure about the scent of sweat, skin, blood, etc. which would seem to go with this – then again, maybe it’s best left out so that pple could identify possible associated scents for you

- okay, I’m done – “free association” by a psych major... you asked for it.

Great work. Thanks for the opportunity!

Engagent 15

Sensuous images

Softness, peace, brightness and darkness

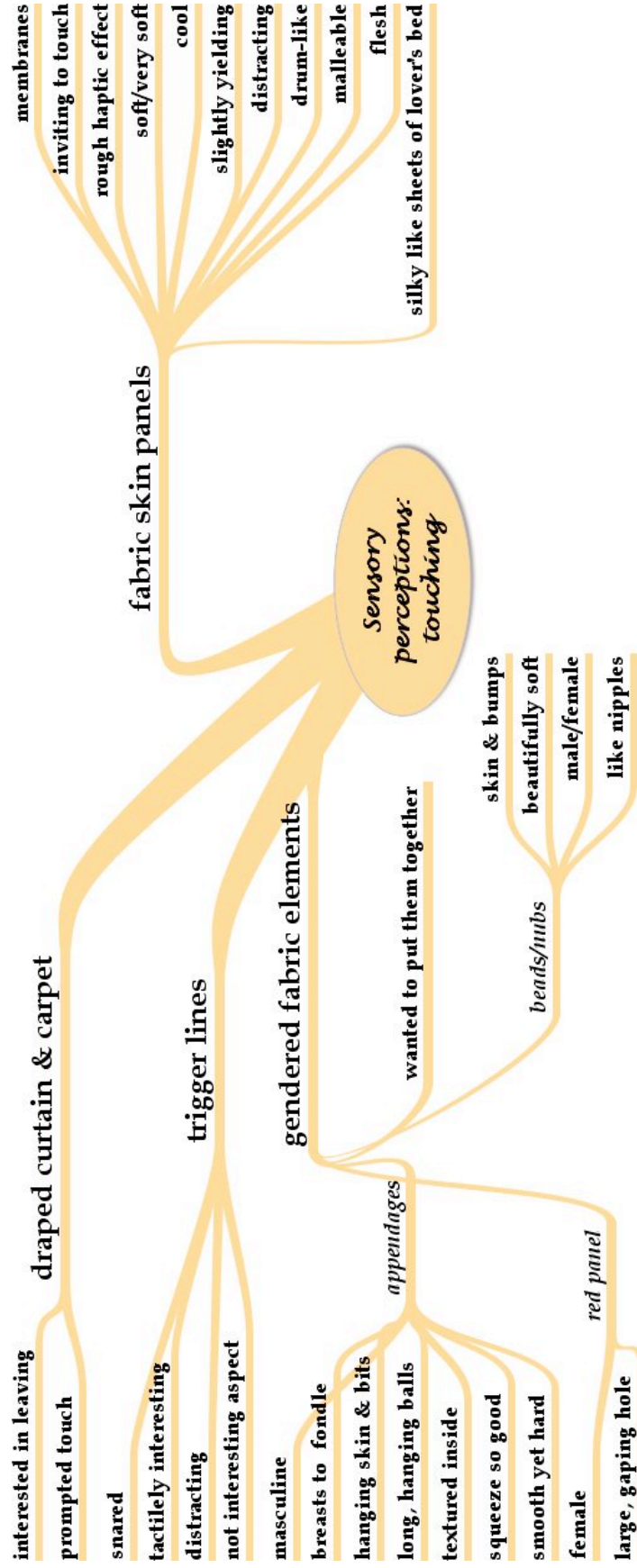
- thoughts of birth, mankind, destruction and construction
- feeling material bounce back and the objects swing, makes ringing noises that give me control of my surroundings.
- images at times disturbing, like broken bones without skin.
- I am left with a more sensitive image of mankind.
- adding an incense or subtle smell would enhance the experience

The use of images flowing thru the installation is a great 3D experience

I enjoyed bouncing the objects off the skin, and making the music of the bells.

