Technology, Science, and Ageism: An Examination of Three Patterns of Discrimination

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ABSTRACT

In this article, we argue that there are three primary ways people use science and technology to produce ageist ideals and relations. The first directly targets the aging body itself. Normative behaviors for aging bodies are redefined so that old people are now required to inhabit a youthful body. We discuss two examples of this pattern—Viagra and Hormone Replacement Therapy. We also show how the emphasis on youth reaches new heights with the rise of anti-aging medicine and its insistence that all aspects of aging are pathological. The second form of ageism neglects aging bodies in technological and scientific design. Everyday technologies such as answering machines or computers are often devised with a youthful, able-bodied person in mind. To illustrate this pattern, we discuss cell phones and computers. Finally, we address a third form of ageism: the rationing of medical technologies. We discuss direct and indirect rationing to illustrate this practice. In conclusion, we show how these techno-scientific forms of ageism limit individual’s ability to fully participate in political and civic life.

Keywords: Technology, Ageism, Medicalization

Science and technology are central to the normative definitions and lived experiences of aging. The design and use of technologies
can enable aging people to participate more fully in civic and political life. Alternatively, they can reproduce ageist practices and biases. As social products, technologies can be designed in a range of ways and put to a variety of uses, each of which redefines behaviors, perceptions, and lifestyles associated with aging.

In this article, we discuss three ways science and technology contribute to the social construction of ageist ideals and experiences. Drawing on literature in medical sociology, gerontology, and science and technology studies, we show how the medicalization of aging bodies, the design of technologies, and health care rationing all help produce ageism in contemporary life. These examples demonstrate the importance of putting science and technology at the center of future empirical investigations of aging and ageism. Throughout this article, we focus on the United States, but we hope that the analysis presented here will foster similar analyses of developments in other countries and cross-national comparisons.

The Medicalization of Aging

The twentieth century was marked by an increasing tendency to define mental, physical, and emotional processes as illnesses. This trend, known as medicalization, was initially described by sociologists Zola Irving (1972), Friedson Elliot (1970), and Pitts Jesse (1968). In his canonical essay “Medicine as an Institution of Social Control,” Zola noted how alcoholism, having trouble sleeping, pregnancy, and other behaviors and bodily processes once defined as socially unacceptable or normal became redefined as illnesses by the 1970s. As additional aspects of life were redefined as medical problems, physicians and other health care professionals gained more control over the management and treatment of people. Zola (1972) expressed concern about the expansion of medicine’s jurisdiction over new areas of life, noting that “the labels health and illness are remarkable ‘depoliticizers’ of an issue.” That is, medical labels turn social issues (e.g., structural reasons for addiction, sleeplessness, and the like) into an individual “illness” in need of a medical not a political solution.

Medicalization affects all ages, but it has particular implications in an ageist society. In societies that position youthful bodies as the norm, the changes associated with aging are ripe for being labeled pathological. As Zola cautioned, turning such processes into illnesses depoliticizes underlying cultural and structural causes. The opportunity to challenge the ageist bias that causes their very construction is lost.

Sociologists and gerontologists have spent years documenting the transformation of the emotional, mental, and physical changes associated with aging into “illnesses” (Cruikshank, 2002; Estes and Binney, 1989; Gubrium, 1986; Kaufman, 1994; and Lock, 1993). For example, the biomedical construction of Alzheimer’s disease redefined memory loss as an illness category during the 1960s and 1970s (Gubrium 1986). What had been a normal component of aging was reconfigured into disease through the creation and delineation of medical diagnostic categories.

This early work provides key insights into the way aging was transformed into pathology. However, major transformations have occurred in the organization of biomedicine in the United States since this research. The last two decades witnessed the increasing privatization of health care as for-profit hospitals, clinics, and health insurance companies increased in number. The use of technologies grew in diagnostic and treatment practices, and care moved from the hospital to the home as hospitals stays were shortened and the responsibility for care work shifted to families and friends.

