Voluntary and irrational action: the implications of body theory for design research

Susan Liepert and Stan Ruecker
University of Alberta, Edmonton AB Canada

Abstract

Every design assumes a user, and every user is a body: nerves that fire, joints that flex, muscles that pull. The privilege of defining the body has traditionally belonged to scientific discourse, leaving the study of affect and subjectivity to disciplines within the humanities and social sciences. Recent critical debate among humanists concerning the nature of embodiment, however, along with new research in the sciences, creates serious questions about this Cartesian division of academic labor. The advent of magnetic resonance imaging and related technologies, in particular, have helped trigger a full-scale re-evaluation of the nature of consciousness, action and volition. Studies by neurophysiologists such as Francisco Varela and V.S. Ramachandran have uncovered compelling evidence that subjective experience is produced by a set of interrelated systems involving consciousness, the body and the environment; in Varela's own words, "our minds are, literally, inseparable, not only from the external environment, but also from . . . the fact that we have not only a brain but an entire body" (qtd. Rudrauf et al. 40). Given this radical interdependence, theorists such as Patricia Churchland suggest that traditional concepts of voluntary action need to be reassessed. The body may no longer be characterized as a machine under the direction of consciousness, nor consciousness as an analytical engine construing its environment; voluntary action is a co-creation of all three.

This paper will argue that design research is in a unique position to address these issues of interdependence, both in subjective ecological experience and in the related creation and examination of the artificial sign tokens that are a central feature of design activity. As designers have long recognized, the boundaries between body and mind, interior and exterior, physicality and subjectivity are permeable. The destabilization of science's ability to maintain a totalizing discourse of self and the body creates opportunities for other disciplines to renegotiate their relationship with scientific discourse. Design research should be at the forefront of these new developments, since its approach addresses not merely objects or experiences, but the whole range of interactions between the two. First, however, it needs to interrogate its own critical practice for the presence of unfounded ideologies of separation.

Keywords

Body theory; affordances; design theory

Debating the body: theories historical and current

Folk understandings of the body stress its materiality, its immediacy, and the incontrovertibility of its experiences: “sticks out like a sore thumb,” “know it like the back of my hand,” or “seeing is believing.” Knowledge and experience of one’s own body seems the most basic kind of truth. This fundamental truth is, however, radically subjective. The body one experiences so directly cannot be shared or communicated: “no skin off my nose,” or “*chaque à son gôut.*” For the purposes of research, this folk body is coherent but elusive; what everybody knows, and cannot help knowing, cannot be objectified for study. In the words of critic Luke Wilson, the boundaries of the body are “marked out by an epistemologically resistant natural margin” (62). This incommunicable body which, to paraphrase the words of Gaytri Spivak, *cannot not* be known becomes rather a subject for narrative than for analysis, a character in various stories that imprint cultural, political, and social meanings on a generalized, and generalizable, body. Scholars of seventeenth-century history and iconography, for example, have pointed out the important role the monarch’s body played in representing and reifying an abstract body politic (e.g., Kantorowicz). The ascendancy of England during the late Elizabethan period was literally incarnated in the miraculous body of an unaging virgin queen, celebrated by diplomats and artists, certified by doctors, and sustained by an elaborate stagecraft of wigs, costumes, and cosmetics (Mullaney 145-49). This royal body, with its powerful political and social meanings, was reflected and repeated in artifacts ranging from state portraits to city water systems (Harris 216-20). Research regarding the folk body, then, is necessarily textual research, examining not the inevitably inaccessible interior, but the discourses which constitute the body’s observable surface.

