Age Matters

Realigning Feminist Thinking

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Graying the Cyborg

*New Directions in Feminist Analyses of
Aging, Science, and Technology*

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Transportation, communication, and domestic and medical technologies are part of today's consumer culture for those at every age. However, aging people in particular are increasingly yet variously targeted as consumers of new technologies, a focus that promises to intensify. The current, aging baby-boomer population—a group socialized to work with and consume scientific knowledges and technologies—represents potential, new markets for pharmaceutical, assisted living, and entertainment technology companies. Business magazines, newspapers, and business news programs reveal that plans are in progress to address this growing population. Headlines such as "Technology's Elder Boom" (Brooks 2004) or "Gerotechnology: The Cutting Edge of Eldercare" (Taylor 2004) extol the latest technological innovations and, thereby, generate potential markets for such products.

Within biomedicine, the aged body is increasingly constructed as a set of age-related diseases as well as a site for continual restoration and

improvement. Such conceptualizations of aging and aging bodies produce a market for potential scientific and technological interventions from treatments deemed to be lifesaving (cardiac implants, kidney dialysis) to therapies for prevention and risk reduction (Tamoxifen for breast cancer, prostate cancer screening) to technologies designed to improve lifestyle (cosmetic surgeries, baldness medications). In all, there is an urgency about the importance of technology and science to the meaning, interventions, and lived experiences of aging. Furthermore, these issues illustrate the extent to which scientific knowledge and its technical applications are central producers of the meaning of "normal" aging and the embodied, lived experiences of old age.

In this chapter, we encourage scholarship to engage the complex ways technologies and sciences constitute the meanings and experiences of aging as well as the ways aging people negotiate and give meaning to these in their own lives. New age relations emerging in interaction with technological innovations like those described previously beckon research that pays attention to issues of power and inequalities. Feminist perspectives are primed to consider the complex ways technology and science contribute to inequalities of race, class, gender, age, and other social positions and, in turn, how these social positions shape technoscientific practices.[1]

We call forward the image of the cyborg to make our point that technologies and science are central to definitions and lived experiences of aging and that aging is central to technologies and science. According to feminist scholar Donna Haraway (1991: 149), "A cyborg is a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction." Attention needs to be given to the complex ways ageism underlies the design, diffusion, and use of technoscientific applications. For example, in popular culture the cyborg is often imagined as a youthful, male computer user or action figure, a body-machine at work and play. In reality, it is more often aging people who negotiate a complex landscape of technological devices to continue (active) living. It is our contention that new research should "gray the cyborg" and attend to the age, technology, science, and gender junction.

In many ways, aging people disproportionately rely on and negotiate technologies inside and outside of their bodies. Feminists have paid much attention to the damage done when social positions such as race, class, gender, and sexuality are universalized in favor of neutrality, yet ageism often goes unnoticed in feminist analyses. Nonetheless, a feminist approach reveals that aging social actors are not uniformly treated nor are their viewpoints homogeneous. Instead, older people are highly but differentially targeted by medical interventions. They are at times implicated, at times ignored, and at times targeted users in the design and diffusion of medical technologies, such as heart medications, hormonal therapies, and brain scans, as well as other communication and home technologies, such as computer keyboards, cell phones, and remote control devices.

In the next sections, we examine research in the sociology and anthropology of health and illness and science and technology studies (STS)— two areas that bring technoscience and aging into focus. In doing so, we highlight critical analysis of medicalization and the ways scholars extend this idea to grapple with recent large-scale changes in the organization and practices of health care. We then incorporate the STS focus on users as they are envisioned in the design and marketing of technological products and the ways people give meaning to and interact with technologies in ordinary and extraordinary moments. Finally, we use the analytic approach of feminism to transform feminism itself by more fully considering the relations between technoscience, age, and ageism alongside such central topics as femininity, masculinity, race, class, and sexuality. Bringing such a feminist lens to studies of technoscience allows broader understandings of aging in new and complicated ways and provokes further analyses of aging and ageism in these three fields of inquiry.

The Increasing Medicalization of Aging Bodies

Sociologists and anthropologists of health and illness and gerontologists have a long history of investigating the increasing reliance on medicine to define and thus intervene in what is understood as normal and abnormal physical, mental, and emotional processes, or what is referred to as medicalization. Aging bodies intimately interact with a plethora of pharmaceuticals and medical devices in daily life, and medicine is one of the primary sites where the aging body is subjected to technoscientific interventions. In his canonical essay "Medicalization as an Institution of Social Control," Irving Zola (1972) put forth the medicalization thesis, the idea that in the twentieth century mental, emotional, and physical processes previously outside of medicine's jurisdiction are construed as clinical problems and placed under the control of medicine and physicians' expert knowledge.

Research by Cruikshank (2002), Estes and Binney (1989), Gubrium (1986), Kaufman (1994), Lock (1993), and others focused on the construction of illness categories related to aging and analysis of the subsequent professions that were established to manage and control these new diseases. Gubrium (1986) examined Alzheimer's disease and the ways the biomedical model redefined memory loss as an illness category. Similarly, Estes and Binney (1989) examined the social construction of aging as a biomedical problem. They argued that scientific knowledge in general, and

the biomedical model in particular, legitimizes itself and gains acceptance through a continual reproduction of its knowledge claims. That is, by constructing old age as a medical problem, medical practitioners shaped both the objects for their own interventions and the cultural ideals about aging as something pathological and abnormal requiring their expertise and the authoritative knowledge of biomedicine. Constructing old age as pathology is inherently ageist in its very effacement of understanding and treating specific bodily disturbances and concerns of those who are considered old. These authors were prescient to note the ways in which rapid developments in biological science and medical applications constitute (new) knowledge about aging and the aged body and expectations for how best to intervene in aging processes.

However, medicine has undergone significant structural changes since the 1980s when most of this scholarship occurred. These changes include the increasing privatization of health care as for-profit hospitals and health insurance companies expanded in number; the devolution of care from hospitals and physicians to families and caregivers; the escalating reliance on technological and scientific applications for diagnostics, treatment, and surveillance; and the diffusion of medical knowledge through self-help books, activist work and publications, patient-organized support groups, and health-related Internet sites. The contemporary medical terrain is now composed of dense technoscientific practices, corporate actors, and a changing relation between health care providers and patients, with many people accessing more outlets to learn about the efficacy and effects of medical treatments and tests available.