The medical knowledge landscape also changed. Medical technology, pharmaceutical companies, and hospitals increasingly used direct to consumer and product placement forms of advertising to shape medical care. Simultaneously, patients gained more opportunity to educate themselves about biomedical matters as support groups and organizations were formed, self-help literature boomed, and medical search engines such as MEDLINE became available.

Working at the crossroads of medical sociology and science and technology studies, Clarke A. et al. (2004) offer a reconceptualization of the medicalization thesis in light of these broader changes. Drawing on a core science and technology studies idea that technologies—defined broadly as any application of knowledge (e.g., drugs, the built environment, and machines) — are central to daily life, the authors focus on the meaning and content of scientific knowledge and technological applications. Through this focus, Clarke and her colleagues...
emphasize the need to put technology and science at the center of analysis of new medicalization processes.

Clarke et al., suggest the term "biomedicalization" be used to demarcate contemporary medicalization processes given the significant transformations in medical knowledge and practice. 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 and home care; (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 "chronic fatigue syndrome" or "fibromyalgia" (Clarke et al., 2003). Together these processes help produce the conditions needed to spur the expansion of biomedical categories and treatments into more and more areas of life.

Clarke and her colleagues' expansion of the medicalization thesis provides a theoretical framework for new considerations of the relations between ageism, economic interests, stratification, and medicine. To illustrate the ageist bias of biomedicalization processes, we offer two illustrative examples.

Case Study #1: Viagra

In research and clinical trials from 1989 to 1994, Pfizer Pharmaceutical researchers realized that UK-92480 (the early name of Viagra) increased blood flow to the genital region (Loe, 2004). After this finding, Pfizer continued to investigate the link between the substance and the production of erections. In 1998, the company received approval from the Food and Drug Administration to market and distribute the drug, now known as sildenafil or Viagra. Drugs, however, need a disease, and the disease needs to be recognized by both medical professionals and the public in order to garner widespread support. The medicalization of men's sexuality included a conceptual shift from impotence to erectile dysfunction (Fishman, 2007).

Shortly after Pfizer received FDA approval, E. et al. (1999) published an article in JAMA—one of the most prestigious medical journals in the United States. Laumann et al. found that 31% of the 1410 men surveyed had sexual dysfunction. Within the context of the study, any man who reported ever having experienced premature ejaculation, erectile dysfunction, or low desire received the disease label. This broad definition of sexual dysfunction increased the number of potentially "sick" men and made sexual dysfunction sound like a pressing problem. Although the initial publication neglected to include financial disclosure information, it was later revealed that two of the authors (Laumann and Rose, 1999) consulted for Pfizer. Despite the expansive definition of sexual dysfunction and the economic relations between the authors and Pfizer, the article performed critical work in establishing sexual dysfunction as a serious public health problem.

Pfizer further promoted the disease and the drug by launching an aggressive advertising campaign. In 1997, the FDA clarified advertising requirements for pharmaceutical companies (Nordenburg, 1998). The new regulations allowed companies to market drugs directly to consumers on television and radio as long as certain adequate provision requirements were met (e.g., refer customers to physicians or pharmacists, provide a toll free number, or provide the name of a website or print ad that had more information). This change marked a shift from previous years during which a moratorium limited pharmaceutical advertisements on television and radio. Pfizer took advantage of the regulatory change and broadcasted advertisements that featured erectile dysfunction and its cure—Viagra—on American airwaves. The JAMA article, advertisements, and news articles all helped "educate" people about erectile dysfunction and the benefits of treatment.

The rise of Viagra redefined sexuality for old men and women. In the Viagra era "normal for males, as defined by Pfizer Pharmaceuticals and its experts, is having a consistently hard and penetrative penis, feeling eighteen again, and never having to worry about occasional problems with erections" (Loe, 2004). While this definition of normal is hard for men of any age to accomplish, it is particularly difficult for old men to embody. Purchasing and using Viagra is one way this ideal can be achieved. The redefinition of male sexuality affects women as well. Whether women enjoy penetrative sex or not, the existence of Viagra (and other similar drugs) raises "new concerns for women regarding marital obligations and sexual
duty" (Loe, 2004). Female partners of Viagra users are now expected to be sexually active until death.