The attraction of body-as-narrative is its almost unlimited flexibility. In contrast to the severe limits of the subjective experience of embodiment, inescapably imminent and private, narratives of body can be endlessly negotiated as part of both public and private discourse. In the early modern era, this meant bodies that could swap sexes, grow excrescences, dry up, leak, swell, and produce stones or flames or litters of baby rabbits (e.g., Laqueur, chapter 3). In our own time, the development and diffusion of those critical tools and insights loosely labeled “post-modern” created a particularly lively interest in examining the fluid, indeterminate body-as-narrative. Researchers investigating social definitions based on the body (such as race, gender, sexual orientation or disability), for example, found in the post-modern interrogation of the body a vantage point from which to challenge any fixity these definitions might claim. How can one “be” a man, a woman, a lesbian, a heterosexual, paraplegic, Inuit, father, cancer patient when the body is a story *about* being? When confronting dominant discourse in which race, gender, etc. may dictate the difference between full participation in society and permanent disenfranchisement, the body-as-narrative offers a potent tool for disruption.

Ultimately, the work of late-twentieth-century body theorists led to a formal critique of materiality itself. Judith Butler, in particular, produced an influential account of the body by arguing that matter is simply that which is posited *in* language as being prior *to* language:

> If the body signified as prior to signification is an effect of signification, then the mimetic or representational status of language, which claims that signs follow bodies as their necessary mirrors, is not mimetic at all. On the contrary, it is productive, constitutive, one might even argue performative, inasmuch as this signifying act delimits and contours the body that it then claims to find prior to any and all signification. ("Bodies that matter" 144).[1]

Further, she argues that the body itself consists of a dynamic interaction between matter and mind: "the very contours of the body are sites which vacillate between the psychic and the material. Bodily contours and morphology are not merely implicated in an irreducible tension between the psychic and the material but are that tension" (*Bodies* 66). This suggested that the body, in the twentieth century as in the seventeenth, is fluid, indeterminate, and capable of almost limitless redefinition: a "Trickster" body "of indeterminate sex and changeable gender. . . . [a] creative force at war with convention" (Smith-Rosenberg 291), or a semi-artificial "cyborg" body which "can be dispersed and interfaced in nearly infinite, polymorphous ways" (Haraway 193).

Not all body theorists, however, 'post-modern' or otherwise, have welcomed this apparent emancipation from materiality. Susan Bordo, for example, raises concerns about the protean body-as-narrative as a long-term conceptual construct for understanding embodiment, arguing that Butler does not sufficiently acknowledge the subjective experiences of the folk body, which are characterized by limitation rather than by unfettered creativity:

> To deny the unity and stability of identity is one thing. The epistemological fantasy of becoming multiplicity . . . is another. What sort of body is it that is free to change its shape and location at will, that can become anyone and travel everywhere? If the body is a metaphor for our locatedness in space in time and thus for the finitude of human perception and knowledge, then the post-modern body is no body at all. ("Feminism, post-modernism and gender-scepticism" 145)

Bordo's criticism only echoes certain reactions to the theory of performative speech. Philosopher J. R. Searle, for example, has argued pithily against accepting performativity as a kind of verbal or textual magic wand: "I can't fry an egg by saying, 'I fry an egg,' but I can promise to come and see you just by saying, 'I promise to come and see you' . . . Now why the one and not the other? The limitations on the class that determine which will succeed and which will fail derive from facts about how the world works" ("How

---

[1] Butler's emphasis on the "performative" draws on J. L. Austin's theory of illocutionary speech acts, outlined in his famous 1955 William James lectures; this theory attempts to define a category of speech acts "in which by saying something we do something" (Austin 30). Butler, however, elaborates Austin's relatively simple linguistic taxonomy into the more complex concept of "a dramatic and contingent construction of meaning" (*Gender Trouble* 139).

performatives work" 74, 93). The "facts about how the world works," Bordo insists, include our subjective experiences of our own bodies—bodies that insist upon being immediately present to us as specific objects, with particular shapes, feelings, and ranges of action. The complaint of one academic has taken on an almost iconic status in this regard, summarizing the misgivings of many serious thinkers faced with the prospect of completely disowning the materiality of that body so immediately present to each of us: "'There's so much written about the body . . . . And in so much of it, the body just dissolves into language. The body that eats, that works, that dies, that is afraid—that body just isn't there'" (qtd. Bynum 1).