Working at the crossroads of STS and the sociology of health and illness, Clarke, Shim, Mamo, Fosket, and Fishman (2003) offer a reconceptualization of the medicalization thesis in light of the cumulative changes that have occurred in medicine over the past quarter century. Drawing on a core STS idea that technologies—defined broadly to include any application of knowledge, including scientific knowledge such as drugs, classification schemes, and machines—are central to contemporary life, the authors focus on the meaning and content of scientific ideas and their technological applications. By keeping technoscience central, Clarke and her colleagues provide a careful analysis of the complex ways technological innovations in computer and information technologies conjoin with innovations in biomedical sciences and shape the contours of new medicalization processes.

Suggesting that medicalization no longer adequately explains contemporary medical practice, Clarke and her colleagues argue that we are now in an era of "biomedicalization," a moment in which the corporate,

epistemological, and technoscientific processes of biomedicine unevenly extend further into health and life.[2] They outline five processes in particular that constitute biomedicalization: (1) the increasing privatization of biomedicine, with for-profit companies and hospitals gaining in prominence; (2) the extension of risk and surveillance categories resulting in more and more "healthy" conditions being labeled as "pre-disease" or at the very least risky; (3) the escalating use of technology and science in clinical practice; (4) the availability of new computer technologies, such as the Internet, that change knowledge production and distribution; and (5) the production of new individual and collective health-related identities such as "obsessive compulsive disorder" or "chronic fatigue syndrome" (Clarke et al. 2003: 163). Together these processes constitute a transformation in American medicine where an additional agenda of biomedical intervention is to transform every aspect of life.[3]

Each of these key processes could be interrogated for their specifically ageist undertones. Most obvious are the consequences for the extension of risk and surveillance categories into physical, emotional, and mental processes previously constructed as healthy. When one grays the cyborg, as we argue here, the obvious ageism of this shift becomes clear. As cosmetic and lifestyle interventions become the big business of health care, the very meaning of "life" is equated with youth and the targeted consumer is any person who does not meet this standard. The health care system is now saturated with both aged bodies requiring needed health care and aging bodies hoping to delay or avoid aging.

Studying Aging through a Biomedicalization Lens

Biomedicalization offers a theoretical entry into analysis of contemporary medical practice as it simultaneously calls attention to the increasing use of technology and science in diagnostic, surveillance, and treatment work as well as the ongoing privatization of various health care sectors. Attention to these features of the current health care landscape has particular implications for analyses of aging. The body as a process is increasingly viewed as a project to be worked on and the aging body as a site for continual redefinition and thus corresponding technoscientific interventions. In the case of end-of-life care, Kaufman, Shim, and Russ (2004) demonstrate how societal expectations about aging shape the distribution and use of technologies at the end of life. The moral imperative to use life-extending technologies, such as cardiac procedures and kidney dialysis and transplants, accompany a cultural belief in extending life (i.e., age) and results in social pressures to use these techniques at any cost. Such technologies often add to the quality and length of life and are, therefore, configured as

vital to the production of health. This cultural imperative suggests a moral idea that life extension is "appropriate" and the refusal of such treatments is a sign of deviance.

Intervening in aging processes, while perhaps debateable, is illustrative in medicine's current preoccupation with replacing, enhancing, and regenerating the body through practices such as hormone replacement therapy for menopause; prosthetic replacements for shoulders, knees, and hips; and new research into regenerative organs and limbs. A tension exists here between *being in* the body (a material, biophysiological state) and imagining or culturally constructing the limits, desires, and possibilities of the body. Aging, in this regard, is at best optional and at worst something (part biological, part cultural) to be individually negotiated and medically cured (Squier 2004).

Previous lines between health and illness are blurred. What was once healthy is today presymptomatic, at risk, and in need of antiaging therapies. The creation, expansion, and redefinition of biomedical disease categories, such as Parkinson's, Alzheimer's, sexual dysfunction, and incontinence, and new biomedical risk categories, such as prediabetes and precancer, are particularly relevant to feminist studies of aging in that these projects concomitantly produce the raced, gendered, and (anti)aging body. The search for biomarkers of difference in light of the Human Genome Diversity Project is one such example (Reardon 2005).

The expansion of disease categories, with their corresponding diagnostic tests, treatments, and spin-off products such as magazines, supplements, home technologies, and the like, is part of a corporate-profit system that fuels and financially benefits from the ever-expanding notion of illness (into wellness) and its concomitant stratifications. Corporations benefit from both the expansion of home-based surveillance technologies such as blood pressure monitors and glucometers and the expansion of clinically based diagnostic tests, like mammograms, to a wider range of older patients, many of whom are low income. As antiaging lifestyle drugs (e.g., medicine for hair loss) and early prevention diagnostics (e.g., genetic testing for breast cancer) targeting mostly those who can afford such "boutique" medicines proliferate, the experience and meaning of aging will continue to stratify based on a complex interplay of race, gender, and class positions. Furthermore, ageism, with its inherent valuing of youth, exists at the very heart of antiaging discourse.

A research agenda focusing on the centrality of science and technology to the social production and deployment of clinical categories and their gendered, raced, classed, and aged attributes could, for example, study how sciences, discursive practices, the state, and corporations cocreate the

very notion of disease categories such as Alzheimer's, heart disease, and the hormonal body and, in doing so, reshape the definitions of gender, race, and class as well as youth and aging. For example, the state, through grants from the National Institutes of Health, funds projects that aim to find Alzheimer's disease in brain images (Cahan and Dollemore 2004). This research may also unintentionally gender and race the brain as new National Institutes of Health requirements call for between-group comparisons (Fausto-Sterling 2004: 3). Such comparisons produce images of the male Alzheimer's brain and the female Alzheimer's brain as well as the black, white, and Asian brain, reaffirming preconceived notions of gender and race as biologically different. Building on Gubrium's (1986) work on the early medical construction of Alzheimer's, new research could examine the use of science and technology to define the meaning and treatment of Alzheimer's (and now pre-Alzheimer's or "mild cognitive impairment" as it is commonly called), which further race and gender the aging body, while simultaneously aging the gendered and raced body.