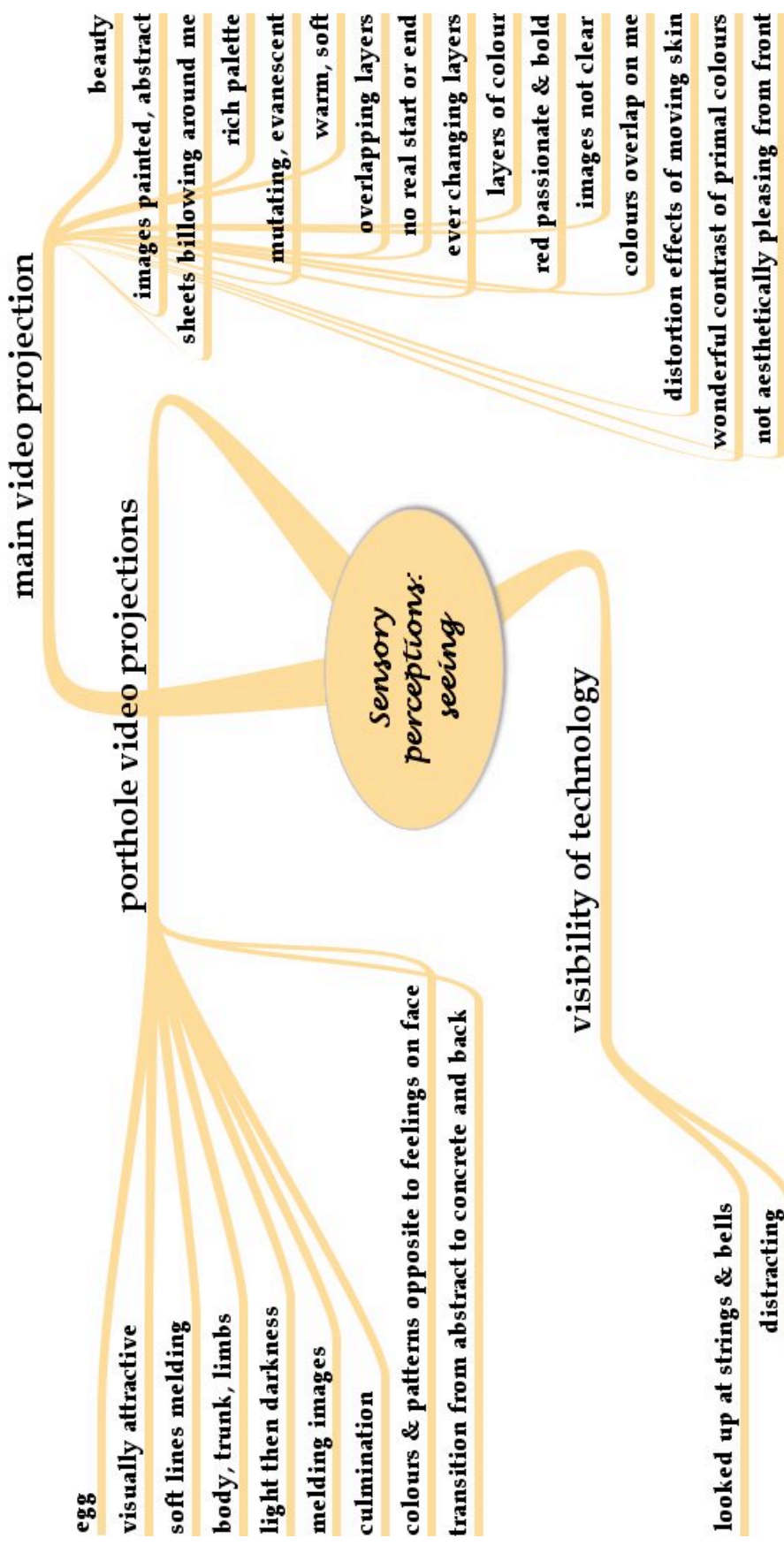
Appendix 3: Engagent statements clustered thematically

Figure 23. Engaging sensory perceptions related to *touching*.