It is in this context that body theorists and other researchers in the humanities have made recent calls for a *rapprochement* with materialism, and with the traditional sciences. In a recent issue of *Critical Inquiry*, for example, academics ranging from Mary Poovey to Bruno Latour advocate the formation of new relationships between scientific and humanistic endeavors; "[i]t is hard to overstate the urgency of this task," one contributor argued (Neer 474). This spirit of cooperation is particularly noteworthy in that some of the most potent driving forces behind the development of modern body theory—specifically, feminism and psychoanalysis—are founded on an overt antagonism to the role of biology in defining human experience (Foucault 39). Before these champions surrender their posts, however, it would be worthwhile to examine how traditional science has dealt with the folk body, and to note certain similarities of thought between those who view the body as a narrative, and those who see it as a "biologically inevitable and unquestionable" material object (Smith-Rosenberg 289).

Traditional science and the body

The role of scientific discourse with regard to the folk body has been, traditionally, to turn it inside-out. Anatomy, for example, exteriorizes the folk body's interior conceptually as well as visually. The body's subjective immediacy (normally its most perceptible quality) vanishes, and flayed, disjointed persons lean casually on their normal occupational tools, gesture, or gaze, apparently oblivious to the excruciating processes evident upon their flesh (Fig. 1). Similarly, within medical treatises, the subjective sense of bodily coherence disintegrates into objective description of symptoms and parts, to the point that a prominent eighteenth-century expert can write, with no hint of humor or irony: "I will here subjoin a short description of the breast, for the benefit of such of my readers as may not yet have had proper opportunities of gaining information. The breast consists of a large conglomerate circumscribed gland, mixed with a considerable quantity of fat" (White 59-60).

Figure 1. A fully-coiffed cadaver with rosy cheeks strikes the pose of an odalisque. Colour mezzotint anatomical plate by Jacques Gautier d'Agoty, from *Myologie complette* (Paris, 1746).

The folk body's incommunicability, within scientific discourse, is inverted as well. The body in science can only exist at all, is constituted through, exhaustive exposure to external analysis. Both Stephen Toulmin and Byron Good, for example, in their studies of medical education, stress the importance of the physician's gaze in creating (rather than observing) the body of the medical subject. In Good's own words, it is the role of the medical scientist to produce "a medical body, quite distinct from the bodies with which we interact in everyday life" (72). It is for this reason that the figures of early anatomy appear to offer themselves to the viewer, helpfully volunteering to display themselves, as though cadavers yet retain one aspect of their otherwise vanished agency in the form of an ability to surrender their agency (Fig. 2). Once placed within the purview of science, these dead bodies *cannot not* be known, analyzed, reproduced, and disseminated in a way that the subjective folk body resolutely resists.