The pharmaceutical industry in particular must be studied as recent changes in direct-to-consumer advertisement laws have increased the ability of these companies to reshape definitions of "normal" aging and masculinity and femininity. The Food and Drug Administration (FDA) controls prescription drug advertising, and in 1983, concerned about possible misinformation, it called for a voluntary moratorium on direct-to-consumer advertisements.[4] In 1985 the FDA lifted the moratorium but still required significant restrictions. In 1997 the FDA reinterpreted the regulations to allow prescription drugs to be marketed on television and radio. Since then, we have witnessed an increasing number of pharmaceutical advertisements, and companies spend more each year on advertising, particularly to old people. The United States and New Zealand are the only two countries that allow pharmaceutical companies to market prescription drugs directly to consumers (Benesh 2005).

Moreover, pharmaceutical companies now compose an important part of biomedical practice. Called the era of "Big Pharma," the 1990s marked an increase in the presence and size of megapharmaceutical companies such as Pfizer Pharmaceuticals, Eli Lily, Merck Research Laboratories, and Bristol-Myers Squibb Company. These companies are among the most profitable industries in the United States, with average net returns that rank far above those of other American companies (Angell 2005). In 2000 and 2001, for example, the ten pharmaceutical companies in the Fortune 500 were leaders in the top two key measures of profitability, reporting "a profit of 17 cents for every dollar of revenue, compared with a Fortune 500 median of 3.1 cents per dollar of revenue and a return on assets of

14.1 percent, compared with a Fortune 500 median of 2.3 percent" (Pattison and Warren 2003: 1). This economic power, coupled with changes in direct-to-consumer advertising regulations, translates into pharmaceutical companies having enormous influence. As we demonstrate in the next section, pharmaceutical marketing redefines not only what it means to be healthy and sick but also what it means to be masculine and feminine, young and old.

Feminist Analysis and Biomedicalization

One drug that helped redefine masculinity and femininity is Viagra. Several feminist scholars variously examine Viagra for the work it does to redefine gender (Fishman 2004; Loe 2004; Mamo and Fishman 2001; Marshall and Katz 2002; Potts 2000) yet few have explicitly argued that Viagra redefines aging masculinity and femininity using youthful assumptions about the body to do so. For example, feminist sociologist Meika Loe's (2004) work shows how urologists, scientific studies published in medical journals, the rise of Big Pharma, advertisements, and a large aging population all coproduced the disease "sexual dysfunction" and its concomitant treatment, Viagra. More important, though, the rise of Viagra redefined "normal" sexuality so that men are expected to produce and maintain an erection on demand (Loe 2004: 19). As Loe (2004: 92) demonstrates, "Viagra can and is being used to enforce and perpetuate an ideal masculinity"—one that is impossible for many male bodies to attain. This redefinition of masculinity, as Loe convincingly argues, simultaneously redefines femininity. Women, to accommodate their Viagra-infused partners, are now expected to be sexually active until death.

Loe's rich analysis successfully shows how the marketing and use of Viagra redefines gender and sexuality in troubling ways. However, her primary analytical focus is gender. Loe does provide an excellent chapter on senior female partners of Viagra users (see pp. 95–123) and briefly discusses the drug's relation to other antiaging therapies such as Botox, the antiwrinkle drug (see pp. 174–76), but a sustained discussion of ageism and aging male bodies is not Loe's central concern. While every book clearly cannot be inclusive of all issues, we contend that Viagra and other pharmaceuticals targeting sexual function are illustrative of a shift toward antiaging therapies that reconfigure aging. For example, although the attainment of the always-erect penis is hard for many men to accomplish, it is especially difficult for aging men. Similarly, the redefinition of women's sexuality has a clear antiaging tone as it excludes aging bodily processes and positions the young female body as the ideal. Moreover, the success of Viagra and other antiaging interventions is related to the underlying age-ism that permeates the United States. If aging bodies were perceived to be and constructed as part of routine, even "normal" social processes, then such interventions would be harder to sell.

A feminist analysis of aging must continue to examine biomedicalization processes as social definitions of "normal" masculinity and femininity are increasingly constructed on biomedical and corporate terrain. For example, menopause, potentially perceived as a normal part of aging, is currently positioned as an abnormality or pathology. As part of this cultural definition, a "normal" aging woman is expected to take actions, such as using hormone replacement therapy (now available in a "low dose" form in response to the Women's Health Initiative finding that the risks of taking hormone replacement therapy often outweigh the benefits), to avoid displaying bodily changes associated with aging. The ageism is clear here as well. Yet while feminist research on the medicalization of menopause is extensive (see, for example, Bell 1987; Lewis 1993; Lock 1993; and Martin 1989), few explicitly place ageism and age-relations at the center of analysis.[5] For example, Guillemin's (2000) research on menopause clinics studies how the understanding of menopause as hormone deficiency is generated and stabilized in interactions between clients and health care professionals. Menopause information seminars, diagnostic questionnaires, and the use of technologies such as bone densitometry all prime women to reframe their own initial perceptions of menopause into the medicalized model. While Guillemin clearly shows the importance of technoscience to the framing of menopause as pathology, she simultaneously neglects the role ageism plays in this reframing.

Biomedical topics related to gender and aging, from both the research agenda of gender-based medicine and the new field of race-based medicine, are proliferating and require further analysis. Medical constructions of heart disease, osteoporosis, colon cancer, and other illnesses all participate in and reshape cultural definitions of masculinity, femininity, and aging. In all, biomedicalization processes reconfigure aging bodies and their multiple identifications from the inside out by means of illness categories and their corresponding pharmaceutical and surgical interventions. At the same time, changes in advertising regulations make it easier for pharmaceutical companies to sell new ideas of "normal," ideas that seamlessly connect normalcy with youthfulness. Presented as an "ageless" body, what is actually being sold is an ideal, youthful body mutually shaped within ideals of femininity and masculinity. Viagra and hormone replacement therapy demonstrate that to stay feminine or masculine, consumers should "choose" to maintain the erect penises and perky breasts associated with teenage or twentysomething bodies.