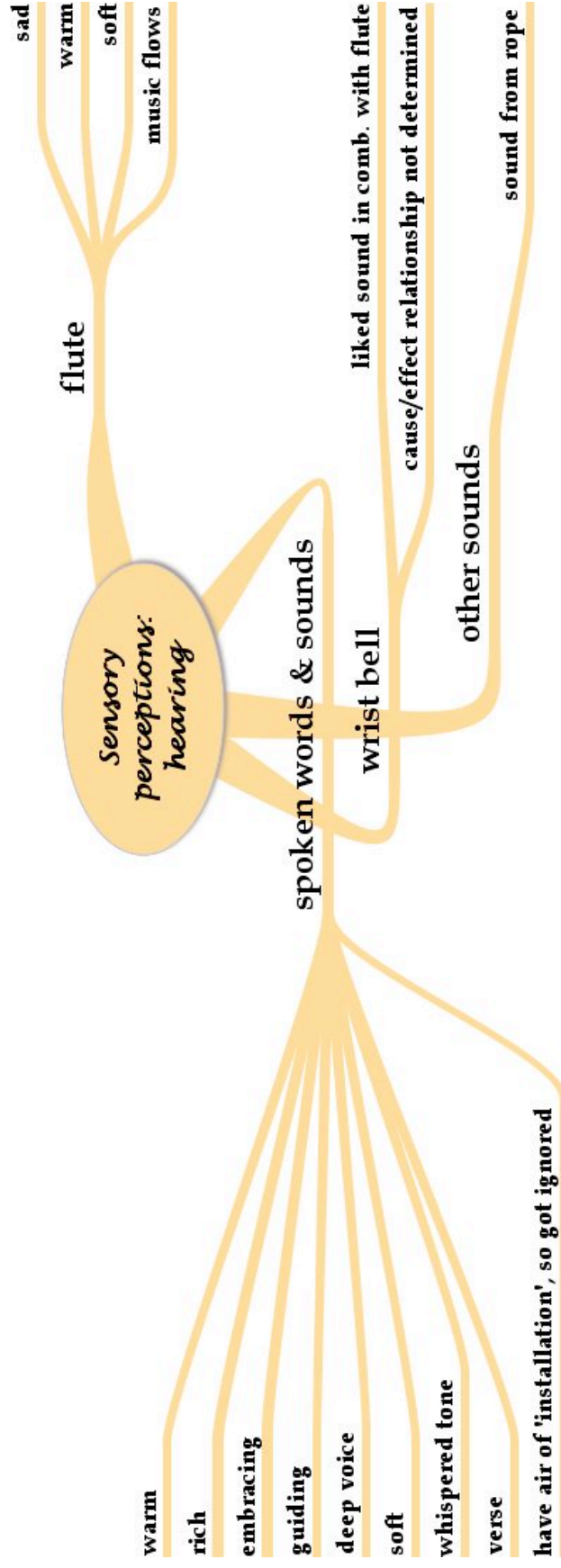
© 2007, Dennis Humphrey.

Figure 24. Engaging sensory perceptions related to *seeing*.



© 2007, Dennis Humphrey.

Figure 25. Engagent sensory perceptions related to *hearing*.



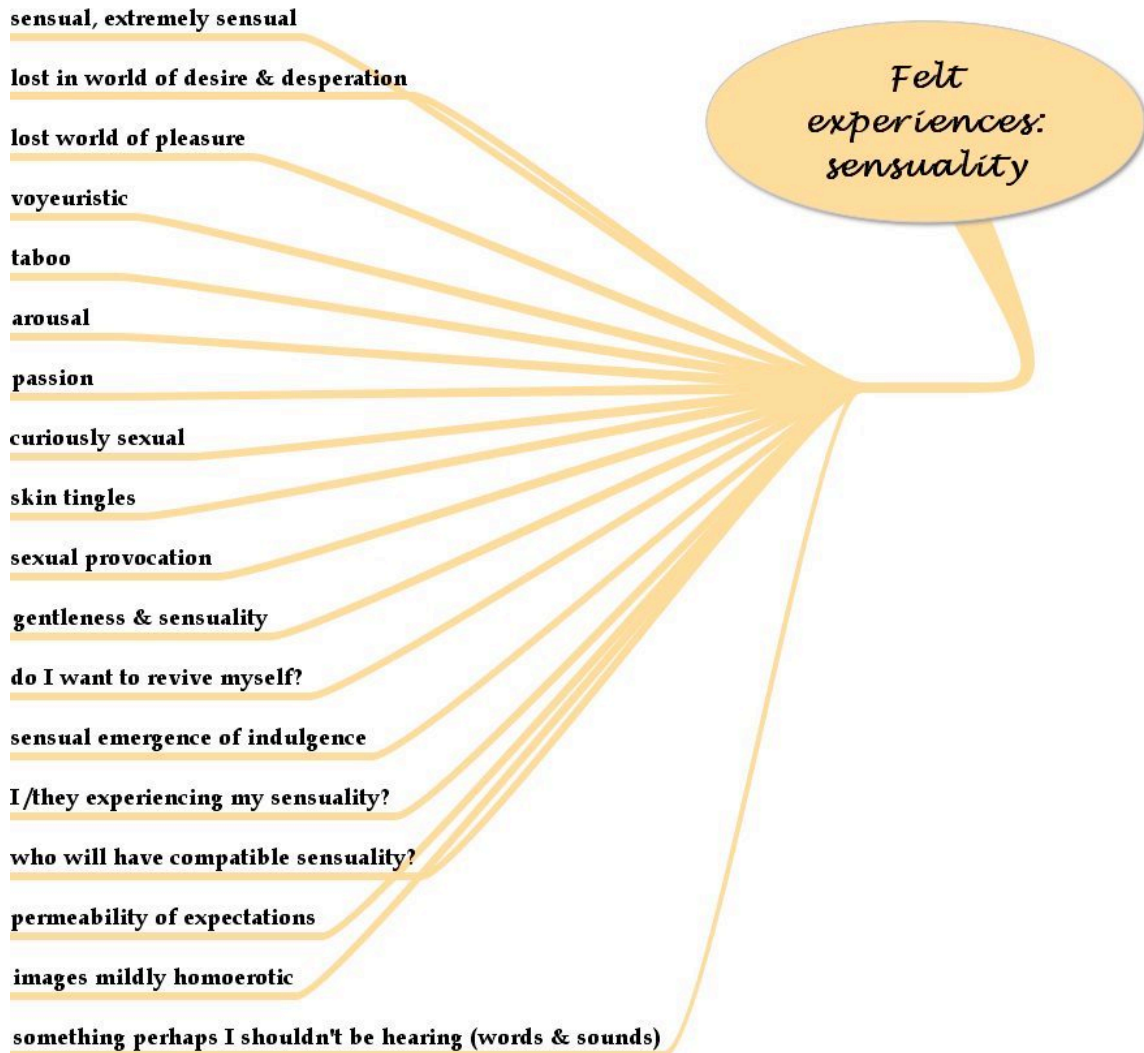
© 2007, Dennis Humphrey.

