For most people, visual impairment conjures up a dichotomy — of able sight on one hand and blindness on the other; or of those who can travel and read independently versus those who experience the world only through touch, hearing, taste, and smell. The past 50 years in which we have witnessed a growth in life expectancy and consequent increased population of older people have posed an important challenge to this binary view. There have always been people with low vision among us, but only with the growth of age-related vision loss have the numbers of partially-sighted people dwarfed the numbers of the totally blind (see Figure 1).

What is low vision (or, interchangeably, partial sight), this new, prevalent condition among the old? It is the condition of significant and permanent, yet incomplete, loss of vision function in both eyes that cannot be corrected by medication, surgery, conventional glasses, or contact lenses. A key feature of partial sight is that the visual sense is sufficiently functional for the planning or execution of some tasks. The most common uncorrectable eye conditions that cause low vision in the developed world are age-related macular degeneration, glaucoma, and diabetes. Risk for all three increases with age and accelerates sharply as age increases — 15 percent of Americans age 45-64 report some kind of vision impairment while 26 percent of those 75 and older report vision impairment (The Lighthouse Inc., 1995). These numbers compare (with
caution) with roughly 1.7 percent of those under age 45 reporting vision impairment (Adams, Hendershot, & Marano, 1999).

The impact of low vision depends on the particular kind of functional visual impairment and on the types of visual tasks an individual needs to perform. Peripheral visual field problems, for example, may have their biggest impact on mobility and driving performance, whereas central visual field defects most often impact reading and other fine detail vision tasks.

We consider vision impairment in general and low vision in particular for two reasons. First, ethnic minorities and immigrant minorities, who make up a substantial and growing segment of the American population, generally become visually impaired at rates equal to or greater than the non-minority population and may face cultural issues that differentially impact their quality of life. (Ethnicity also comes with different degrees of risk for eye disease.) Second, and the focus of this essay, all Americans who become visually impaired later in life will, to varying degrees, become members of a minority to which they did not previously belong: specifically, the visually disabled minority. This is a large and growing minority with particular psychological, social, and political problems associated with it.

How visually impaired is the low vision population, and how disabled? We know that relatively few Americans (about 0.1 percent) have insufficient vision for deciphering visual imagery beyond discriminating ambient light or darkness (American Foundation for the Blind, 2006). We also know from “legal” blindness statistics that roughly 0.5 percent of Americans have visual acuity of 20/200 or worse or visual fields restricted to 20 degrees or less in both eyes (American
Foundation for the Blind, 2006). Even using a stringent definition of low vision (about 4 million Americans, or 1.3 percent), we can surmise that about 80 percent of the low vision population has visual function better than that which defines legal blindness. The population distribution of visual impairment is positively skewed with fewer people experiencing the most severe forms of vision impairment.

Figure 1. Estimates of the size of the low vision U.S. population vary between about 4 million and 16.5 million, depending on the definition, while the blind population with total blindness or rudimentary “light perception” is estimated to be under 300,000.

Far less is known about the prevalence of the disabling effects of low vision. Since visual impairment affects performance of tasks requiring vision in complex ways and interacts significantly with co-morbid conditions and social, psychological, lifestyle and employment-related factors, there is no simple correspondence between degree of clinically measured visual function and disability. Recently, the Social Security Administration (SSA) commissioned a National Research Council study to reassess how the SSA determines visual disability. One of their conclusions was that clinical tests of visual function “do not suggest a natural cutoff point for disability” (National Research Council, 2002, p. 2). Another conclusion was that the current “legal blindness” standard represents “severely impaired vision” (National Research Council, 2002, p. 117). The low vision population, composed primarily of older people, is itself a highly
diverse group in terms of clinically assessed visual capabilities and disability. In terms of visual acuity alone, low vision ranges between 20/60 and less than 20/2000 spanning both sides of the legal blindness criterion; degree of disability depends only loosely on degree of clinically measurable visual impairment.