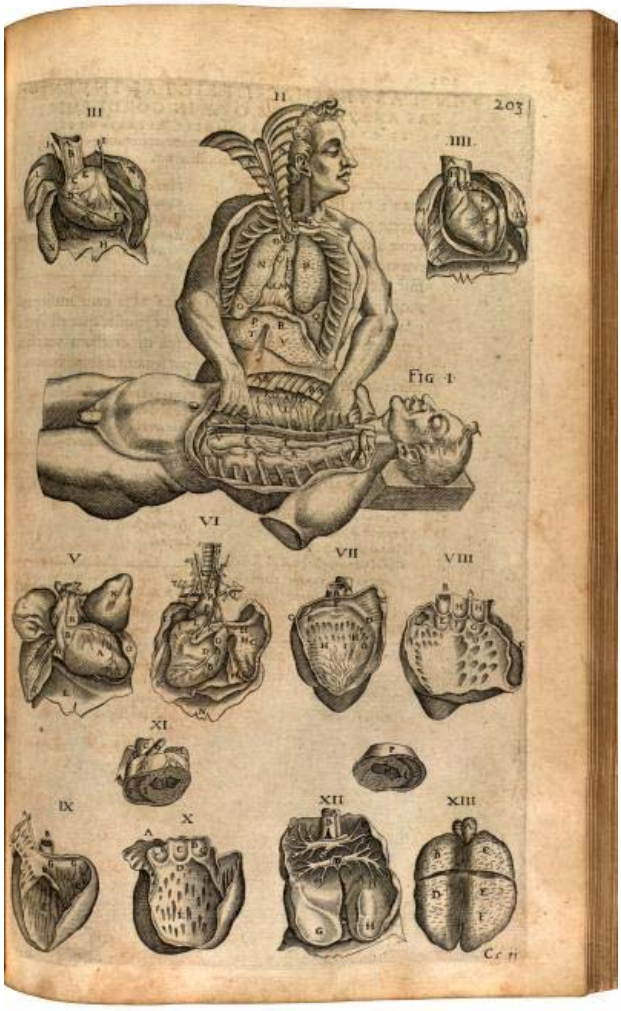

Figure 2. The helpful cadaver: one dead body dissects another. Engraving by Andrâe Du Laurens, from *Opera omnia anatomica et medica* (Frankfurt, 1627).

Bodily agency and the universality of somatophobia

In spite of the direct opposition between the folk body, which must be felt and cannot be spoken, and the medical body, which does not feel and yet must speak, scholars of these two bodies share, surprisingly, somatophobia as a common theme. Historians of science, for example, are generally agreed that the anatomizing gaze of medicine exists, at least in part, to control an unruly and threatening body (Wilson 63). Less widely acknowledged is the possibility that scientific discourse's most energetic critics in feminist studies and psychoanalysis display a tendency to retain and reinscribe this somatophobia within their own work. Among body theorist, materialist advocates of the "lived body," on the one hand, are far likelier to focus their attention on bodily traumas than on everyday experience; anorexia, evacuation, and torture have all received at least one major scholarly treatment in the last twenty years (e.g. Bordo's *Unbearable Weight*, Kristeva's *Powers of Horror*, and Scarry's *The Body in Pain*) while experiences of intense bodily mindfulness, such as

dancing or tasting, remain largely unexplored. On the other hand, constructivist body theorists, with their intense focus on the creative power of narrative, puzzle and outrage readers by celebrating bodily practices widely acknowledged to be unpleasant, such as physical humiliation or torture. When literary critic Lynda Hart, for example, endorses sexual sado-masochism as "a process of coming to realize that the self is . . . a construct" (59), one might be excused for feeling that this liberation with regard to the "self" is bought at an unacceptably high expense to the lived body. The pervasiveness and persistence of the belief that the body is intrinsically a thing to be feared and avoided, that the subjective experience of embodiment is normally one of pain, suggest that the root causes of somatophobia lie deeper than whatever theoretical framework is used to understand the body in the first place.

The primary aspect of the body, and in particular of the experience of embodiment, which inspires and sustains somatophobia across disciplinary boundaries and through time is the fear that the body has an agency beyond the reach of consciousness. When Descartes rejects Harvey's suggestion that normal bodies contain involuntary systems (Gorham 211-2) or when Bordo warns that the body's susceptibility to enculturation makes it a potential traitor to conscious attempts at political liberalization (13), when an anthropologist relegates the body to the status of wholly instrument (Mauss 75) or a psychoanalyst equates the advent of bodily awareness with irremediable psychic trauma (Price and Shildrick vi-vii), the radical differences among these various approaches fail to conceal a unanimous uneasiness with the possibility that the body might act, or even exist, without whatever conscious process it is we mean when we say "us."

Further, a non-trivial corpus of work maintains that the body is, under ideal conditions, subjectively imperceptible. Explicit formulations of this idea range from folk psychology's 'sore thumb' arguments (canonized in Woolf's *On Being Ill* and Freud's "On Narcissism") to Drew Leder's claim that "the body tends to disappear when functioning unproblematically" (74).[2] Even where subjective bodily experience can be acknowledged, it is sometimes denied a role in legitimate research. In Meditation VI of *Meditations on First Philosophy*, for example, Descartes noted that his body "belonged to me more properly and strictly than any other . . . . I experienced pain and pleasure in its parts and not in those of other bodies which are separated from it" (72). The radical idiosyncrasy of one's own body experience, he argued, renders this experience an unfit basis for forming conclusions about the world; "it is the business of the mind alone," he concluded, ". . . to decide the truth" (78). The influence of Cartesian philosophy is not, in general, directly visible in modern body theory; anti-Cartesianism has been the order of the literary-critical day for some time. As Lauren Berlant points out in a recent article, however, "a certain disenchantment" with the body-specific work of race, gender and queer theorists is currently producing a critical drift towards categories (such as "globalization" or "ethics") that ensure "the distance from the body that traditionally secures the prestige of critical thought" (445). The "disenchantment" Berlant discerns echoes Cartesian distrust of the body as a

