The Gerontologist
cite as: *Gerontologist*, 2016, Vol. 56, No. S2, S281–S292
doi:10.1093/geront/gnw032

Literature Review

A Global View on the Effects of Work on Health in Later Life

Ursula M. Staudinger, PhD,[1,*] Ruth Finkelstein, PhD,[1] Esteban Calvo, PhD,[1,2] and Kavita Sivaramakrishnan, PhD[1]

[1]Columbia Aging Center, Columbia University, New York. [2]School of Business and Economics, University Diego Portales, Santiago, Chile.

*Address correspondence to Ursula M. Staudinger, Columbia Aging Center, Columbia University, 722 West 168th Street, New York, NY 10032. E-mail: umstaudinger@columbia.edu

Received June 9, 2015; Accepted January 14, 2016

Decision Editor: Peter Lloyd-Sherlock, PhD

Abstract

Purpose of the Study: Work is an important environment shaping the aging processes during the adult years. Therefore, the cumulative and acute effects of work characteristics on late-life health deserve great attention. Given that population aging has become a global trend with ensuing changes in labor markets around the world, increased attention is paid to investigating the effects of the timing of retirement around the world and the macroeconomic benefits often associated with delaying retirement. It will be essential for societies with aging populations to maintain productivity given an aging workforce and for individuals it will be crucial to add healthy and meaningful years rather than just years to their lives.
Design and Methods: We first describe the available evidence about participation of older workers (65+) in the labor force in high, middle, and low-income countries. Second, we discuss the individual-level and societal influences that might govern labor-force participation of older adults. Thirdly, we review evidence on the association between work on the one and physical, mental, and cognitive health in later life on the other.
Results and Implications: Globally, both is true: work supports healthy aging and jeopordizes it. We draw implications for policymaking in terms of social protection, HR policies, and older employee employability.

Key Words: Workforce issues, Work, Health, Cognition, Cross-cultural studies, Productive aging

Work is an important environment shaping the aging processes during the adult years. Therefore, work characteristics and their effects on physical, mental, and cognitive health in later life deserve great attention (Bowen, Noack, & Staudinger, 2010). In a global context of population aging with ensuing changes in the labor market, investigating the health effects of continued employment and delayed retirement has become even more important (Bloom et al., 2014; Calvo, Sarkisian, & Tamborini, 2013; Harper, 2014*). It will be essential for societies with aging populations to maintain productivity and for individuals it will be critical to add healthy and meaningful years rather than just number of years to their lives (Staudinger & Kocka, 2010). Thus, improving our understanding of the acute and cumulative effects of work on different health indicators in later life is pivotal.

For many years, academic and policy debates in high-income countries exclusively emphasized stress, physical exhaustion, and other negative consequences of work, and neglected the potential positive effects on aging outcomes. Consistent with this one-sided negative view of work, protecting people from work through fewer and fewer weekly working hours, mandatory retirement age, or other measures has been considered as a major societal achievement of the past century. More recent evidence from high-income countries has been accruing on the

positive outcomes of work in later life. However, there are hardly any studies investigating the association between work environment and health in low- and middle-income countries, where work environments are often still hazardous and exhausting. Rather than reducing the exposure to work, we suggest that changing the work characteristics may be the method of choice that profits both employees and employers the most. In sum, a differentiated discussion is needed when it comes to the health effects of work in later life.

In the following we first describe the available evidence about participation of older workers (65+) in the labor force around the world. Second, we discuss the individual-level and societal influences that might govern labor-force participation of older adults. Thirdly, we review evidence on the association between work on the one and physical, mental, and cognitive health in later life on the other. Finally, we draw implications for policymaking in terms of social protection, HR policies, and older employee employability.

Table 1. Total Labor-force Participation Rate Mean and Median Values for the Age Group 65+ by Income Category and Region (for 2013)

	N	Mean	*SD*	Median
HICs	58	12.63	10.05	9.85
Americas		15.40	6.14	16.70
Asia		18.50	10.42	16.40
Europe		6.89	4.09	5.50
Oceania		14.00	8.55	12.30
UMICs	48	19.30	13.37	16.65
Africa		23.67	16.70	17.00
Americas		24.58	11.97	25.20
Asia		16.60	9.50	13.69
Europe		6.00	5.11	4.10
Oceania		34.10	8.98	34.10
LMICs	44	33.10	15.93	32.40
Africa		40.40	18.01	46.60
Americas		35.40	10.36	34.90
Asia		26.40	11.07	25.90
Europe		13.60	9.33	13.60
Oceania		38.50	21.35	41.30
LICs	33	51.40	16.88	53.60
Africa		55.30	15.35	55.20
Asia		35.48	16.04	33.10

Notes. HICs = high-income countries; LICs = low-income countries; LMIC = lower-middle income countries; UMIC = upper-middle income countries.

Source: Columbia Aging Center's analysis of (i) Key Indicators of the Labour Market, 2013 (http://www.ilo.org/empelm/what/WCMS_114240/lang--en/index.htm); (ii) The World Bank's classification scheme of levels of development (http://data.worldbank.org/about/country-and-lending-groups#Low_income); and (iii) The United Nation's macroclassification of geographical regions (http://unstats.un.org /unsd/ methods /m49 /m49 regin.htm).

Global Trends in Labor-force Participation in Later Life

This section is organized around Table 1 and Figure 1, which describe labor-force participation rates for those older than 65 years (LFPR65+) by level of income and region, including 183 countries with data available in 2013. We draw data from the International Labor Organization's (ILO) Key Indicators of the Labor Market (KILM), which is to our knowledge the only source with comparable labor-force participation rates by age, gender, and country. However, because the KILM adapts national labor-force surveys, there are issues of noncomparability that cannot be overlooked. These include systematic differences in data sources (labor-force surveys, population censuses, establishment surveys, insurance records, or official government estimates) and methodology of data collection and coverage. Of particular concern for this analysis is varying age-group coverage and variations in national definitions of the economically active population (ILO, 2013).

We follow the KILM, 8th edition, 2014 estimates of the United Nation's macroclassification system that divides regions into five broad zones. Because the ILO uses a broad definition of labor-force participation, which includes agrarian and subsistence work for an hour or more a week, LFPR65+ is extremely high in many low-income countries. ILO's Methodological Description of the KILM (http://kilm.ilo.org/2011/ download/kilmcompleteEN.pdf) defines the labor force as the sum of unemployed and employed individuals. The employed are broadly defined as follows (ILO, 2014, p. 3): "The employed include people aged 15 and over who, during the reference week worked for one hour or more for pay, profit, commission or payment in kind, in a job or business or on a farm (comprising employees, employers and own account workers); or who worked for one hour or more without pay in a family business or on a family farm (i.e., contributing family workers); or who had a job, business or farm, but were not at work for various reasons (holiday, sickness, strike, etc.). In brief, employment is of a dichotomous nature and covers people working a few hours per week, as well as those working a very large number of hours per week and cumulating several jobs. The employed can also be people engaged only in production of goods for own final use (subsistence work). Subsistence work can be extremely important in poor agrarian areas. It is important to note that work in unpaid household services is not counted as employment, largely explaining differences in labor-force participation rates by gender."