Figure 26. Engagant felt experiences related to *space*.



© 2007, Dennis Humphrey.

Figure 27. Engagent felt experiences related to *sensuality*.



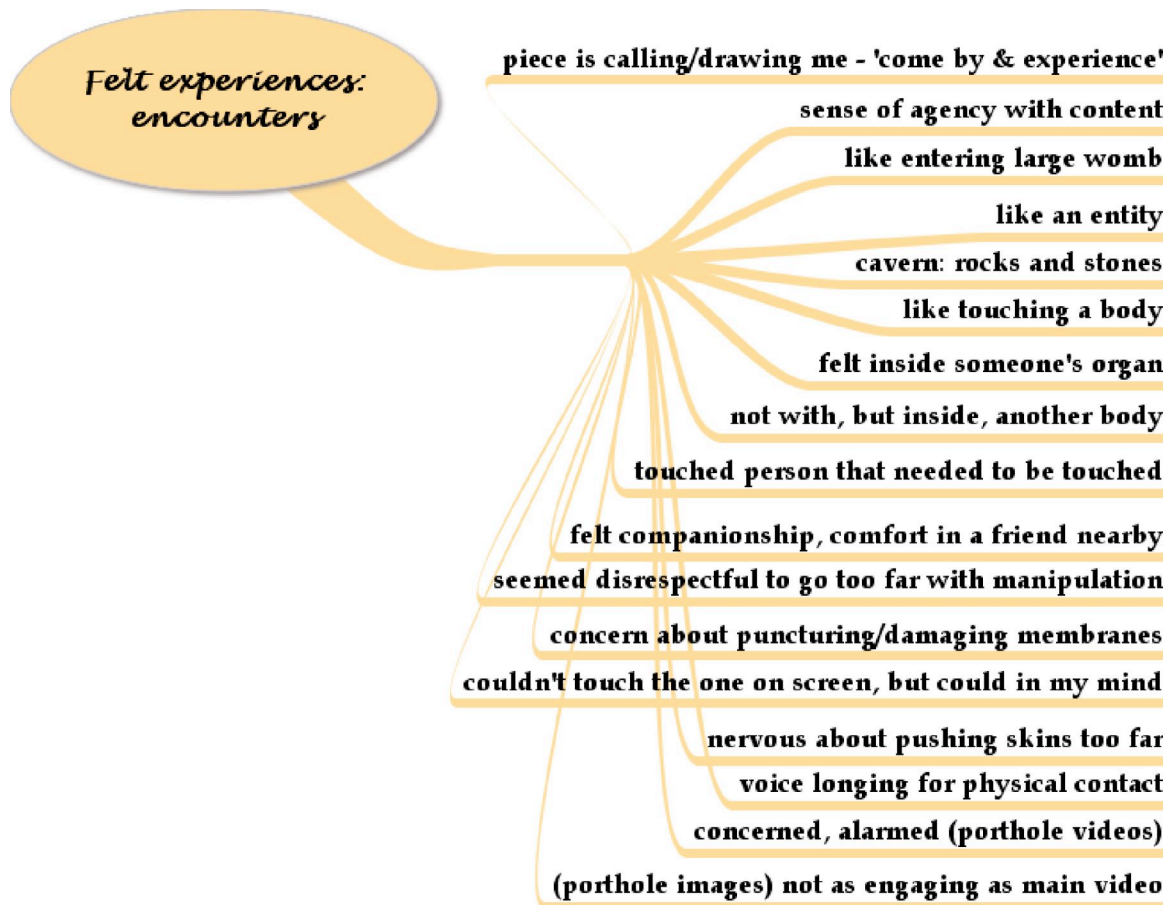
© 2007, Dennis Humphrey.