[2] There is, of course, a logical error in equating a failure to observe with the lack of anything observable. By accepting the absence of bodily mindfulness as a norm of subjectivity, one necessarily excludes all products of such mindfulness.

source of knowledge; a persistent belief in the unreliability of subjective sensory knowledge hampers attempts to incorporate "the lived body" into body theory. If one's experience of one's own body is as radically idiosyncratic as Descartes's account claims, generalization becomes impossible; no number of points upon the graph paper will ever resolve into a curve.

What would happen if a research field took as its direction the possibility that the body *has* a subjectivity and agency of its own? What if, instead of dreading or denying this possibility, researchers explored its functions and potentials? Such research could address the possibility that subjective interior life might already be present in those parts of the body we mistake as wholly material, and that the material body, unreachable though it is through the tools of language, might yet form an essential part of the fabric, not only of language, but of consciousness itself.

Embracing the body as agent: the designer's role

Such research is currently taking place in the fields of neurophysiology and consciousness studies. The advent of new technologies, such as MRI scanning, for examining the neural processes of the body, has led to surprising new directions in brain research. Reductionists in the field had generally assumed that a closer look at neural activity would be able to locate specific structures or functions within the brain directly or indirectly responsible for producing the subjective experience of consciousness: "neural correlates of consciousness" or "NCCs" (Searle 557). What pioneers in the field, such as Ramachandran and Varela, discovered, however, was that consciousness, far from being a product of a one-way cause-and-effect relationship, is only one element in a dynamic and complex system encompassing brain, body, and world (Thompson and Varela 420). The very model of a body as the exterior of an interior consciousness evaporates in the face of these physiological developments:

> Because they are so thoroughly enmeshed—biologically, ecologically, and socially—a better conception of brain, body, and environment would be as mutually embedded systems rather than as internally and externally located with respect to one another (Thompson and Varela 423)

With "internal" and "external" demoted as categories from positions of primary importance, the strict dichotomies of both the folk body and the medical body give way to a wider field of inquiry. Phantom limb pain, for example, has troubled physicians and theorists from Hippocrates to Lacan, suggesting as it does a more complex relationship between body and mind than object/subject or material/immaterial. Ramachandran, by focusing on brain, body, and environment as co-creators of the experience of embodiment, has not only been able to provide a plausible account of phantom limb pain as "a back-and-forth interaction," but to treat this pain successfully in patients (320). And phantom limb pain is only one of a number of puzzles concerning the relations of body, brain and world which the new neurophysiology is currently re-investigating; other candidates include proprioception, inattentional blindsight, and schizophrenia, to name only a few.

The recognition that body, brain, and world are mutually embedded systems has led both biologists and critical theorists to the realization that they must study and share each other's methodologies in order to continue researching these phenomena. Bruno Latour, for example, calls for a "renew[ed] empiricism" (231) among humanist scholars—not a surrender to scientific discourse, but rather a recognition of the situatedness of the objects of science: "they too act, they too do things, they too *make you do* things" (243). On the other side of the methodological divide, Francisco Varela urges scientists to consider the subjective human experiences normally relegated to psychology, sociology, or even literary criticism as an integral part of biological research: a "call for transforming the style and values of the research community itself" (qtd Rudrauf et al. 48). The quest for more inclusive, effective methodologies has led, not only to a potential exchange of expertise between biology and critical theory, but also to the renovation of certain marginalized methods, such as phenomenology (Marshall 153-4), and to a search for research tools beyond the boundaries of the academy (e.g., the ongoing symposia instituted by Varela with the participation of H.H. the XIVth Dalai Lama). To suggest that design should take a place in this ongoing research into the body and embodiment, or that the developments and critiques currently moulding body theory should also be brought to bear upon design, is not a radical departure from historical or contemporary practice, nor an unduly optimistic proposal for the future of the discipline.