Furthermore, we have adopted the World Bank's classification of high-income countries (HICs), upper middle–income countries (UMICs), lower middle–income countries (LMICs), and low-income countries (LICs). The World Bank uses Gross National Income per capita to define levels of development: $12,746 or more is high income, between $4126 and $12,745 is high middle income, from $1,046 to $4,125 is lower middle income, and $1,045 or less is low income (World Bank Country and Lending Group, 2013).

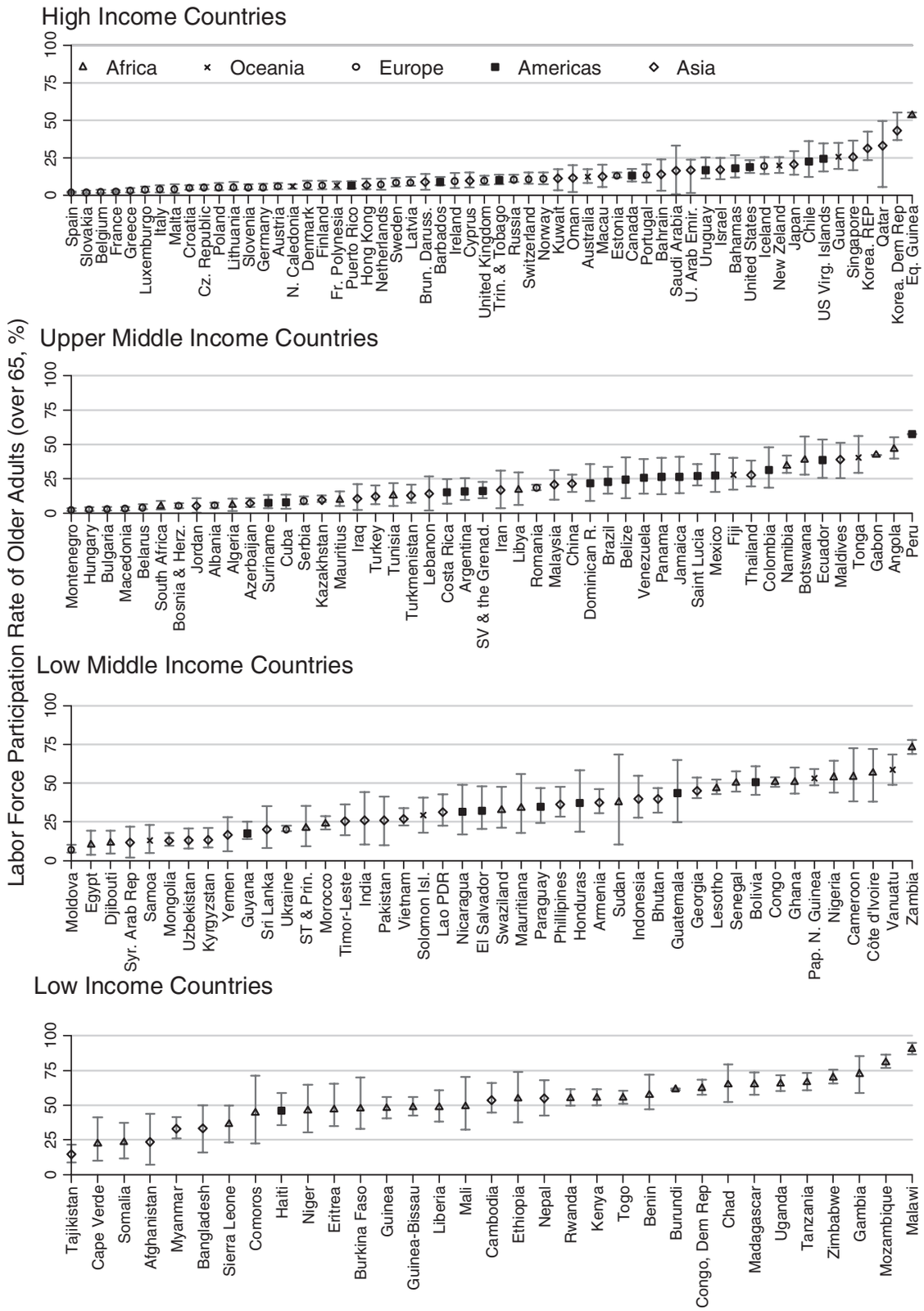

Figure 1. Percent labor-force participation for the population aged 65+ (2013) organized by country income category (%). Source: Columbia Aging Center's analysis of (i) Key Indicators of the Labour Market, 2013 (http://www.ilo.org/empelm/what/WCMS_114240/lang--en/index.htm); (ii) The World Bank's classification scheme of levels of development (http://data.worldbank.org/about/country-and-lending-groups#Low_income); and (iii) The United Nation's macroclassification of geographical regions (http://unstats.un.org /unsd/ methods /m49 /m49 regin.htm).

Labor-force Participation 65+ in HICs

HICs have very low and relatively homogeneous LFPR65+. HICs in Europe have the lowest rate of participation—with a median of only 5.5% in the labor force (e.g., Germany, Austria), and significant economies in much of the European Union with rates below that median: France, Belgium, Spain, Malta, Italy, Luxembourg, Greece, Poland, Czech Republic, and Lithuania.

Labor-force Participation 65+ in MICs

LFPR65+ is higher and more heterogeneous in UMICs than in HICs (M = 19.3%, SD = 13.3) and is also higher and more heterogeneous in LMICs than in UMICs (M = 33.1%, SD = 15.9). For the 48 UMICs, the LFPR65+ is more evenly distributed across the range of values. It ranges from 2.5% in Montenegro and 2.6% in Hungary to 57.5% in Peru, despite the recently introduced limited old-age income support. The nine UMICs in Europe have a median LFPR65+ of only 4.1%. The countries in this income category from Asia, Africa, the Americas, and Oceania are extremely heterogeneous culturally and economically and show a wide range of much higher LFPR65+.

In LMICs, mean LFPR65+ is 33.1%, with the two European countries far below the others (Moldova at 7.0% and Ukraine at 20.2%). Africa is significantly represented in this income category with 15 countries with LFPR65+ ranging from 10.3% in Egypt to 72.9% in Zambia, where the economy remains primarily agrarian and farm work continues until physically impossible.