This diversity of function and disability within the minority population of the partially-sighted clashes with the dichotomy of able sight versus blindness. For the visually-impaired older person who has lived most of her life as an able-sighted person and identifies as a sighted person, knows not whether to identify herself as a sighted or as a blind person. Stereotypes of the blind person as dependent on and at the mercy of charity, rather than as having a medical condition that can be successfully addressed through rehabilitation, encourage the older partially-sighted person to shun both the label of blindness, and often, the help that could be provided by vision rehabilitation services. Those who identify themselves as blind or who meet “legal” blindness standards for disability, rehabilitation reimbursement, or tax benefits may suffer a loss of self-esteem and other negative psychological adjustments. While the concept of legal blindness has some value in providing a clear cut-off for social benefits, it also reinforces a dichotomy that divides the continuum of visual impairment in ways that have a negative impact on the older individual, thus complicating outreach efforts.

How does partial sight limit or impair the performance of tasks requiring vision? Within the continuum of low vision, there are four levels at which low vision should be understood: sensory/perceptual, social, psychological, and lifestyle.
At the sensory and perceptual levels, those with able vision often perform visually under threshold and reduced visibility conditions (e.g., in fog or at night) just as those with low vision do. The contemporary neuroscience view of the visual experience is as a cognitive construction of a mental visual world formed from sparse information imaged optically on the photoreceptor array of the retina. Able vision and low vision share the basic goal of solving spatial tasks through brain processes that use whatever optical information is available through this array. Seen in this way, low vision is similar to able vision. The main difference is that there is less information available to the brain -- diminished light, reduced contrast, visual field defects, image degradation, or photoreceptor or optic nerve dysfunction. Low vision may produce some or all of the following: 1) diminished visual resolution (acuity) leading to difficulties requiring any kind of fine detail vision, including reading text or music on paper or computer screens, reading signs, identifying distant objects, watching television, or performing near work with the hands such as sewing or soldering; 2) a loss of sensitivity to subtle variations of lightness in visual patterns (contrast sensitivity) leading to difficulties with driving, recognizing faces, and detecting curbs stairs and other low contrast objects; 3) increased sensitivity to glare leading to reduced contrast sensitivity and acuity under conditions of high illumination (such as outdoors); 4) loss of contrast sensitivity under low light, especially night viewing conditions; and 5) reduced color discrimination and effective color contrast. When low vision involves loss of central visual field function, as it does even in the early stages of age-related macular degeneration and diabetic retinopathy, there are additional difficulties associated with visual guidance of eye movements—directing the eyes to navigate the image so that attended objects (such as text) are imaged on functional parts of the retinas.
These sensory and perceptual deficits are inevitably experienced as losses, inconveniences, and frustrations. They eliminate or make difficult specific tasks and activities that have great functional importance in the modern world such as reading, driving, and way finding, especially in unfamiliar places. The loss of those tasks in turn may have important social and emotional consequences. For example, losing the ability to read may restrict or eliminate privacy if assistance is required to, for example, read mail, write checks, or shop. Avoiding performance of such tasks may increase social isolation, and asking for or requiring the assistance of friends, spouses, and other associates may alter social relationships and foster feelings of dependency.

Loss of driving function is known to limit independence and empowerment. Given that the older person in the twenty-first century is destined to work longer into old age, the loss or diminution of travel and reading independence will impact employment and vocational activities as well.

These losses and accompanying frustrations with the difficulty of accomplishing what used to be simple tasks may lead to depression (Horowitz & Reinhardt, 2000) or anxiety (Kleinschmidt et al., 1995). Additionally, using optical low vision aids in public or displaying behaviors associated with vision impairment may make older visually impaired people feel that they are drawing unwanted attention, or that they are vulnerable and potential targets for street crime.

Co-morbid conditions may exacerbate the social and psychosocial effects of vision loss. Hearing loss, itself a highly prevalent condition in older people, may have negative synergistic effects on all levels of functioning with low vision (Caban, Lee, Gómez-Marín, Lam, & Zheng, 2005), as can other disabling conditions.
There are a correspondingly wide range of rehabilitation services that may help the older partially sighted person including: 1) optometric clinical low vision, in which a visual function assessment (with history) is performed, and appropriate optical (e.g. magnifying lens systems), opto-electronic (e.g. video magnifiers), or other devices are prescribed to aid in the performance of specific tasks like reading or driving; 2) training in the use of such devices; 3) rehabilitation teaching, in which new adaptive ways of performing skills of living are taught; 4) orientation and mobility training (e.g. cane travel); 5) psychological and social service counseling; 6) peer support groups; 7) vocational rehabilitation; and, 8) technology training in the use of screen magnification, screen reading, or other software. Some of these services are very similar, if not identical to, those offered in traditional blind rehabilitation.