The transformation of the substance of the inner self is one way that the body becomes a cyborg. However, the gendered, aged body is also a hybrid of flesh and machine in his or her relation to the outer world. The matrix of ageism, gender, and other social positions that underlie much of biomedicalization processes requires further analysis by feminists and those located in STS and the sociology of health and illness. More than ever, older people interact with machines at home and in public space and they are besieged by direct-to-consumer advertising promoting the latest youth-maintaining therapy, yet little research examines the age–gender matrix of these messages and the lived reality of these technocitizens.

Technologies and Everyday Living

In the 1980s STS, drawing from different theoretical paradigms, began to think about what STS scholars call "users" as both embedded in techno-logical design and active participants in the social shaping of technology.[6] Trevor Pinch and Wiebe Bijker (1984), working within the social construc-tion of technology (SHOT) approach, theorized users as key social groups that create multiple meanings of technologies. Feminist historian Ruth Schwarz Cowan (1987) also called for research on users in her landmark essay "The Consumption Junction: A Proposal for Research Strategies in the Sociology of Technology." The "consumption junction" positions "the place and time at which the consumer makes choices between compet-ing technologies" as central to any analysis of technoscience (Cowan 1987: 263). Analysis of users continues to flourish, and as Oudshoorn and Pinch (2003: ix) write, "Users are everywhere gaining prominence."

Simultaneously, in the mid-1980s several feminist scholars studying health and illness turned their attention to the perspective of patients and the ways women were actively involved in defining their own health (see Olesen and Lewin 1985). This feminist framework revealed that women were not passive creatures acted upon by others but active constructors of contexts and meanings. From here women were understood as able to take on "medicalization" for their own purposes and gain control over the diagnosis and treatment of illnesses and issues important to them as well as resist medicine's social control imperative; that is, the pressure to use hormone replacement therapy, have hospital births, and the like. Here consumers, women in this case, were brought forward as active agents (see especially Riessman 1983; Cussins 1996).

Feminist scholars also actively challenge gender bias in technological design. Bell (1995), for example, questions the exclusion of women from clinical trials, providing insight into the hidden biases of pharmaceuti-cal research. The creation of average drug dosages and the protocols for standardized treatments also reveal a bias toward the average male body. As Clarke and Fujimura (1992) point out, institutions and actors copro-duce the "right tools for the job" and the one size fits all model seldom takes women's bodies into account. While there is important research (Fausto-Sterling 2005; Martin 1989; Kaufman, Shim, and Russ 2004) that addresses topics related to aging, explicit investigations of the aging body and the antiaging practices of technoscience remain rare.

Feminist studies of aging critically interrogate how gender inequali-ties are built into the later stages of the life course. Initially focused on the particular identities and ideals constructed for older, white, middle-class women (Copper 1988; Macdonald and Rich 2001; Woodward 1999), the field now includes analyses of masculinities and men's lived experi-ences (Katz 2001/2002); the intersection of race, class, gender, and aging (Calasanti and Slevin 2001; Cruikshank 2002; Slevin and Wingrove 1998); and the centrality of the body to the lived experience and performance of aging (Biggs 2004; Twigg 2003, 2004). These renewed engagements provide insight into the political complexity of aging in the United States.

STS approaches combined with feminist perspectives on health and gerontology offer insight into the contemporary contours of aging. While STS rarely takes up aging and ageism as a central concern, we argue that many of their conceptual tools are ripe for such investigations. We outline three here that we think are useful for future analyses of aging, technol-ogy, and intersectional feminism: (1) configuration of the user, (2) material practices and negotiations, and (3) technological design.

Configuration of the User

First, STS analyzes how a preconceived user informs the design and mar-keting of a particular technology. Referred to as the "configured user," every technology is designed and sold with a "normal" user in mind. Con-cealed by popular discourses that emphasize the neutrality of technologies, critical analysis is needed to uncover the assumptions built into technolo-gies and advertisements. This is particularly relevant to feminist studies of aging as aging men and women, even when they are majority users, are ignored in marketing practices that highlight youthful bodies and themes. They are also marginalized in the actual design of machines, which are often designed for use by a younger, able-bodied person.

For example, the design and marketing of technologies are situated within a climate currently tilted toward an antiaging discourse. Antiag-ing ideals celebrate a search for immortality, the extension of healthy liv-ing, and living without aging altogether (Elliott 2003; Katz 2001/2002; and Haber 2001/2002). Such ideals promote and reinforce the belief that aging is

pathology and something that can be overcome. Configuring an ideal user as active, energetic, and able-bodied, antiaging discourse helps to eliminate aging bodies and aging from consideration in design and marketing practices. This idea has important gender implications, as masculinity and femininity are relationally implicated in cultural ideals of beauty, health, and well-being.

Mamo and Fishman's (2001) study of Viagra advertisements provided an early example of a need for a critical feminist approach to the configuring of users.[7] The authors argued that Viagra advertisements in the late 1990s initially constructed the white, heterosexual, older male body securely located in a monogamous relation as the ideal user (e.g., think back to the Bob Dole advertisements). This construction was used as a way to garner legitimacy for the drug's entry into the medical market. In a sophisticated move, the advertisement campaign quickly shifted to include younger, more diverse, mischievous, single, male bodies (e.g., soccer star Pelé and baseball star Rafael Palmeiro). This shift expanded the construction of the ideal user, as the single, male body could be read as monogamous, polygamous, straight, bisexual, or gay. The diverse representation of racial and ethnic identities also increased potential users, resulting in even more prospective markets for the drug.

While there is very little analysis of the ideal user represented in advertisements geared toward older people, new work by Calasanti and King (2005) fills this omission. Their analysis concludes that advertisements are filled with antiaging, or what the mass media uncritically calls "positive aging," ideas. For example, they illustrate how Viagra advertisements align sex with not aging. Viagra is crucial to the performance of a reconfigured understanding of aging masculinity and to the accomplishment of strength and virility associated with it; "staying hard" is central to what Calasanti and King call "the doing of old manhood" (2005: 14).

While these innovative projects examine the aging, gender, and technoscience junction, more research is needed. Given the plethora of technoscientific products and therapies designed for consumption among the aging U.S. population, much could be done to examine how the design and marketing of technologies reproduce and, at times, reconfigure cultural understandings of aging. Mundane, everyday technologies as well as complex drugs and machines provide future sites of such critical research. We provide one example with the case of rolling walkers.