Labor-force Participation 65+ in LICs

Finally, LFPR65+ is extremely heterogeneous in LICs. Although LFPR65+ for LICs has the highest median of 53.6%, country-specific rates range from 14.7% in Tajikistan to 90.3% in Malawi. It should be noted that more than three quarters of LICs are in Africa and that none of these LICs offers any public income support.

Labor-force Participation 65+ and Gender

Figure 1 provides a breakdown of LFPR65+ by gender. Not surprisingly, participation rates are higher for men than for women all over the world and at every income level. This difference is amplified by the definition of labor-force participation as excluding household work. Although there are differences in the size of the gender gap, these differences do not substantially alter the understanding of the relative overall LFPR65+ across countries.

For many years, the higher LFPR65+ in LICs has been driven by agricultural and subsistence activities, with no public income support to replace them. More recently, LFPR65+ have been increasing in particular in HICs due to population aging and the associated changes in the labor market, retirement income levels, and health levels at later ages. The following section explicates the main determinants of labor-force participation of older adults.

Determinants of Labor-force Participation of Older Workers

Labor-force participation in general is determined by structural, cyclical, and accidental factors (ILO, 2013). Structural factors refer to policy, legal, and other long-term drivers of labor-force participation, such as flexible working time arrangements, retirement systems, taxation, subsidies, demographics, and cultural values. Cyclical factors include recurrent economic conditions, such as recessions or seasonality in the labor market. Accidental factors are those that only temporarily influence labor-force participation, such as natural disasters or wars.

As with overall labor-force participation, structural, cyclical, and accidental factors play an important role in shaping labor-force participation of older adults. However, labor-force participation of older adults also has its own specificities (Hurd & Rohwedder, 2014). Two key conceptual perspectives that help to further unravel labor-force participation of older adults are whether they need, want, and are healthy enough to work (i.e., supply side) and whether employers retain, train, or hire them (i.e., demand side; Hardy, 2006*; Munnell & Sass, 2008). In the following, we therefore review those two perspectives and their effect on LFPR65+.

Older Workers: Determinants of the Supply Side

Several factors influence the decisions of older adults to continue working such as incentives in pension systems, availability of less physically demanding jobs, labor-market flexibility, and health limitations. For example, in LICs, many older adults need to work in paid or subsistence agrarian jobs until older ages simply because they cannot afford retirement. In contrast, wealthier countries that have expanded the coverage and generosity of their pension systems enable older workers to withdraw from the labor force at earlier ages (Barr & Diamond, 2008).

Although older adults in LICs work until later in life compared with their counterparts living in HIC, UN projections suggest that this gap will decrease over the next decades as the percentage of older adults in the labor force decreases in poorer regions and increases in wealthier regions (UN, 2013). The projected downward trend in LICs will be primarily driven by decreases in labor-force participation of older men, whose employment patterns over the life cycle typically results in better retirement income prospects than for women (Meyer & Parker, 2011). The upward trend in labor-force participation for HICs is projected to be similar across gender and may be linked to the reduction in pension replacement rates, changing attitudes toward work in late life, and better health in old

age. Although numerous countries have introduced pension benefits cuts and increases in legal retirement ages, several surveys also suggest that older adults are expecting to work beyond legal retirement ages and retire gradually because they want to remain active and not only because they need the income and resources that employment provides (Employee Benefit Research Institute, 2008).

Because older individuals in HICs and UMICs often report that they would continue to work if they could reduce the number of hours, gradual retirement options have gained substantial policy interest throughout the world (Aleksandrowicz, Schömann, Fasang, & Staudinger, 2011*; Calvo, Haverstick, & Sass, 2009; Rix, 2011). Although the prevalence of gradual retirement is still low, Japan and Scandinavian countries have been particularly successful at implementing formal partial retirement schemes and training programs for older workers to improve their skills to remain longer in the labor force (Sundén, 2006; Wacker & Roberto, 2011*). In the United States, gradual retirement pathways have been documented in the form of "bridge jobs" between the full-time career job and complete labor-force withdrawal (Quinn, 1999*). These jobs typically involve changes of industry, switches to self-employment, and reductions in hours of work. Despite the significant policy attention, whether gradual retirement options in fact increase labor-force participation of older adults is still under debate (Sundén, 2006).

Even if older adults are willing to work, they need to be healthy enough to work (Milligan & Wise, 2012). A growing literature documents cohort difference in the age-related changes of cognition, perception, mobility, and other health outcomes that are relevant to work performance (Skirbekk, Stonawski, Bonsang, & Staudinger, 2013). The shifts from manufacturing to less onerous service jobs combined with increases in healthy life expectancy suggest that health limitations to work should decrease over time (Rix, 2011; Vodopivec & Dolenc, 2008*). Although older adults are healthier than in previous generations and less demanding jobs are on the rise, health is still one of the most frequent reasons for forced retirements across countries, followed by layoffs and the impossibility to find a new job (Munnell & Sass, 2008).

Employers of Older Adults: Determinants of the Demand Side

Compared with the literature on labor supply of older adults, little is known about employers' demand for the labor of older adults. However, existing research suggests that employers' decisions for or against older workers may be influenced by the interplay between projected labor shortages, educational levels and life-long learning, costs of older workers, and age discrimination (Vodopivec & Dolenc, 2008*).

As countries continue to age demographically, they may experience labor-force shortages and thus may have more jobs available for older adults (Rix, 2011). Also, older workers may be attractive to employers as they have experience, good skills and work attitude, low absenteeism and turnover, firm loyalty, and many other positive characteristics (Staudinger & Bowen, 2011). Furthermore, in numerous developing countries, the educational level of older adults increases with each new cohort that reaches old age. However, the industrial structure is also undergoing transformations through globalization, outsourcing, and the increased use of technology (Schulz & Binstock, 2006). Therefore, employment prospects of older adults without increases in training participation of older workers are not straightforward.

Labor-force shortages may also prompt employers to offer more flexible job arrangements. Most employers resist part-time employment, but full-time employment is inconsistent with the preferences of older adults. The experiences collected in Finland and other European countries suggest that improving the fit between the preferences and abilities of older workers and their jobs requires not only the active intervention of policymakers but also that of human resource managers (Naegele & Walker, 2006).

Furthermore, numerous employers are reluctant to employ older workers. One of the major barriers is that older workers are expensive, particularly if companies cover parts of their health insurance (Munnell & Sass, 2008). On average, older adults are paid more than younger workers and are associated with rising costs in traditional employer-sponsored health care, disability, and pension plans. Moving from traditional employer-sponsored plans to defined contribution schemes, which shift the risk to the individual, influences employers' willingness to hire older adults.