Figure 28. Engagent felt experiences related to *responsiveness*.



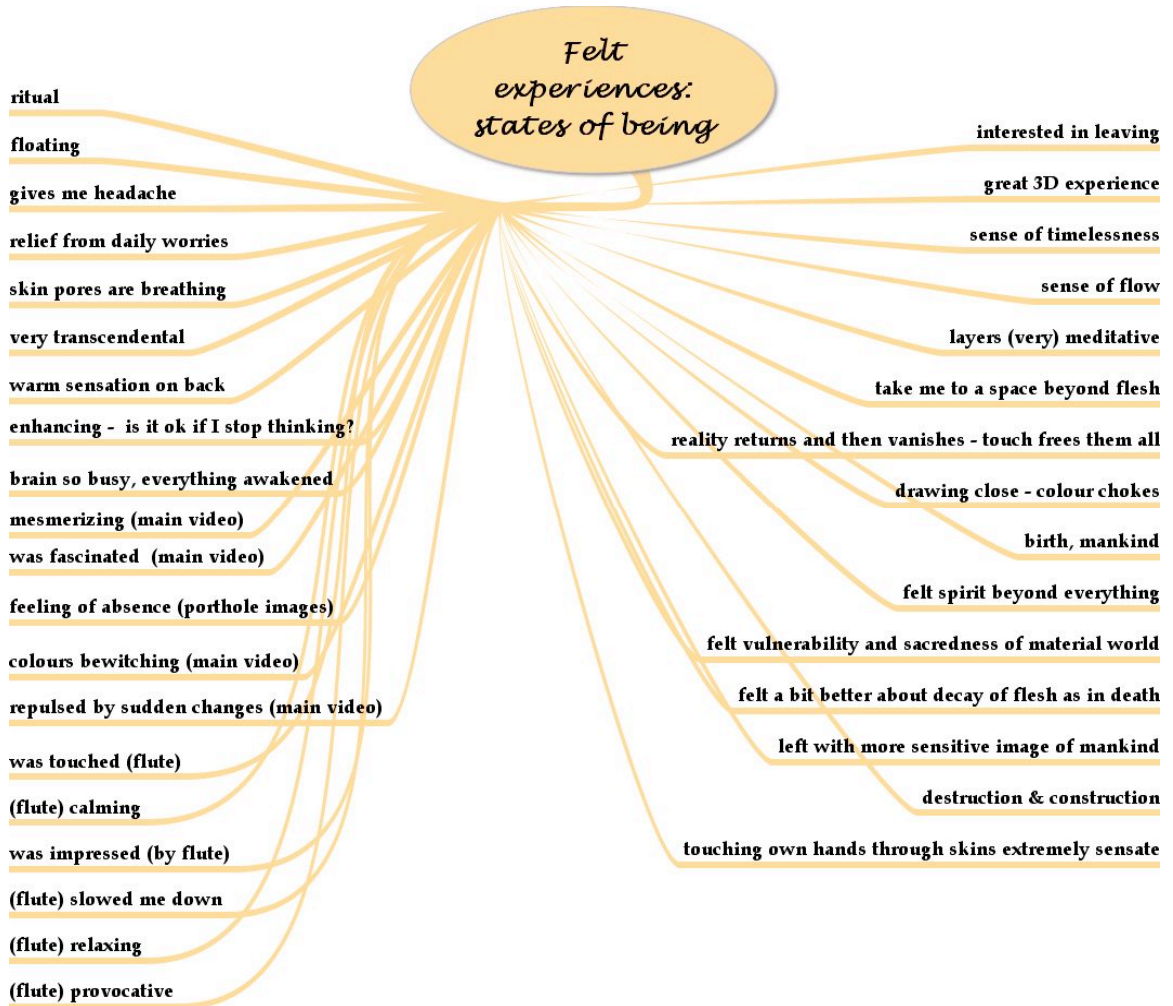
© 2007, Dennis Humphrey.

Figure 29. Engagent felt experiences related to *encounters*.



© 2007, Dennis Humphrey.

Figure 30. Engagant felt experiences related to *states of being*.



© 2007, Dennis Humphrey.