Advertisements for rolling walkers construct an ideal user—one that is mobile and upper-middle class and likes outdoor travel. Names for rolling walkers like the Explorer and the Envoy emphasize sports utility vehicle (SUV) themes by using the names of SUVs currently on the road. The

SUV link is made even clearer in the written text of some advertisements. For example, an advertisement for the Explorer walker reads, "The Nova Explorer Rolling Walker is great for the outdoors. The low center of gravity, wide wheel base and sturdy steel frame provide the user with the ultimate stability. The solid, oversize 8″ tires will never puncture and provide a soft ride on any terrain." While it is unlikely that people take their walkers (or their SUVs for that matter) on rough, outdoor terrain, these advertisements create an image of the ideal user—one who is financially secure and likes the idea of participating in rugged, outdoor activities. In presenting the ideal user as mobile and agile, the walker advertisements reconfigure aging. The slower movements and changes in balance often associated with aging bodies can be transformed through technoscientific applications. The positioning of slowness and rest as undesirable has implications for us all at any age. In our caffeinated, sped-up world, aging people and bodies provide a potential reminder of the value and threat of slowness. This potential site of resistance (and perhaps respite) is lost when antiaging ideals, put forth in advertisements for technologies, identify aging with the agility and energy associated with able-bodied youth.[8]

Advertisements for rolling walkers also reproduce hegemonic notions of gender. Smaller walkers, typically associated with women, reinforce gender stereotypes by using diminutive names such as Cruiser Deluxe Junior and Aussie Lite. The walker for tall, big people summons up traditional masculinity. For example, the Nova model is called "Mack." As no human bodies are portrayed with these walkers, the race and ethnicity of the user remain open for our imaginations.

An ideal or configured user is presented through marketing, but it is also built into the design of technologies. Each style of the rolling walker, or the "rollator" as it is known in the industry, is designed with a "normal" body in mind. Rollators are interesting artifacts, as they are available for a wide range of heights and weights, from those designed to accommodate people shorter than five feet tall, to those for people between five feet four inches and six feet one inch tall, to models made for people taller than six feet tall and for larger people who weigh more than 250 pounds.

The rolling walker situation is unusual because most machines are not designed to accommodate a variety of body sizes or abilities. The average U.S. male body height and weight—five feet nine inches and 165 pounds—is often used as the norm in technology design. This was initially the case with automobile air bags (Mohl 1996) and continues to be true for many body-technologies. In addition, technologies like cell phones, computer keyboards, and alarm clocks are typically designed for a body with 20/20 eyesight and steady eye–hand coordination. This design practice makes it

hard for people with different sight and coordination abilities to work with these machines, and these people are unable to use technologies that are crucial to participation in daily life.

Similarly, pharmaceuticals are tested and designed with an ideal body—often able-bodied and young—in mind. This ideal becomes a standard to which we all must strive. Returning again to the case of Viagra, the average dosage of this pill is 50 mg. However, the fine print says this dosage is for an average weight, younger body. Such "one size fits all" designs erase bodily and aging differences, thereby creating potential harms to consumers (*Consumer Reports on Health* 2005).

The configured user in advertising and design is ripe for feminist theories of aging. Technologies, such as pharmaceuticals, scooters, glucometers, and canes, are constructed for and marketed to an ideal user, which may or may not be an aging person. It is highly plausible that aging people (particularly old women), because they are positioned poorly in economic and social hierarchies, will *not* be the imagined user.

These technologies also help produce aging gender identities and ways of being in the body. Technoscience is often central to performances of aging masculinities and femininities, as the cases of testosterone patches, hormone replacement therapy, and sexual function drugs have shown. Analyzing how the configured user reinforces, challenges, or destabilizes traditional aged meanings adds to feminist understandings of the production of age and gender in everyday life.

Material Practices and Negotiations

In addition to research in marketing and design, research is needed that examines how aging people use technologies in everyday life. Such an analysis would focus on the actions of men and women as they follow, modify, or resist altogether designers' and marketers' intended meanings and purposes (Oudshoorn and Pinch 2003: 1). Inspired by Bijker's (1987) concept of interpretive flexibility, STS scholars often refer to technologies as holding multiple meanings depending on one's position: technologies are able to mean different things to different users. Feminists bring forward the complex and intersecting ways social positions, such as one's race, class, gender, and sexuality, compose life choices and possibilities (Andersen and Collins 2003; Calasanti and Slevin 2001). This perspective, coupled with a deep understanding of interpretive flexibility, allows for the kind of examination we call for in this chapter. Analysis into how heterogeneous, older people accept, negotiate, and resist the wide range of technologies in their lives and how their social positions within hierarchies of power variously shape these actions would add much to the current literature.

While there is some work that explores how aging persons use technologies, the intersectionality of gender, race, class, age, and other social positions is not of central concern. Selwyn (2004) and Blit-Cohen and Litwin (2004), for example, study how aging adults perceive and use Internet technologies. These projects, while examining important questions like the reasons and motivations for "silver surfing" (Selwyn 2004: 370), ignore gender as a conceptual category. Loe's (2004) emphasis on the heterosexual partners of Viagra users makes an important contribution, as she carefully attends to how Viagra redefines gender for older people. Yet in all, in-depth analysis of the intersections of age, race, class, and gender are largely absent and only one axis of identity—be it age or gender—is highlighted.

Technology use requires critical analysis of its gendered, raced, classed, and aged meanings. The way the body, health, illness, and age are experienced and given meaning varies across the life course and across one's position in race, class, sexuality, and gender hierarchies, yet little work uses an intersectional model to examine how one's position changes meaning, access, and use of technologies. Janet Shim's (2005) work on cardiovascular disease examines the ways epidemiologists and people with cardiovascular disease employ race, class, and gender in their accounts of the mechanisms through which differences in cardiovascular disease are produced. Her research reveals that such conceptualizations of difference and their role in health vary not only across the science–lay divide but also among people with cardiovascular disease who occupy different race, class, and gender positions. While epidemiologists principally understand race as cultural difference, laypeople living with cardiovascular disease tend to construct race in structural terms. Shim argues that the multiple lived experiences of race undermine the validity of scientific measurement and the conception that laypeople are homogeneous in their views and embodied experiences.