Leaving the cost of older workers aside, employers often have negative attitudes toward older workers (Bowen et al., 2010). Historical roots of age discrimination are typically traced back to the shift from an agricultural to a manufacturing based economy, where employers favored younger workers to operate machines at a higher speed (Hardy, 2006*). As the 20th century unfolded, older workers continued to face difficulties in keeping and finding jobs (Wacker & Roberto, 2011*). Today, age discrimination persists even though older workers are not necessarily less healthy, educated, skillful, and productive than their younger counterparts (Burtless, 2013; MacArthur Foundation, 2009*).

After the Second World War, HICs implemented early retirement alternatives that alleviated the need for continued employment of older adults. More recently, numerous countries around the world shifted this policy prescription toward implementing anti-age discrimination laws and campaigns challenging inaccurate stereotypes that penalize older workers (Wacker & Robert, 2011*). For example, the 1967 Age Discrimination in Employment Act (ADEA) prohibits employment discrimination against people aged 40 and older in the United States. Numerous other countries have implemented similar laws. However, there are

important cross-national differences in the legal frameworks (Lahey, 2010). For example, the 2000 legal framework for the European Union tackles discrimination at all ages yet allows states an easy route to specify a mandatory retirement age, unlike ADEA in the United States. Although illegal in many other countries, age discrimination still exists worldwide and is heavily entrenched within cultural views of generations and social constructions of fairness (Hardy, 2006*).

Impact of Work on Health as Employees Age

This section discusses the empirical evidence on the association between paid or unpaid work and physical, mental, and brain health. Results are limited by the fact that to date these kind of studies are primarily available from HICs. Using online search engines, 180 studies published between 1990 and 2013 were identified that investigated the link between work (including voluntary work) and (physical, mental, and cognitive) health in later life (50+ years.), of which 59 studies satisfied the quality criteria of a Cochrane review (Armstrong, Hall, Doyle, & Waters, 2011) and were included in the final scoping review.

Physical and Mental Health and Work

With regard to physical and mental health, it was found overall that physical activity, intellectual activity, and other lifestyle factors, all of which often are closely associated with work or volunteering activities, could moderate age-related physical and psychological changes. Thus, a recent longitudinal study of work and volunteering in Japan found that there has been a trend toward reduced work hours with increasing age and that paid work (at less than 35 hours) contributed to the maintenance of physical and mental health at higher ages (Kajitani, 2011). Interestingly, volunteering activity in this study contributed independently of paid work to the maintenance of health across later ages. Similar studies in the United States suggest that even among the older old (i.e., 80+ years.) volunteering and/or paid work activities at an intensity of 10 hours or more per month contribute to maintain good physical and mental health (Luoh & Herzog, 2002). A review of 10 cross-sectional studies of retirees from Australia, Japan, and the United States reported that no study found negative effects of working or volunteering past retirement age, whereas four studies found positive effects (Maimaris, Hogan, & Lock, 2010). A longitudinal U.S. study using a representative life-span sample of 60+ age groups demonstrated that the greater the time commitment to productive activities, the greater the level of and improvement (change) in life satisfaction over time (Baker, Cahalin, Gerst, & Burr, 2005).

A study based on the 1992–2003 data of the Health and Retirement Study applied panel data methodologies to account for biases due to unobserved selection and endogeneity, with counterfactual and specification checks to gauge the robustness and plausibility of the estimates (Dave, Rashad, & Spasojevic, 2006). Results indicated that complete retirement leads to a 23%–29% increase in difficulties associated with mobility and daily activities, 8% increase in illness conditions, and 11% decline in mental health. Thus, the authors conclude that retiring later may lessen or postpone poor health outcomes for older adults, raise well-being, and reduce the utilization of health care services, particularly acute care. In the same vein, a review study showed that when accounting for selectivity and unobserved heterogeneity in the samples using two distinct research strategies, large negative health effects of retirement are displayed among both women and men (Sahlgren, 2013).

Although there remains some doubt about the immediate health impact of employment among older people, there seem to be converging evidence documenting the longer-term health benefits of employment for older adults. It is still unclear, however, whether there is an optimal amount of working hours in later life. Obviously working conditions across the life span need to be under scrutiny in terms of minimal wages as well as job strain (high demands/low control). Such findings should not imply that everyone is forced to continue to work but rather they entail reducing the impediments on returning to work after retirement and on increasing opportunities for gradual retirement. Workers at a specific risk for negative health effects should receive specific protection.

It is interesting to note that the seemingly positive effect of work is not intuitive for those working. Currently older cohorts have a negative attitude toward later retirement while still working (Davies & Cartwright, 2011). Similarly, the value of retirement is overestimated by workers, and the value of work increases as the retirement experience accumulates (Aleksandrowicz et al., 2010*).

Brain Health and Work

Aside from studying the effects on physical and mental health, much research has been devoted to understanding the role of the work context—specifically, the degree of cognitive stimulation adults encounter within their work environments—in predicting concurrent and later patterns of cognitive health (for review, see Bowen et al., 2010). The most common research hypothesis on the relationship between the work context and cognitive development is some derivation of the use-it-or-lose-it or the disuse hypothesis (Denney, 1984*), which posits that age-related changes in cognition are at least in part caused by disuse of certain skills and abilities. Earlier considerations of the use-it-or-lose-it/disuse hypothesis typically did not differentiate between the need to practice skills in order to maintain competence from the need to be continuously faced with new cognitive challenges in order to support cognitive development throughout adulthood and old age (lack of new challenge hypothesis).

Recent analyses have started to address the methodological shortcomings present in the earlier literature and made more conclusive suggestions about possible causal links between cognitive stimulation at work on cognitive aging. Schooler Mulatu, and Oates (2004) demonstrated that the self-directedness of work (a combined measure of job complexity, routinization, and closeness of supervision) affected intellectual functioning 20 years later more than intellectual functioning affected self-directedness (these analyses were controlled for age, gender, race, and education). Analysis of data from approximately 1,000 World War II Veterans revealed that higher levels of general intellectual demands and human interaction and communication at work (retrospectively assessed) were associated with higher cognitive status after controlling for early adulthood intelligence, age, and years of education (Potter, Helms, & Plassman, 2007). Interestingly, results suggested that there was an aptitude by context interaction such that individuals with lower initial intelligence in young adulthood derived greater benefit from intellectually demanding work. Longitudinal data from the Maastricht Aging Study indicated that older people (average age 61 years, range 50–85 years) with mentally demanding jobs (currently or formerly) had lower risks of developing cognitive impairment 3 years later (1.5% vs 4% for individuals with high and low mental work demands, respectively). This relation was independent of intellectual abilities at baseline as well as age, sex, education, smoking, physical activity alcohol, depression, and family history of dementia and disease (Bosma et al., 2003). Similarly, a study of Swedish twins found that the work complexity of an individual's predominant lifetime occupation, and in particular, the complexity of the work with other people and with data (as opposed to things), predicted the incidence of dementia and Alzheimer's disease among adults aged 65–100 years controlling for age, gender, and education (Andel et al., 2005). Although the identification of the precise causal pathways between cognitive stimulation in the work context and cognitive development remain to be uncovered, overall evidence suggests that intellectual engagement and cognitive stimulation—which can be fostered by a cognitively stimulating work context—does indeed promote more successful cognitive aging (see also Hertzog, Kramer, Wilson, & Lindenberger, 2008).