Design's inclusion in the process, in fact, has already begun, at least in some measure. In the search for research methodologies and directions capable of accommodating the lived body as part of a complex system, both critical theorists and scientists have taken a renewed interest in the theories of ecological psychologist J.J. Gibson. In particular, his theory of affordances has drawn attention, focusing as it does on interaction—the "relations of possibility between actors and environments" (qtd Bermúdez 155)—rather than the dualities of either behaviorism or mentalism. A number of neurophysiologists and philosophers of consciousness have recognized in "the Gibsonian concept of ecological perception" a tool flexible enough to account for the mechanisms of self-perception: "a core for such comprehensive accounts of the phenomenon (or phenomena) of self-consciousness" (Bermúdez 152-3; see also Gallese and Gallagher). The added participation of designers already well-versed in Gibson's theories and their implications could contribute vitality and insight to this discussion.

Participating in any ongoing process of criticism and discovery will tend, as Germaine Greer once warned a hopeful male feminist, to "cost you something, personally."[3] If design research actively engages with the current research trends this paper describes, this engagement will necessarily entail a certain amount of self-examination. To give a single example, design researchers who choose to enter the conversations begun by Varela, Butler and/or Latour with regard to subjectivity and embodiment will need to reassess radically their definitions of intentionality and volition. The brute facts of neurophysiology, as they currently stand, make it clear that the chain of events in the performance of any physical action does *not* run from the voluntary decision of

[3] Post-lecture Q&A session, University of Saskatchewan (Saskatoon, Canada), 1986.

a conscious mind, through the nervous system, to an obedient system of muscles, ligaments and bones (one thinks again of the helpful cadavers of early modern anatomists, eagerly awaiting the dissector's demands). The first objection to this scenario lies in the fact that intentional consciousness, the supposed first cause of voluntary action, is both preceded and constrained by non-conscious bodily processes (Gallagher 226). The very distinction between the mind that decides and the body that acts is fallacious, in that cognition *per se* is distributed among conscious and non-conscious processes: "[t]here is overwhelming evidence that non-conscious *cognition* plays a critical role in memory retrieval, belief consolidation, judgment, reasoning, perception, and language use" (Churchland 48). The body is capable of thinking and deciding, as well as acting. Further, the body appears to be able to form its own intentions, along with or prior to conscious intentionality. Gallagher, for example, analyzes clinical findings with regard to body posture as examples of how the non-conscious body can demonstrate intentionality: "[h]ow the body reacts to a particular environment, even if automatic, is not a matter of simple mechanics or reflex . . . Rather, the body *meets* stimulation and organizes it" (235). Philosopher Patricia Churchland goes so far as to question whether classical concepts of volition can survive the findings of neurophysiology: "[i]ncreasingly, it seems unlikely that there is a sharp distinction—brain-based or otherwise—between the voluntary and the involuntary, between being in control and being out of control, either in terms of behavioural conditions or in terms of the underlying neurobiology" (211). In this context, design research that focuses solely on users' intentions, testing protocols that include only task-based design evaluations, or design critiques that endorse a strict hierarchy of the functional, the usable, and the pleasurable, may be viewed with a certain amount of scepticism by those in other disciplines whose concepts of the body are more complex and dynamic.

Conclusion

Today is not the day that designers should don the mantle of early-modern, rationalist science. This moment is not the moment that design research should seek to be 'more scientific' in its methodologies, and commit itself to tracing one-way paths of linked cause-and-effect leading from a sovereign, immaterial conscious mind, to an ignorant body, to an inanimate artefact. Research in the name of the traditional sciences exists to control and exclude, and the sciences themselves are struggling against this restrictive intellectual and social legacy. This is not the time for design to turn its attention away from the 'unscientific' aspects of experience, just as other disciplines grasp at the possibility that "how it feels" and "what it's like" might be, not only legitimate questions for any academic to explore, but perhaps *the* questions.