This type of rigorous analysis could be taken into aging. Aging takes on various meanings whether one is concerned with mobility, lifestyle, or life-course issues, such as fertility, menopause, or memory and cognition loss, depending on one's position in social, economic, and political categories. As users of technologies, older persons intimately interact with techno-scientific practices such as blood sugar monitors, walkers, pharmaceuticals, and pill dispensers, yet there is little research that studies how raced, classed, and gendered aging bodies actually use and give meaning to these technologies. The opportunity to theorize aging people as technologically creative and literate is missed when we ignore this topic.

The political implications of various technologies are also lost when aging users are not taken up as central sites of analysis. As we noted earlier,

older people are targeted as users of lifesaving technoscientific interventions, but there are also many antiaging technologies on the market that employ ideas of individual transformative potential to sell products to those who seek a prolonged look or feel of youthfulness. Analysis of how people actually use and make sense of technologies designed to maintain youthful bodies and appearances is needed. Such research will provide insight into the underlying age relations and ageism used to sell these techniques and the subjective meaning aging people, in all their diversity, give to these technologies.

People actively work on technologies to make them more suitable for their aging needs. For example, recall a familiar scene of an older person, diversely embodied by various genders, races, ethnicities, and shapes, using a traditional walker with tennis balls placed on the front two poles. The rubber balls work as brakes, providing older folks a way to walk steadily without the machine getting ahead of them. This memory, however, could be quickly replaced by corporate-produced images of aging, mostly white, fit men on the Segway Human Transporter, a personal transportation device designed for those workers wanting greater visibility, versatility, mobility, and carrying capacity. It is also equipped with an optional golf bag carrier for those who have the time, money, and body ability to play.

Technological Design

How users (and groups that represent users) might actively shape the design of technologies in process is yet another issue to be considered. As noted previously, many technologies are not designed for aging bodies, and when they are, they often privilege the aging male body. This practice could be challenged if more attention was paid to when, where, and how older men and women use technologies. The Center for Research and Education on Aging and Technology Enhancement at the Georgia Institute for Technology is one project that thinks about design through the bodies and abilities of older people.[9] This project actively includes older people in design processes and aims to create new technologies and design suggestions with the aging body as the normative user. However, this type of research is rare. Thus, possible research includes studying how older men and women are directly included in design projects through focus groups and interviews or indirectly included through the activities of organizations such as the American Association of Retired Persons. Such analysis would highlight when and where perspectives of older persons are *not* included in design choices, raising awareness about the politics of exclusion at play in these situations.

New complex technologies can be extremely helpful in the everyday life of older people, and old men and women routinely use technologies and scientific interventions in their daily life. Despite their experience as technocitizens, older people in general and older women in particular are commonly represented as lacking the skills and comprehension needed to use and assess the risks and benefits of new technologies. By taking the perspectives and situations of older users seriously, we can bring together the skills and perceptions of older people and the capabilities of new technologies in positive ways. However, we do not want to become another cheerleader promoting the promise of modernity.

Critiques of the corporate–medicine nexus caution us here, pointing to the way social movements have been co-opted by biomedical, corporate interests for its own profit-making and ideological purposes (Ganchoff 2004; Paulsen 1993). For example, pharmaceutical companies often organize patient groups to promote their products. This practice occurred with drug companies' eliciting the support of menopausal women, who argued for the positive effects of hormone replacement therapy. In addition, centers for aging at hospitals and other health care facilities are now big business for biomedicine. The control of such centers is no longer in the hands of alternative health movements and their original intent of patient empowerment. Increased participation in design processes is therefore not the sole goal. Feminist questions about the design, use, and purpose of a particular technology and their relation to normative notions of aging are crucial.

Future Directions

Heterogeneously situated aging men and women are often the object of scientific knowledge and practice, yet their perspectives and experiences are seldom investigated in STS, feminist research, or mainstream media. The dominant media image of the cyborg is the male, youthful game player, computer user, or action figure, but the cyborg in other everyday practices often includes old people relying on a range of medical therapies and devices to negotiate daily life. This may include navigating and constructing a sexual life, resisting biomedicalization, taking on lifesaving medical care, and negotiating caregiving assistive technologies. We would do well to gray the cyborg and examine the way aging is variously produced and given meaning across life-course issues; the ways it is attributed to various gendered, raced, and classed bodies; and the complex ways people use and give meanings to technologies. Finally, we should pay attention to the ways technosciences reproduce social hierarchies. We must ask, Which drugs and devices are marketed, with what ideals in mind, and to which social actors or populations? For what purposes (i.e., to transform, to cure, to

control) are the innovations intended and taken up and with what meanings for gender, race, class, and age relations? And, finally, in what ways do age, aging, and the older person make sense of and integrate technoscientific interventions into their lives? Reclaiming old women in particular as knowledgeable, technoscientific users counters stereotypes that suggest they are baffled and illiterate when faced with machines or science. It also opens up the space for them to be active, valued participants in the design process and produces the possibility of designing technologies with old women's knowledge and needs at the center.

Analysis of the technology, science, aging, and gender junction is timely and crucial. Not surprisingly, the business of redefining the aging body as a youthful, flexible body capable of working and consuming further into the life course occurs simultaneously with public discussions about extending the retirement age, reducing the number of hospital beds, cutting Medicaid and Medicare coverage, and a whole scale devolution of care for the aged from public responsibility to private commodity. There is a clear tension between practices that produce the category of aging and its interventions and those that defer aging further and further into the future. Theorizing the centrality of technological and scientific interventions to the production of the mentally and physically agile aging body thus illustrates age as a political location.

The dialogue between feminist aging studies and STS staged in this chapter also offers a rethinking of the very notion of STS. STS must address ageism within its own discipline. Topics related to aging men and women are often ignored, and this practice creates a lack of understanding of the politics of aging. It may also be time to extend the name "science and technology studies" to "science, technology, and medicine studies." Biomedicine is increasingly important to the definitions and lived experiences of citizens in contemporary life and to scholarship within STS. In the early 1980s, for example, papers on biomedical topics constituted 5 percent or less of the annual meetings of the Society for the Social Studies of Science. In 2000 more than 25 percent of its sessions were on such topics.[10] The rise of biomedicalization processes promotes a rethinking of the name STS, calling for a shift that recognizes the significance of biomedicine to all of our lives.