The biomedicalization of sexuality illustrates the connections between ageism, medicine, pharmaceutical companies, and media. The rise of Viagra capitalized on ageist practices that position the youthful body as the norm. Creating an erection on demand and having frequent sex are activities commonly associated with younger bodies. Putting aging bodies at the center would create a different ideal. However, old bodies are not privileged as the model for aging sexualities. Instead, old men and women are expected to adjust their sexual practices to mimic youthful expectations and desires.

**Case Study #2: Hormone Replacement Therapies**

Ageism and medicine also intersect in the development and use of hormone replacement therapies. The use and marketing of hormones have a long history in the medical marketplace. Medical practitioners experimented with hormone supplements throughout the 1920s and 1930s, and the first estrogen pill, Premarin, was introduced in 1942 (Neel, 2002). Premarin, which is still prescribed today, is made from pregnant mares' urine—a fact that is evoked in the drug's name: Pre[gnant]Mar(e)in.¹ The pharmaceutical company Ayerst (now Wyeth-Ayerst) initially promoted the drug for a variety of conditions associated with aging, including menopause.

Menopause was defined as unnatural throughout the 19th and 20th centuries in Europe and the United States. The Victorians viewed it as a sign of sin and decay, while early 20th century Freudians viewed menopause as a neurosis. During the twentieth century, physicians, researchers, and pharmaceutical interests transformed the deviant status of menopause into a biomedical disease (Palmlund, 2006). Part of the broader trend of biomedicalization, the medical profession defined menopause as a deficiency disease, which helped give doctors control over this bodily process (Bell, 1987).

The definition of menopause as pathological and the promotion of Premarin and other hormone therapies intensified in the 1960s. Gynecologist Robert Wilson (1962, 1963, 1966), a man who had financial ties to pharmaceutical industries, was a key supporter of both projects. Published scientific articles in *JAMA* and the *Journal of the American Geriatric Society* as well as the popular book *Forever Feminine* to convince the public and medical professionals about the value of hormone replacement therapy. Illustrating the framing of menopause as pathological, Wilson called women who did not use estrogen replacement therapies “castrates.”

Sales of Premarin and other estrogen replacement therapies steadily increased throughout the late 1960s and the 1970s. The Food and Drug Association’s announcement in 1986 that estrogen replacement pharmaceuticals helped prevent the bone loss associated with osteoporosis further fueled the market (Kling, 2000). Offering additional medical reasons to prescribe estrogen products, the announcement increased the perceived legitimacy of the drugs and prescriptions soared. By the 1990s, there were estrogen only and estrogen-progestin combination drugs available to “treat” menopausal symptoms. Millions of women used the drugs, and the multi-million dollar market thrived, (Palmlund, 2006).

In 2002, the Women’s Health Initiative’s decision to stop a clinical trial on estrogen-progestin combination therapies (e.g. Prempro, Premeise) due to clear evidence of increased risk of heart disease, stroke, and breast cancer put a damper on the hormone replacement bandwagon. This announcement was soon followed by a second one. In 2004, the Women’s Health Initiative halted a trial on estrogen alone therapies (e.g. Premarin) when it became clear that participants had an increased risk of stroke and blood clots deep in veins. Moreover, the study showed that the drug regime did not reduce the risk of coronary heart disease as had been claimed (NIH, 2005).