Low vision rehabilitation is a young field that began as a branch of the blindness rehabilitation system. The first optometric low vision clinics opened almost simultaneously in the early 1950s at The New York Association for the Blind (now Lighthouse International) and The Industrial Home for the Blind (now Hellen Keller Services for the Blind). Because blindness rehabilitation started outside the medical system, low vision rehabilitation has only recently, after a long struggle, begun to make inroads into standard medical care and the medical insurance reimbursement system. It is ironic that our medical system reimburses generously for rehabilitation following a recreational sports injury, but still reimburses almost nothing for rehabilitation following a disabling eye disease. Better reimbursement (through state governments) for vision rehabilitation services is available to some with low vision—those that meet the criteria for legal blindness. The first item on my wish list for the visually impaired minority in the twenty-first century is full integration of low vision and blind rehabilitation.
services and reimbursements into the standard medical system, including education of physicians, many of whom, even ophthalmologists, are unexposed to and unfamiliar with low vision and low vision rehabilitation.

In addition to low vision rehabilitation services, there are other remedies available to address issues of partial sight, which are intended to enhance accessibility. These include large print text materials, high contrast, large print signage for the built environment, and low vision interfaces for information kiosks and transaction machines like automated teller and vending machines. Of recent interest are accessible websites designed with larger fonts, better color contrasts, and easy-to-navigate screens. Occasionally, the user can customize the site’s presentation to suit his or her own visual needs.

The term “accessibility” grew out of the physical disability advocacy movement and originated with the idea that stairs and other architectural features can be barriers for wheelchair access. Accessibility has been adopted as a cause by most disability groups is viewed as a civil right — the right to access public accommodations, transportation facilities, employment, education, health care, and others, regardless of disability. Reasonable accommodation to provide access is mandated in a number of domains and culminated in the passage of the Americans with Disabilities Act (ADA), Section 508 of the Rehabilitation Act, and other state and federal legislation. Substantial ambiguity in interpretation of what constitutes reasonable and acceptable accommodation still exists and there have been few successful legal challenges to enforce the new laws, but in general, our society now accepts the idea that accessibility is a civil right.
For vision loss, accessibility is associated almost exclusively with blindness and accessibility solutions have focused on providing access for totally blind people. Why? The blind community has a much stronger political voice. Most people with low vision are older, have become visually impaired later in life, and as noted above, are reluctant to identify themselves as visually impaired, no less join a group that advocates for their rights. Blind users, on the other hand, have a clear, unified voice within the disability community. Blindness organizations have rallied and brought lawsuits that pressure governments to enforce laws. Even though laws such as the ADA protect people with low vision also, there are few if any organizations that represent the political voice of those with low vision. As a result, the general public worldwide equates visual disability with blindness and further promotes the simplistic dichotomy of blindness versus able sight (Oslo Workshop on Low Vision, 2005).

In addition, those who develop accessibility solutions do so as if all visually impaired people had no vision. They may not understand what low vision is and may believe that those with partial sight should learn to accomplish tasks without vision at all, to take advantage of tools and techniques developed for blind people, and to prepare for the eventual possibility of losing all vision. This is a prevalent belief dating back to the previous century (Goodrich & Bailey, 2000). Tools and techniques for blind persons are inclusive in that the continuum of visually impaired people can use them. But even for those with very low vision, performing tasks visually is nearly always more efficient and subjectively preferable, when possible. Another item on my wish list for the twenty-first century is increased accessibility for low vision in the built and online environments, and better educated designers of accessible solutions for both.
A third wish is public education about partial sight to help transform the dichotomy of blindness versus able sight into an informed continuum ranging from able sight to complete blindness. Basic knowledge about low vision will help all of us to better understand the nature of vision impairment and its impact on aging and to accept as more commonplace the public use of personal low vision devices such as reading magnifiers, telescopes, screen magnification software, and very near and or eccentric viewing. It will reduce the stigma for people with low vision and encourage partially-sighted people to seek out helpful rehabilitation services which we hope will be reimbursed through public and private medical insurance.

Public education will not arise from the efforts of the rehabilitation service community or the medical system, but from a low vision disability rights movement with substantial numbers of older people who identify themselves as partially sighted and advocate for themselves. We can take a step to accept those with vision loss and other sensory disabilities as a social minority whose identities and rights need to be respected as part of a coherent program to address the challenges of aging in this new century.
References