Acknowledgments

Notes

1. French anthropologist Bruno Latour (1987) promotes use of the term *technoscience* to describe the complex flows between society, science, nature, and technology. Donna Haraway (1996), expanding on Latour's work, employs *technoscience* to specifically emphasize the ties between popular culture, corporations, technology, and science. Many STS scholars, following the early work of Latour and Haraway, now use the term *technoscience* to evoke the inseparability of the social and the technical, the subjective and the objective, and culture and science. Locating ourselves within this trajectory, we use this term in this piece.

2. While gerontologists use the word *biomedicalization* interchangeably with *medicalization* (see, for example, Estes and Binney 1989; Lyman 2000), Clarke and her colleagues redefine *biomedicalization* to specifically call attention to the technoscientific changes central to clinical practices and cultural understandings of health and illness.

3. Peter Conrad (2005) offers a similar perspective on medicalization. His analysis, however, de-emphasizes the centrality of science and technology studies to the sociology of health, illness, and medicine.

4. For a history of changes in FDA direct-to-consumer advertisement regulations, see http://www.pbs.org/now/science/drugads2.html.

5. Bell (1987), Lewis (1993), Lock (1993), and Martin (1989) study the social construction of menopause as pathology. Lock's work focuses on perceptions of menopause in Japan and North America, whereas Bell, Lewis, and Martin study the medicalization of menopause in the United States.

6. Emerging from industries such as Internet technology and computer companies, academics now also use the term *users* to describe the people who interact with a particular technology. The epistemological implications of describing people as users instead of as citizens or consumers have not been considered.

7. See Oudshoorn (2003) for another excellent example of feminist work. Researching the development of the male birth control pill, Oudshoorn shows how cultural ideas about gender inform technological innovation and vice versa.

8. Another market for walkers is younger people with mobility disabilities. Such individuals include injured people recovering from accidents or surgery as well as people who have permanent disabilities. It is outside of the scope of this chapter to take up the connections between disabled people of all ages, aging people, and technoscience.

9. For more information on the Center for Research and Education on Aging and Technology Enhancement's projects and publications, see http://www.psychology.gatech.edu/create/index.htm.

10. For review of STS papers presented at annual conferences, see http://www.lsu.edu/guests/ssss/public_html.

References

Andersen, M., and Collins, P.H. (2003) *Race, Class, and Gender: An Anthology, Fifth Edition.* Belmont, CA: Wadsworth.

Angell, M. (2005) *The Truth about the Drug Companies: How They Deceive Us and What We Can Do about It.* New York: Random House Trade Paperbacks.

Bell, S. (1987) "Changing Ideas: The Medicalization of Menopause," *Social Science and Medicine* 24 (6): 535–42.

Bell, S. (1995) "Gendered Medical Science: Producing a Drug for Women," *Feminist Studies* 21 (3): 469–500.

Benesh, P. (2005) "Direct-to-Consumer Advertising Takes Direct Hit from FDA," *Investor's Business Daily,* May 31, A12.

Biggs, S. (2004) "Age, Gender, Narrative, and Masquerade," *Journal of Aging Studies* 18 (1): 45–58.

Bijker, W. (1987) *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change.* Cambridge, MA: MIT Press.

Blit-Cohen, E., and Litwin, H. (2004) "Elder Participation in Cyberspace: A Qualitative Analysis of Israeli Retirees," *Journal of Aging Studies* 18 (4): 385–98.

Brooks, R. (2004) "Technology's Elder Boom," *Technology Review* 107 (3): 32.

Cahan, V., and Dollemore, D. (2004) "National Institute of Aging, Industry Launch Partnership, $60 Million Alzheimer's Disease NeuroImaging Initiative," U.S. Department of Health and Human Services National Institutes of Health Press Release, October 13.

Calasanti, T., and King, N. (2005) "Firming the Floppy Penis: Age, Class, and Gender Relations in the Lives of Old Men," *Men and Masculinities* 8 (1): 3–23.

Calasanti, T.M., and Slevin, K.F. (2001) *Gender, Social Inequalities and Aging.* Walnut Creek, CA: AltaMira Press.

Clarke, A., and Fujimura, J. (1992) *The Right Tools for the Job.* Princeton, NJ: Princeton University Press.

Clarke, A., Shim, J., Mamo, L., Fosket, J., and Fishman, J. (2003) "Biomedicalization: Technoscientific Transformations of Health, Illness, and U.S. Biomedicine," *American Sociological Review* 68:161–94.

Conrad, P. (2005) "The Shifting Engines of Medicalization," *Journal of Health and Social Behavior* 46:3–14.

Consumer Reports on Health. (2005) "Are You Taking Too Much Prescription Medication? For Many People, Standard Doses Are Excessive," *Consumer Reports on Health* 17 (8): 1, 3–4.

Copper, B. (1988) *Over the Hill: Reflections on Ageism between Women.* Freedom, CA: Crossing Press.

Cowan, R.S. (1987) "The Consumption Junction: A Proposal for Research Strategies in the Sociology of Technology," in *The Social Construction of Technological Systems,* ed. W. Bijker, T. Hughes, and T. Pinch. Cambridge, MA: MIT Press.

Cruikshank, M. (2002) *Learning to Be Old: Gender, Culture, and Aging.* New York: Rowan and Littlefield.

Cussins, C. (1996) "Ontological Choreography: Agency through Objectification in Infertility Clinics," *Social Studies of Science* 26:575–610.

Elliott, C. (2003) *Better Than Well: American Medicine Meets the American Dream.* New York: W.W. Norton.

Estes, C., and Binney, E. (1989) "The Biomedicalization of Aging," *The Gerontologist* 29 (5): 587–96.

Fausto-Sterling, A. (2004) "Refashioning Race: DNA and the Politics of Health Care," *Differences: A Journal of Feminist Cultural Studies* 15 (3): 1–37.