These studies (and the publicity that surrounded them) resulted in numerous women stopping their HRT use. However, the tendency to define menopause as pathology remains. As with the rise of Viagra and the biomedicalization of old men’s sexuality, the definition of menopause as a pathological state arises in part from ageist ideas that use the youthful body as the point of contrast. Compared to menstruating, ovulating, youthful women, menopausal women are defined as lacking. The visible changes associated with post-menopausal life (e.g. wrinkles, dry skin) are also interpreted through an ageist lens. In an ageist society, signs of aging become signs of deviance. They should be avoided whenever possible.
Companies continue to look for new ways to capitalize on the desire to erase the changes associated with menopause. Despite the dangers associated with estrogen-alone and estrogen-progestin combination therapies, some women still use these drugs. Vitamins, minerals, and herbal remedies, such as black cohosh, are also promoted (see, for example, Cornworth, 2007) and bio-identical hormones represent a booming new market. Such hormones are made from yam and soy, and are considered to be more similar to hormones a woman’s body makes than pharmaceutically produced ones. However, hormones produced from yam or soy derivatives are not more natural than pharmaceutical products. As Love Susan and Sue Rochman (2006) point out, “Premarin (estrogen alone) and Prempro (a combination of estrogen and progestin) are made from pregnant mares’ urine, which also comes from a natural source.”

Viagra and hormone replacement therapies are two examples that signal the biomedicalization of aging. Many more examples abound. New diseases such as pre-Alzheimer’s or mild cognitive impairment are being invented and the disease categories associated with aging are proliferating. Moreover, each disease identity comes with a corresponding treatment regime and an array of specialists. The creation and practice of such diseases enrolls a range of actors including pharmaceutical companies, medical specialists, media outlets, patients, and consumers.

In the future, new research should explore how race, class, sexual orientation, and nationality shape the contours of biomedicalization processes. Biomedicalization is a stratified and uneven practice. As such, it can affect various groups in particular and locally situated ways. While some researchers document the uneven effects of biomedicalization processes (see, for example, Cruikshank, 2003; Lock, 1993; Martin, 1989), examination of this issue is all too rare.

**Anti-Aging Medicine: The New Face of Biomedicalization?**

The biomedicalization of aging reaches its logical conclusion in the rise of anti-aging or age-management medicine. Within this emergent field all aging becomes pathological. Physicians no longer aim to carve out aspects of aging as disease. Instead, the process of aging itself is something to be avoided at all costs.

Anti-aging medicine proliferated in the 1990s (Mykytyn, 2006). During this decade, physicians and other anti-aging proponents tried to gain scientific legitimacy by creating professional organizations such as the American Academy of Anti-Aging Medicine [AAM] and journals such as the Journal of Anti-Aging Medicine. The AAM’s full scale assault on aging can be seen in their three basic rules of anti-aging: “Don’t get sick, don’t get old, and don’t die.” These rules, which are posted on their website, represent ageism at its most extreme.

The AAM and other anti-aging organizations promote numerous tactics to help people reach the “triple digit lifespan.” Stem cell research, nanotechnology research, and cancer treatment research all provide potential anti-aging interventions. Anti-aging clinics and practitioners can also encourage off label uses of prescription drugs such as human growth hormone. It is claimed that human growth hormone increases muscle mass, decreases fat, increases energy and sexual desire, and can therefore counteract the effects of aging. Despite critical evaluation of these assertions by physicians (see, for example, Vance, 2003), about 20,000 to 30,000 Americans took human growth hormone as an anti-aging medicine in 2004 (Maugh, 2007).

The desire to eliminate aging is strong in an ageist society, and those who accept aging as a normal component of this life course have low status. Geriatrics medicine has traditionally emphasized aging as a normal process. Guiding the aging process is more important than using unnecessary medical interventions. Geriatric medical doctors are typically paid less than many other specialties and are not considered prestigious in a medical context where technological and scientific interventions are valued. Not surprisingly, the number of doctors specializing in geriatrics medicine is small. Only 9 out of 145 medical schools in the United States have departments of geriatrics (Gross, 2006). Yet, even as geriatrics is a low-paid, low prestige profession, its twin—anti-aging medicine—is growing rapidly despite the reservations and skepticism on the vast majority of American physicians.