We would like to suggest that it is necessary to distinguish between at least three cognitively relevant dimensions of work and that is the degree of routinization, the level of difficulty, and the degree of novelty exposure. This distinction may be useful in teasing out the different mechanisms underlying the relationship between work and brain health across adulthood and into old age. In tentative support of this argument, the results of a 6-year longitudinal study of older adults found that novel information processing was one of the few engagement domains (as opposed to engagement in e.g., social or passive information processing activities) that significantly predicted less longitudinal decline in cognitive speed (Bielak, Hughes, Small, & Dixon, 2007). The novelty perspective may also explain why it has been found that the complexity of social interactions encountered on the job, which may be related to a higher likelihood of continuously encountering novel aspects, seems to play a particularly important role in cognitive development relative to other aspects of complexity (e.g., motor skills, work with data) (e.g., Finkel, Andel, Gatz, & Pedersen, 2009; Kröger et al., 2008*). More longitudinal as well as experimental work is needed in order to gain a more thorough understanding of the mediating mechanisms.

The tentative conclusion that can be drawn from these studies is that it is not work per se that make workers sick or keeps them healthy but rather the specific characteristics and the work-task patterns over time. In other words, if work is physically and/or mentally exhausting, it results in the loss of health over the years unless the specific work tasks change across time. Such changes in work tasks over time buffer age-related cognitive decline (Oltmanns, Godde, & Staudinger, 2015). It is not chronological age per se that leads to loss of productivity and motivation but rather the specific characteristics of the job and the time spent on a given job. With regard to brain health, there is tentative evidence that underscores the importance to implement moderate novelty in work tasks in order to keep the brain active and to counteract age-related decline in functioning (Staudinger, 2015). These findings should be translated in occupational health regulations that specify and protect against health threatening life-course patterns of work (Oltmanns et al., 2015).

Policy Implications to Facilitate Healthy Labor-force Participation in Old Age

This final section discusses policy implications. A first implication from this review is that promoting labor-force participation of older adults requires a two-sided solution that makes both older adults willing to work and employers willing to hire them. Another clear implication is that policies to promote healthy labor-force participation of older adults are not universal prescriptions, and thus this section differentiates between countries with inadequate and comprehensive old-age income support.

What is the "right" level of labor-force participation for those older than 65 years depends on the kind of work people were exposed to across their life course. The very high level of LFPR65+ in the lowest-income countries seems too high—that hardship is entailed in working until death, as must be the case in Gambia, Mozambique, and Malawi where LFPR65+ is 72%, 81%, and 90%, respectively (Figure 1). It is less universally accepted, however, that there can also be a LFPR65+ that is too low.

Policy Implications for Countries With Inadequate Old-age Income Support

LMICs face particular and distinct challenges in creating policies supporting healthy aging in the context of work

(e.g., Bloom et al., 2014). Labor markets, workplace contexts, and the resources available for investments in social policies in these countries vary quite widely from those found in HICs. Many LMICs face competing priorities of a growing older population and chronic diseases but also rising rates of youth unemployment (International Labor Office, 2012) and in some cases a continued struggle with infectious diseases and injuries (Engelgau et al., 2011).

In the case of India based on National Sample Survey data, there are estimates that 60% of rural older persons are still participating in the labor force, with the equivalent figure for urban areas being 54.9% (Rajan, 2010). Individuals aged 80 and older maintain relatively high levels of workforce participation at 16% for men and 17% for women. Given the largely informal sector work among older people in India, the majority of older people are not covered by any kind of financial support (Rajan, 2010). The category of "pensioner" accounts for 22% of the total population in urban areas but only 7.5% in rural areas.

In LMICs, many nations have some form of social security in place mostly for the formal sector, whether in the form of pensions for civil servants or stipends for those who have retired from formal employment (Palacios & Whitehouse, 2006; Williamson & Pampel, 1993*). These groups, including teachers, military employees, and other public sector employees, are still often the only sectors to be eligible for social security such as Bangladesh, Bhutan, Botswana, Eritrea, Lebanon, and the Maldives.

In many LMICs, however, informal work represents a substantial part of the labor market (Jütting & de Laiglesia, 2009). Often the informal economy is defined as "all economic activities that are, in law or practice, not covered or insufficiently covered by formal arrangements" (Huitfeld & Jütting, 2009, p. 97). Although estimates vary, informal employment appears to account for more than 70% of nonagricultural employment in sub-Saharan Africa and nearly the same level in the nations of South and South East Asia (Charmes, 2009). Among the poorest, the economic risks are high as they hold multiple occupations and even act as entrepreneurs. As they get older, there is an accumulation of adverse life-course experiences in terms of chronic ill health and poverty (Banerjee & Duflo, 2006).

Informal employment varies not just by country but also according to gender within nations. Charmes (2009) suggests that 77% of women in sub-Saharan Africa are informally employed, whereas only 62.6% of the men are involved in this sector. Women also appear more likely to have the most vulnerable positions and occupations within the broad category of informal labor (Kucera & Xenogiani, 2009). These factors offer particular challenges to establishing policies for supporting healthy aging in workplace contexts.

Research into older people in LMICs and development policies has largely been constructed around a formulation of the old as vulnerable and poor, paying relatively little attention to supporting and facilitating healthy aging processes as a way of bolstering economic development. Work on the possibility of incorporating healthy aging policies into the informal sector is even more limited (Giambiagi & de Mello, 2006). However, given the importance of the informal sector in many LMICs, there is an increasing amount of policy work which aims at connecting informal workers with different forms of social security and pension coverage (Hu & Stewart, 2009). Lesotho has recently been hailed as a successful example of developing a relatively comprehensive social protection program (Olivier, 2013).

Over the last years, microfinance has become more common in practice and more widely discussed in terms of supporting disadvantaged populations and promoting their health (Pronyk et al., 2006*) or ability to buffer health care expenses (Gertler, Levine, & Moretti, 2009). However, further investigation is needed as to how health programs and microfinance organizations might best be combined and how they play out with older adults (European Commission, 2012; Pronyk, Hargreaves, & Morduch, 2007).