Bibliography

Austin, J. L. *How to Do Things with Words*. Oxford: Clarendon Press, 1962.

Berlant, Lauren. "Critical inquiry, affirmative culture." *Critical Inquiry* 30, 2004. 445-51.

Bermúdez, José Luis. "Ecological perception and the notion of a nonconceptual point of view." *The Body and the Self*. Ed. José Luis Bermúdez et al. Cambridge, Mass.: MIT Press, 1995. 153-73.

Birke, Lynda. "Bodies and biology." *Feminist Theory and the Body: A Reader*. Ed. Janet Price and Margrit Shildrick. NY: Routledge Press, 1999. 42-49.

Bordo, Susan. "Feminism, post-modernism and gender-scepticism." *Feminism/Postmodernism*. Ed. Linda J. Nicholson. NY: Routledge, 1990. 133-56.

-----. *Unbearable Weight: Feminism, Western Culture, and the Body*. Berkeley: U of California P, 1993.

Butler, Judith. "Bodies that matter." *Engaging with Irigaray: Feminist Philosophy and Modern European Thought*. Ed. Carolyn Burke et al. NY: Columbia UP, 1994. 141-73.

-----. *Bodies that Matter: On the Discursive Limits of 'Sex.'* NY: Routledge, 1993.

-----. *Gender Trouble: Feminism and the Subversion of Identity*. NY: Routledge, 1990.

Bynum, Caroline. "Why all the fuss about the body? A medievalist's perspective." *Critical Inquiry* 22:1, 1995. 1-34.

Churchland, Patricia. *Brain-Wise: Studies in Neurophilosophy*. Cambridge, Mass.: MIT Press, 2002.

Foucault, Michel. "Body/power." *Power/Knowledge: Selected Interviews and Other Writings, 1972-1977*. Ed. and trans. Colin Gordon. Brighton, UK: Harvester Press, 1980. 35-42.

Galese, Vittorio. "The acting subject: Toward the neural basis of social cognition." *Neural Correlates of Consciousness: Empirical and Conceptual Questions*. Ed. Thomas Metzinger. Cambridge, Mass.: MIT Press, 2000. 325-33.

Gallagher, Shaun. "Body schema and intentionality." *The Body and the Self*. Ed. José Luis Bermúdez et al. Cambridge, Mass.: MIT Press, 1995. 225-44.

Gibson, J.J. *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin, 1979.

Good, Byron. *Medicine, Rationality and Experience*. Cambridge: Cambridge UP, 1994.

Gorham, Geoffrey. “Mind-body dualism and the Harvey-Descartes controversy.” *Journal of the History of Ideas* 55:2, 1994. 211-34.

Haraway, Donna. “A manifesto for cyborgs: Science, technology, and socialist feminism in the 1980s.” *Feminism/Postmodernism*. Ed. Linda J. Nicholson. NY: Routledge, 1990. 190-233.

Harris, Jonathan Gil. “This is not a pipe: Water supply, incontinent sources, and the leaky body politic.” *Review of English Studies* 41:163, 1990. 203-27.

Hart, Lynda. “Doing it anyway: Lesbian sado-masochism and performance.” *Performance and Cultural Politics*. Ellin Diamond, ed. London: Routledge, 1996. 48-61.

Hayward, Jeremy and Francisco Varela. *Gentle Bridges: Conversations with the Dalai Lama on the Sciences of the Mind*. Boston: Shambhala Publications, 1992.

Kantorowicz, Ernst. *The King’s Two Bodies: A Study in Mediaeval Political Theology*. Princeton, NJ: Princeton UP, 1957.

Kristeva, Julia. *Powers of Horror: An Essay on Abjection*. Trans. Leon S. Roudiez. NY: Columbia UP, 1982.

Laqueur, Thomas. *Making Sex: Body and Gender from the Greeks to Freud*. Cambridge, MA: Harvard UP, 1990.