**Technology Design and Ageism**

Technology design is another site where technology, science, and ageism intersect. While some technologies such as walkers or pill dispensers are designed for elderly users, most technologies are designed with a youthful, able-bodied person in mind. Although
technological design does not determine which people use a technology or how they use it, built-in assumptions about ideal users can hinder full participation and equal access to a particular apparatus. The reliance on the youthful body in design practices can exclude old people from using computers, the internet, and other technologies that are now crucial for participation in political and cultural life.

Science and technology studies (STS) scholarship provides a useful framework for examining the relations between technologies and users. In the 1980s, scholars working in STS began to articulate the importance of analyzing how designers—intentionally and unintentionally—have an ideal user in mind when they create technologies. In his classic essay “Do Artifacts Have Politics?”, Winner (1980) examined an array of technologies (e.g., overpasses on Long Island, NY, machines used to make metal castings) to show how each had an imagined user embedded in it. For Winner, technologies have political qualities; design is one way specific forms of power and authority are embodied.

During the same decade that Winner called for analyses of the politics embedded in artifacts, other STS scholars began examining how people use technologies in daily life. Pinch Trevor and Bijker Wiebe (1984), working within the social construction of technology (SCT) approach, theorized users as key social groups that create multiple meanings of technologies. Feminist historian Ruth Schwarz Cowan (1987) also called for research that examined the junction between the consumer and his or her choices about technologies. Since this early work, STS scholars have produced a rich literature that analyzes how users contribute to the social shaping of technology (see, for example, Moore, 1997; Oudshoorn & Pinch, 2003; Taylor, 2006). While STS rarely takes up aging and ageism as a central concern, the focus on the relations between technologies and users provides an entry into such analyses.

For example, computers and internet sites are typically designed with a youthful body in mind. The movement of cursors on websites or documents requires precise hand-eye coordination, and the font size on many websites is geared toward those who can read small print. Although people age in a variety of ways, these qualities are more commonly found in younger bodies. People who experience changes associated with aging (e.g., changes in hand stability or vision) will not be able to use information technologies as easily as those who do not. Given that companies, governments, and organizations use internet sites to distribute information in the United States, such design barriers are a concern. Cost and cultural familiarity influence computer use among old adults (Cutler et al., 2003; Selwyn, 2004), but technological design can also create a significant barrier.

Ageism also shapes the design of pharmaceuticals. Most pills are sold in standardized sizes. Standardized doses can affect all people, but it can especially harm older people. As people age, the liver’s ability to process medication and the kidney’s efficiency in eliminating it decline (Consumer Reports on Health 2005). Thus, smaller doses may be more appropriate for old people—a fact ignored in the “one size fits all” approach to pill design.

Groups that traditionally advocate for the interests of the old have not called for action on design issues. For example, the American Association of Retired Persons (AARP), an American organization that represents approximately 38 million people age 50 and over, recognizes that design bias exists. This recognition is done through technology: the AARP includes two links on its website that allow viewers to increase and decrease font size. It also discusses technologies aimed at older people in promotional articles such as “Life Online: Demystifying the Communications Gap.” However, the AARP does not focus on the relation between design and ageism in its reports or advocacy campaigns. Moreover, even when the organization discusses technologies geared toward older people, it does not comment on the ageist designs of new or existing technologies. Instead, all new technologies (e.g., Skype, Vista) are discussed without giving any consideration to the biases of design.

Despite the lack of action by the AARP and other organizations, some companies and non-profit organizations are designing products for aging people. 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. Companies such as Life Solutions Plus and Marilyn Electronics sell dressing aids, arthritis aids, and other products aimed to ensure independent living. These types of products make it possible for people with different abilities to participate more fully in daily life.
Recent changes in cell phone design illustrate how technologies change when old people are the imagined user. Like computers and the internet, cell phones were initially designed with an able-bodied, youthful person in mind. The small buttons and print on cell phones demand precise hand-eye coordination and the lack of contrast between the text and background on the LCD screen requires visual acuity. Given these design constraints, it is not surprising that old people have not purchased and used cell phones to the same degree as younger consumers.