Concepts of healthy aging are often not translatable from HICs to LMICs. For example, "healthy aging" in Thailand is described as a process of the "accumulation of positives" or a change in the significance that is assigned to body, mind, social and economic status, and one's life and environment. These attitudes to healthy aging have been applied to workplace policies in South-East Asia and may actually serve as models for HICs (Thiamwong, McManus, & Suwanno, 2013).

For the majority of the aging populations in LMICs, their working lives are protracted and the nature of the work tends to compound their economic and physical frailty. It accelerates aging of the body and finally threatens survival (Banerjee & Duflo, 2006). This requires policy interventions that support the aging process with a multipillared income security system. National Old Age Pension Schemes have tended to target only the most needy and state-level social assistance amounts for the aging are highly variable across states and most schemes are savings based and have low coverage. Instead, there is need for long-term government investment in long-term old age savings instruments and in postretirement income security plans (Alam, 2004).

Policy Implications for Countries With Comprehensive Old-age Income Support

In HICs, the pendulum may have swung too far in the direction of protecting older adults from work. Some have frameworks of social security schemes that actually discourage continuing to work and entrenched employer attitudes and practices that discourage older adults from working. These remain in place despite the desire of some older adults to continue to work, growing evidence of the health benefits to doing so, current and impending labor shortages, and potential macroeconomic benefit of continued employment. There are also disparities between retirement

age of those with higher levels of education and income and those with more low-skilled jobs. The Organisation for Economic Cooperation and Development (OECD) has taken steps to study these issues, make policy recommendations, and monitor and report on actions taken and effects on key indicators (Sonnet, Olsen, & Manfredi, 2014). In the following, we describe the most central policies to promote healthy labor-force participation of older adults and organize them in three categories: (i) modifying social protection programs, (ii) encouraging employers to hire older adults, and (iii) enhancing older workers' employability.

Modifying Social Protection Programs

Each country has a specific set of rules governing public and private pension eligibility, retirement age, other earnings thresholds, health coverage, and disability and unemployment benefits. Numerous modifications to these rules in the OECD countries in the last decade have made a significant impact on raising the number and percentage of people aged 55–65 years who are working. These modifications have less effect on people beyond age of eligibility for pensions, so have had far less effect on LFPR65+ (Sonnet et al., 2014).

Many countries with unsustainable pension systems have increased the age that workers are eligible for old age income support, offer partial income support for those still working to incentivize a longer, phased retirement or incentivize deferred retirement past the age eligible for a full pension. The United States, which has one of the highest LFPR65+ rates among OECD countries, has enacted a series of incremental changes to its social security system that seek to incentivize later retirement by raising the pension level if retirement is delayed until age 70 (Knoll & Olsen, 2014). In Florida, workers who defer retirement receive increased interest paid on their pensions (Florida Department of Management Services, 2014).

Other countries have eliminated sources of income support. The Netherlands is an example where the employment rate of people aged 65–69 years nearly doubled from 6.5% to 12.7% between 2002 and 2012, a time during which all available supports were reduced for older people (OECD, 2014). Of course, the work inducement benefits of eliminating social protection programs must be weighed against the potential effect on economies and individuals if people have neither employment nor other income.

Countries have also explored gradual retirement options as a way to incentivize workforce participation. Many countries have increased supports for retiring in stages, either through "bridge employment" that connects full-time work with complete retirement or "phased retirement" options that allow people to earn more and draw a partial pension (European Commission's Social Protection Committee, 2007; Quinn, 1999*). Japan and Scandinavian countries have been particularly successful (Sundén, 2006; Wacker & Roberto, 2011*).

Unretirement is also gaining attention as an option for individuals to begin working again after retiring and collecting a pension. In many countries, pension policy or mandatory retirement ages make this practice impossible. In others, policies are more fluid. In Sweden, for example, individuals can stop all or part of their pension and continue to work at any age, without constraints on their earned income (European Commission's Social Protection Committee, 2007).

Encouraging Employers to Hire Older Adults

The second category of policy changes include attempts to encourage or require employers to retain, train, hire, protect, and reward older workers.

Health costs are one of the major barriers for employers to hire older adults. The shift from traditional employer-sponsored plans to defined contribution schemes shifting shifts the risk to individuals and reduces the hiring costs of older employees, which in turn and is thus very influential influences on employers' willingness to hire older adults.

Mandatory retirement ages are an important piece of the puzzle. Many countries still have mandatory retirement ages intended to serve many purposes, including creating more jobs for youth. Yet they were proven ineffective years ago at creating more jobs for youth. Mandatory retirement age policies have also often not been adjusted for tremendous gains in life expectancy or increases in health in later life. The OECD recommends the eventual elimination of all such policies for the benefit of workers, employers, and the economy (Sonnet et al., 2014).

Monetary incentives are also a way of encouraging employers to hire older adults. Many countries with labor shortages, high rates of long-term unemployment, and stretched pension systems offer incentives to employers who newly hire older workers. The incentives differ, but typically involve exempting employers from certain taxes, offering bonuses, or offering access to government contracts. Economists have proposed the implementation of wage subsidies (Phelps, 1997) as a more cost-effective alternative to private or public job training programs for older workers, which they suggest are prohibitively costly and ineffective (Heckman & Klenow, 1998). Some countries offer incentives for hiring specific populations of older workers including women, those with lower incomes and those who have been incarcerated (ECSRC, 2007). In Bulgaria, the Employment Protection Act specifically incentivizes employers to hire unemployed women older than 50 years and unemployed men older than 55 years. France, which has one of the lowest job mobility rates for older workers of OECD countries, now provides financial aid and access to government contracts for employers who hire unemployed people older than 50 years.

Anti-age discrimination policies also influence employers decisions regarding older workers. Numerous countries have implemented anti-age discrimination laws and campaigns challenging inaccurate stereotypes that penalize older workers (Wacker & Roberto, 2011*). The United States, which has one of the highest LFPR65+, has some of the most mature and strongest antidiscrimination laws

and enforcement since the 1960s. In 2000, the European Commission adopted a Framework Equality directive to combat discrimination based on disability, sexual orientation, religion or belief, or age in the workplace. This Framework, however, continues to allow employers to enforce mandatory retirement ages as long as it fulfills a "legitimate aim," which includes employment or labor market policy (Numhauser-Henning, 2013).

Enhancing the Employability of Older Workers

The third category of policy changes is education and training to enhance the employability of older workers. This is especially critical for less-skilled workers who work increasingly less than those with higher levels of education, often not by choice (Sonnet et al., 2014).