Latour, Bruno. “Why has critique run out of steam? From matters of fact to matters of concern.” *Critical Inquiry* 30, 2004. 225-48.

Leder, Drew. *The Absent Body*. Chicago: U of Chicago P, 1990.

Marshall, Helen. “Our bodies, ourselves: Why we should add old fashioned empirical phenomenology to the new theories of the body.” *Women’s Studies International Forum* 19:3, 1996. 153-65.

Mauss, Marcel. “Techniques of the body.” 1935. Trans. Ben Brewster. *Economy and Society* 2, 1973. 70-88.

Metzinger, Thomas. “The *subjectivity* of subjective experience: A representationalist analysis of the first-person perspective.” *Neural Correlates of Consciousness: Empirical and Conceptual Questions*. Ed. Thomas Metzinger. Cambridge, Massachusetts, MIT Press, 2000.

Mullaney, Steven. “Mourning and misogyny: *Hamlet, The Revenger’s Tragedy*, and the final progress of Elizabeth I, 1600-1607.” *Shakespeare Quarterly* 45:2, 1994. 139-62.

Neer, Richard. “Reaction and response.” *Critical Inquiry* 30, 2004. 472-76.

Poovey, Mary. “For what it’s worth…” *Critical Inquiry* 30, 2004. 429-33.

Price, Janet and Margrit Shildrick. Introduction. *Feminist Theory and the Body: A Reader*. Ed. Janet Price and Margrit Shildrick. NY: Routledge Press, 1999. i-xx.

Ramachandran, Vilayanur S. and Diane Rogers-Ramachandran. “Phantom limbs and neural plasticity.” *Arch Neurol* 57, 2000. 317-20.

Rudrauf, David et al. “From autopoiesis to neurophenomenology: Francisco Varela’s exploration of the biophysics of being.” *Biological Research* 36, 2003. 27-65.

Scarry, Elaine. *The Body in Pain: The Making and Unmaking of the World.* NY: Oxford UP, 1985.

Searle, John R. “Consciousness.” *Annual Review of Neuroscience* 23, 2000. 557-78.

-----. “How performatives work.” *Basic Topics in the Philosophy of Language*. Ed. Robert M. Harnish. NY: Harvester, 1993.

Smith-Rosenberg, Carroll. “Writing history: Language, class, and gender.” *Feminist Studies: Critical Studies*. Ed. Teresa de Lauretis. Bloomington: Indiana UP, 1986. 31-54.

Thompson, Evan and Francisco J. Varela. “Radical embodiment: neural dynamics and consciousness.” *Trends in Cognitive Sciences* 5:10, 2001. 418-25.

White, Charles. *A Treatise on the Management of Pregnant and Lying-in Women*. London, 1773.

Wilson, Luke. “William Harvey’s *Prelectiones*: The performance of the body in the Renaissance theater of anatomy.” *Representations* 17, 1987. 62-95.

About the Authors

Susan Liepert
PhD Candidate
Department of English and Film Studies
3-5 Humanities Centre
University of Alberta
Edmonton AB T6G 2E5

Susan is currently completing her dissertation in English literature at the University of Alberta. Her research focuses on the literary history of breast cancer in eighteenth-century medical literature and novels. She also has a strong background in classics, drama, and humanities computing.

Dr. Stan Ruecker
Assistant Professor
Humanities Computing
Department of English and Film Studies
3-5 Humanities Centre
University of Alberta
Edmonton AB T6G 2E5
CANADA
email: sruecker@ualberta.ca

Dr. Stan Ruecker is an Assistant Professor of Humanities Computing in the Department of English and Film Studies at the University of Alberta. He is a graduate of the University of Regina (BA Hons English 1985, BSc Computer Science 1988), the University of Toronto (MA English 1989), and the University of Alberta (MDes 1999, PhD 2003). His research interests are in the areas of computer-human interfaces, text visualization, and information design. His PhD research was on the affordances of prospect for computer interfaces to large, interpretively-tagged text collections.