In recent years, however, cell phone companies changed the technologies to accommodate aging users. In 2004, Tu-Ka, a Japanese mobile phone company, recognized that they were missing a potential market, and designed a phone with elderly users in mind (Nakamoto, 2004). The phone has large buttons, no LCD panel, and the buttons light up when its time to use them. Shortly after Tu-Ka’s release, Fujitsu, another mobile phone company, launched the Raku-raku (easy-easy) phone line (Lewis, 2005). While the phone’s name recreates the ageist idea that old people need things to be “easy,” its design takes changes in hearing and conversational styles into account. The Raku-raku phone instantly converts all incoming voices to a slower speed so that it is easier for listeners to understand what is being said.

Such changes in design practices challenge the ageist bias of many technologies. Nonetheless, until computers, pharmaceuticals, and other technologies that are central to daily life are reconfigured with the aged body in mind, design will be a key form of ageist discrimination. As long as younger people develop and market technologies to other young consumers, old people will continually be excluded from new technologies (Cutler, 2005).

Rationing of Health Care

The third key area that science, technology, and ageism intersect is health care rationing. Age-related rationing can be direct or indirect (Adams et al., 2006). Direct ageism occurs when health care policies or guidelines clearly state that goods or services are unavailable to people of a certain age. This form of rationing does not take into account the varied ways people age and is less common as it tends to create controversy.

Indirect ageism takes place when clinicians’ or organizations’ ageist ideas influence clinical encounters and the provision of services. This form of ageism is difficult to recognize since it can occur behind the scenes in one-on-one encounters, and/or be coded as unrelated to age in health care policies. Nonetheless, patients are more likely to encounter this ageist practice than direct forms of discrimination.

For example, physicians’ assumptions about age can cause them to disregard old people when they mention new physical or mental problems. When heard through an ageist lens, patients’ knowledge about changes in their bodies and minds is dismissed as a normal part of aging. Age biases may also prevent clinicians from presenting the full range of treatment options to elderly patients. Studies have shown that patients over 65 often do not get appropriate treatment for cancer, heart disease, and depression (Anti-ageism Taskforce, 2006). Although financial access to health care, sexism, and racism can contribute to this pattern, it is also related to the intentional and unintentional ways ageism shapes the clinical encounter.

Conclusion

National and local policies that invest in technologies and science have helped create what Robert Butler, calls “a revolution in longevity.” Particular technologies and scientific knowledges such as the practice of antisepsis in medicine and the use of engineering and chemistry to create safer water supplies can extend life expectancy. The availability of better glasses, higher quality hearing aids, appropriate medications, and safe and reliable public transportation all contribute to one’s ability to participate fully in life as we age.

In this article we highlighted three ways science and technologies help produce ageism in contemporary life. Biomedicalization, technological design, and health care rationing are three key sites where technologies, science, and ageism can co-produce inequalities. Future research should examine how national policies and ideologies contribute to these practices, highlighting differences and commonalities between nations.
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References


(Endnotes)

1. This article builds upon Joyce and Mamo (2006). In this piece, Mamo and Joyce argue that it is time to “gray the cyborg” and put science and technology at the center of analyses of aging. Drawing on a central assumption of science and technology studies, we argue that a focus on science and technology is crucial to understand aging identities and experiences.


3. Animal rights groups critique the treatment of the pregnant horses used to make Premarin and other similar hormone replacement pharmaceuticals. For example, People for the Ethical Treatment of Animals (PETA) challenge how the horses are kept in small stalls during their pregnancies as well as the fate of the foals born on the ranches. For a summary of PETA's evaluation of Premarin, see [http://www.peta.org/nc/factsheet_display.asp?ID=73](http://www.peta.org/nc/factsheet_display.asp?ID=73)

4. To view the technology related articles posted on the AARP website, see [http://www.aarp.org](http://www.aarp.org).

5. 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](http://www.psychology.gatech.edu/create/index.htm).