Participation in training declines with age, being female, and lower skill level. Unfortunately, a number of programmatic and policy initiatives undertaken in OECD countries to address this issue have proved ineffective for the target population (e.g., Arni, Lalive, & van Ours, 2009: evaluating enhanced support for job seekers in Switzerland) or have been extremely difficult to implement (e.g., French personal account for preventing strenuous work exposure). In the Netherlands, a certificate validating skills acquired on the job is paid for by training and development funds, but its effects on retaining older low-skilled workers have not been demonstrated (Sonnet et al., 2014).

Conclusion

Work is a facet of life that must be fundamentally reconsidered in the context of rising healthy life expectancy around the world. This review has shown that we are missing global data that allow studying labor-force participation in later life with the same amount of scrutiny as between the ages of 20 and 60.

Currently, in LMICs without adequate social protection policies, people are starting to live longer lives and having to work for nearly all of them. The high prevalence of informal labor offers particular challenges to establishing policies for supporting healthy labor-force participation of older adults in this context.

At the opposite extreme, countries with extensive social support programs are still showing rather low labor-force participation after age 65. HICs are challenged to redesign these support programs so they will not discourage those people who are able from continuing paid employment for more of their lives. Particularly challenging is promoting labor-force participation of older adults beyond the age of eligibility for pensions. Facing this challenge requires two-sided policies that make both older adults willing to work and employers willing to hire them.

The role of work in times of longer lives needs to be fundamentally reconsidered for macro- and microeconomic reasons as well as for the maintenance of physical, mental, and cognitive health of the aging individuals. In particular, work at lower levels of qualification is in need of redesign to make longer healthy and satisfactory work lives possible. We need to collect systematic information about the productivity/disability trajectories of different types of occupation in order to being able to suggest timely task changes. Besides the physical and mental exertion, it is also pivotal pay attention to job strain when optimizing longer work lives. Governments and employers must do more to address work place policies and practices that create work environments across the life course that support and maintain productivity and well-being for workers of all ages. It is imperative for people of all ages to better understand the realities of their probable longer life course and to begin to plan for all phases of that life course. We must reorient many sectors of society—education, work, health, and social services—to take a role in this monumental endeavor.

Supplementary Material

Please visit the article online at http://gerontologist.oxfordjournals.org/ to view supplementary material.

Funding

This research was supported by CONICYT/FONDECYT/REGULAR/N°1140107 and a grant from Columbia University President's Global Innovation Fund.

Acknowledgments

The authors thank Jose T. Medina, Neesha Roy, Dorian Block, and Mary Reilly for their comments and other forms of help in connection to this article. However, the authors should be held responsible for any remaining errors or inaccuracies.

References

***Additional references can be found at supplementary materials.**

Alam, M. (2004). Aging, old age income security and reforms: An exploration of Indian situation. *Economic and Political Weekly*, **39**, 3731–3740.

Andel, R., Crowe, M., Pedersen, N. L., Mortimer, J., Crimmins, E., Johansson, B., & Gatz, M. (2005). Complexity of work and risk of Alzheimer's disease: A population-based study of Swedish twins. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **60**, 251–258. doi:10.1093/geronb/60.5.P251

Arni, P., Lalive, R., & van Ours, J. (2009). How effective are unemployment benefit sanctions? Looking beyond unemployment exit (*IZA Discussion Paper No. 4509*). Bonn, Germany.

Armstrong, R., Hall, B., Doyle, J., & Waters, E. (2011). Cochrane update: 'Scoping the scope' of a Cochrane review. *Journal of Public Health*, **33**, 147–150. doi:10.1093/pubmed/fdr015

Baker, L., Cahalin, L., Gerst, K., & Burr, J. (2005). Productive activities and subjective well-being among older adults: The influence of number of activities and time commitment. *Social Indicators Research*, **73**, 431–458. doi:10.1007/s11205-005-0805-6

Banerjee, A., & Duflo, E. (2006). The economic lives of the poor. *Journal of Economic Perspectives*, **25**, 141–167.

Barr, N., & Diamond, P. (2008). *Reforming pensions: Principles and policy choices*. New York: Oxford University Press.

Bielak, A., Hughes, T., Small, B., & Dixon, R. (2007). It's never too late to engage in lifestyle activities: Significant concurrent but not change relationships between lifestyle activities and cognitive speed. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **11**, 331–339.

Bloom, D. E., Somnath, C., Kowal, P., Lloyd-Sherlock, P., McKee, M., Rechel, B., & Smith, J. P. (2014). Macroeconomic implications of population aging and selected policy responses. *The Lancet*. doi:10.1016/S0140-6736(14)61464-1

Bosma, H., van Boxtel, M. P. J., Ponds, R. W. H. M., Houx, P. J., Burdorf, A., & Jolles, J. (2003). Mental work demands protect against cognitive impairment: MAAS prospective cohort study. *Experimental Aging Research*, **29**, 33–45. doi:10.1080/03610730303710

Bowen, C. E., Noack, C. M. G., & Staudinger, U. M. (2010). Aging in the work context. In W. Schaie & S. Willis (Eds.), *Handbook of the psychology of aging* (7th ed., pp. 263–277). San Diego, CA: Elsevier Academic Press.

Burtless, G. (2013). *The impact of population aging and delayed retirement on workforce productivity* (Working Paper 2013-11). Chestnut Hill, MA: Center for Retirement Research at Boston College. Retrieved from http://crr.bc.edu/wp-content/uploads/2013/05/wp_2013-111.pdf

Calvo, E., Haverstick, K., & Sass, S. A. (2009). Gradual retirement, sense of control, and retirees' happiness. *Research on Aging*, **31**, 112–135. doi:10.1177/0164027508324704

Calvo, E., Sarkisian, N., & Tamborini, C. R. (2013). Causal effects of retirement timing on subjective physical and emotional health. *Journal of Gerontology: Social Sciences*, **68**, 73–84. doi:10.1093/geronb/gbs097

Charmes, J. (2009). Concepts, measurement and trends. In J. P. Jutting & J. R. d. Laiglesia (Eds.), *Is informal normal? Towards more and better jobs in developing countries* (pp. 27–62). Paris: OECD Publishing.

Dave, D., Rashad, I., & Spasojevic, J. (2006). *The effects of retirement on physical and mental health outcomes*. Retrieved from http://www.nber.org/papers/w12123

Davies, E., & Cartwright, S. (2011). Psychological and psychosocial predictors of attitudes to working past normal retirement age. *Employee Relations*, **33**, 249–268. doi:10.1108/01425451111121768

Engelgau, M. M., El-Saharty, S., Kudesia, P., Rajan, V., Rosenhouse, S., & Okamoto, K. (2011). *Capitalizing on the demographic transition: Tackling noncommunicable diseases in South Asia*. Washington, DC: World Bank.