Fausto-Sterling, A. (2005) "Bare Bones of Sex: Part I, Sex and Gender," *Signs* 30 (2): 1491–528.

Fishman, J. (2004) "Manufacturing Desire: The Commodification of Female Sexual Dysfunction," *Social Studies of Science* 34 (2): 187–218.

Ganchoff, C. (2004) "Regenerating Movements: Embryonic Stem Cells and the Politics of Potentiality," *Sociology of Health and Illness* 26 (6): 757–74.

Gubrium, J. (1986) *Old Timers and Alzheimer's: The Descriptive Organization of Senility.* Greenwich, CT: JAI Press.

Guillemin, M. (2000) "Working Practices of the Menopause Clinic," *Science, Technology and Human Values* 25 (4): 449–71.

Haber, C. (2001/2002) "Anti-aging: Why Now? A Historical Framework for Understanding the Contemporary Enthusiasm," *Generations* 35 (1): 112–18.

Haraway, D. (1991) *Simians, Cyborgs, and Women: The Reinvention of Nature.* New York: Routledge.

Haraway, D. (1996) *Modest_Witness@Second_Millenium.FemaleMan©_Meets_Oncomouse.™* New York: Routledge.

Katz, S. (2001/2002) "Growing Older without Aging? Positive Aging, Anti-ageism, and Anti-aging," *Generations* 35 (1): 112–18.

Kaufman, S. (1994) "Old Age, Disease, and the Discourse on Risk: Geriatric Assessment in U.S. Health Care," *Medical Anthropology Quarterly* 8 (4): 430–47.

Kaufman, S., Shim, J., and Russ, A. (2004) "Revisiting the Biomedicalization of Aging: Clinical Trends and Ethical Challenges," *The Gerontologist* 44 (6): 731–38.

Latour, B. (1987) *Science in Action: How to Follow Scientists and Engineers through Society.* Cambridge, MA: Harvard University Press.

Lewis, J. (1993) "Feminism, Menopause, and Hormone Replacement Therapy," *Feminist Review* 43 (Spring): 38–56.

Lock, M. (1993) *Encounters with Aging: Mythologies of Menopause in Japan and North America.* Berkeley: University of California Press.

Loe, M. (2004) *The Rise of Viagra: How the Little Blue Pill Changed Sex in America.* New York: New York University Press.

Lyman, K. (2000) "Bringing the Social Back In: A Critique of the Biomedicalization of Dementia," in *Aging and Everyday Life,* ed. J. Gubrium and J. Holstein, 340–56. Malden, MA: Blackwell.

Macdonald, B., with Rich, C. (2001) *Look Me in the Eye: Old Women, Aging and Ageism.* San Francisco: Spinsters Ink Books.

Mamo, L., and Fishman, J. (2001) "Potency in All the Right Places: Viagra as a Gendered Technology of the Body," *Body & Society* 7 (4): 13–35.

Marshall, B., and Katz, S. (2002) "Forever Functional: Sexual Fitness and the Aging Male Body," *Body & Society* 8 (4): 43–70.

Martin, E. (1989) *The Woman in the Body: A Cultural Analysis of Reproduction.* Boston, MA: Beacon Press.

Mohl, B. (1996) "Many Drivers Worry about Air Bag Safety: Children, Short Women Most at Risk," *Boston Globe,* November 5, B1.

Olesen, V., and Lewin, E. (1985) "Women, Health and Healing," in *Women, Health, and Healing: Toward a New Perspective,* ed. E. Lewin and V. Olesen, 1–24. New York: Tavistock.

Oudshoorn, N. (2003) *The Male Pill: A Biography of a Technology in the Making.* Durham, NC: Duke University Press.

Oudshoorn, N., and Pinch, T. (2003) *How Users Matter: The Co-construction of Users and Technology.* Cambridge, MA: MIT Press.

Pattison, N., and Warren, L. (2003) "2002 Drug Industry Profits: Hefty Pharmaceutical Company Margins Dwarf Other Industries," *Public Citizen's Congress Watch,* http://www.citizen.org/documents/Pharma_Reports/pdf.

Paulsen, M. (1993) "The Politics of Cancer," *Utne Reader* (November/December): 81–89.

Pinch, T., and Bijker, W. (1984) "The Social Construction of Facts and Artifacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other," *Social Studies of Science* 13:399–431.

Potts, A. (2000) "The Essence of the 'Hard On': Hegemonic Masculinity and the Cultural Construction of 'Erectile Dysfunction,' " *Men and Masculinities* 3 (1): 85–103.

Reardon, J. (2005) *Race to the Finish: Identity and Governance in an Age of Genomics.* Princeton, NJ: Princeton University Press.

Riessman, C. (1983) "Women and Medicalization: A New Perspective," *Social Policy* 14 (Summer): 3–19.

Selwyn, N. (2004) "The Information Aged: A Qualitative Study of Older Adults' Use of Information and Communications Technology," *Journal of Aging Studies* 18 (4): 369–84.

Shim, J. (2005) "Constructing 'Race' across the Science–Lay Divide: Racial Formation in the Epidemiology and Experience of Cardiovascular Disease," *Social Studies of Science* 35:405–36.

Slevin, K.F., and Wingrove, C.W. (1998) *From Stumbling Blocks to Stepping Stones: The Life Experiences of Fifty Professional African American Women.* New York: New York University Press.

Squier, S. (2004) *Liminal Lives: Imaging the Human at the Frontiers of Biomedicine.* Durham, NC: Duke University Press.

Taylor, L. (2004) "Gerotechnology: The Cutting Edge of Eldercare," *Seattle Times,* October 11, E8.

Twigg, J. (2003) "The Body and Bathing: Help with Personal Care at Home," in *Aging Bodies: Images and Everyday Experiences,* ed. C. Faircloth. Walnut Creek, CA: AltaMira Press.

Twigg, J. (2004) "The Body, Gender, and Age: Feminist Insights in Social Gerontology," *Journal of Aging Studies* 18 (1): 59–73.

Woodward, K., ed. (1999) *Figuring Age: Women, Bodies, Generations.* Bloomington, IN: Indiana University Press.

Zola, I. (1972) "Medicine as an Institution of Social Control," *American Sociological Review* 20:487–504.