Employee Benefit Research Institute. (2008). Retirement confidence survey. Retrieved from www.ebri.org/surveys/rcs/.

European Commission's Social Protection Committee. (2007). Joint report on social protection and social inclusion: Social inclusion, pensions, healthcare and long term care. Retrieved from http://europa.eu/legislation_summaries/employment_and_social_policy/social_protection/c10157_fr.htm

European Commission. (2012, January). *Active aging report (Special Eurobarometer 378)*. Retrieved from http://ec.europa.eu/public_opinion/archives/ebs/ebs_378_en.pdf

Finkel, D., Andel, R., Gatz, M., & Pedersen, N. L. (2009). The role of occupational complexity in trajectories of cognitive aging before and after retirement. *Psychology and Aging*, **24**, 563–573. doi:10.1037/a0015511

Florida Department of Management Services. (2014). *Pension plan, deferred retirement option program, 2014*. Retrieved from https://www.rol.frs.state.fl.us/forms/drop-guide.pdf

Gertler, P., Levine, D. I., & Moretti, E. (2009). Do microfinance programs help families insure consumption against illness? *Health Economics*, **18**, 257–273. doi:10.1002/hec.1372

Giambiagi, F., & de Mello, L. (2006). *Social security reform in Brazil* (OECD Economics Department Working Papers No. 534). Paris, France: OECD Publishing.

Hertzog, C., Kramer, A. F., Wilson, R. S., & Lindenberger, U. (2008). Enrichment effects on adult cognitive development can the functional capacity of older adults be preserved and enhanced? *Psychological Science in the Public Interest*, **9**, 1–65.

Heckman, J. J., & Klenow, P. (1998). *Human capital policy. Policies to promote capital formation*. Stanford, CA: Hoover Institution. Retrieved from http://www.klenow.com/HumanCapital.pdf

Hu, Y.-W., & Stewart, F. (2009). *Pension coverage and informal sector workers: International experiences* (OECD Working Papers on Insurance and Private Pensions). Washington, DC: OECD Publishing.

Huitfeld, H., & Jütting, J. P. (2009). Informality and informal employment. In O. D. Center (Ed.), *Promoting pro-poor growth: Employment* (pp. 95–108). Washington, DC: OECD Development Center in Washington.

Hurd, M. D., & Rohwedder, S. (2014). *Predicting labor-force participation of the older population* (SIEPR Discussion Paper No. 14-011). Stanford, CA: Stanford Institute for Economic Policy Research.

International Labour Office. (2013). *Employment and social protection in the new demographic context*. Geneva, Switzerland: International Labor Office. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_209717.pdf.

International Labour Office. (2014). *Key indicators of the labor market* (8th ed., pp. 30–31). Geneva, Switzerland: International Labor Office. Retrieved from http://kilm.ilo.org/2011/download/kilmcompleteEN.pdf

International Labor Organization (2013). *ILO estimates and projections of the economically active population: 1990–2030* (2013 ed.). Retrieved from http://www.ilo.org/ilostat/content/conn/ILOSTAT ContentServer/path/Contribution Folders /statistics/web_pages/static_pages /EAPEP/EAPEP Methodological paper2013.pdf

Jütting, J. P., & de Laiglesia, J. R. (Eds.). (2009). *Is informal normal? towards more and better jobs in developing countries*. Paris, France: Development Centre of the Organisation for Economic Co-operation and Development.

Kajitani, S. (2011). Working in old age and health outcomes in Japan. *Japan and the World Economy*, **23**, 153–162. doi:10.1016/j.japwor.2011.06.001

Knoll, M. A., & Olsen, A. (2014). Incentivizing delayed claiming of social security retirement benefits before reaching full retirement age. *Social Security Bulletin*, **74**. Retrieved from http://www.ssa.gov/policy/docs/ssb/v74n4/v74n4p21.html

Kucera, D., & Xenogiani, T. (2009). Women in informal employment: What explains it? In J. P. Jütting & J. R. de Laiglesia (Eds.), *Is informal normal? Towards more and better jobs in*

developing countries (pp. 89–114). Paris, France: Development Centre of the Organisation for Economic Co-operation and Development.

Luoh, M. C., & Herzog, A. R. (2002). Individual consequences of volunteer and paid work in old age: Health and mortality. *Journal of Health and Social Behavior*, **43**, 490–509.

Lahey, J. N. (2010). International comparison of age discrimination laws. *Research on Aging*, **32**, 679–697. doi:10.1177/0164027510379348

Maimaris, W., Hogan, H., & Lock, K. (2010). The impact of working beyond traditional retirement ages on mental health: Implications for public health and welfare policy. *Public Health Reviews*, **31**, 532–548.

Meyer, M. H., & Parker, W. M. (2011). Gender, aging, and social policy. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (7th ed., pp. 323–335). San Diego, CA: Academic Press.

Milligan, K. S., & Wise, D. A. (2012). *Health and work at older ages: Using mortality to assess the capacity to work across countries* (NBER Working Papers No. 18229). Washington, DC: National Bureau of Economic Research.

Munnell, A. H., & Sass, S. A. (2008). *Working longer: The solution to the retirement income challenge*. Washington, DC: Brookings Institution Press.

Naegele, G., & Walker, A. (2006). *A guide to good practice in age management*. Luxembourg: European Foundation for the Improvement of Living and Working Conditions.

Numhauser-Henning, A. (2013). The EU ban on age discrimination and older workers: Potentials and pitfalls. *The International Journal of Comparative Labor Law and Industrial Relations*, **29**, 391–414. Retrieved from http://works.bepress.com/ann_numhauser-henning/26

Olivier, M. (2013). Social protection in Lesotho: Innovations and reform challenges. *Development Southern Africa*, **30**, 98–110. doi:10.1080/0376835X.2012.756218

Oltmanns, J., Godde, B., & Staudinger, U. M. (2015). *Don't lose your brain at work—Work demands buffer cognitive and brain aging*. Manuscript submitted for publication.

Oltmanns, J., Richter, G., Godde, B., & Staudinger, U. M. (in press). Healthy aging at work. In M. Wiencke, M. Cacace, & S. Fischer (Eds.), *Promoting health at work*. Heidelberg, New York: Springer.

Palacios, R., & Whitehouse, E. (2006). *Civil-service pension schemes around the world* (MPRA Paper No. 14796). Germany: University Library of Munich. Retrieved from https://ideas.repec.org/p/pra/mprapa/14796.html

Phelps, E. S. (1997). *Rewarding work: How to restore participation and self-support to free enterprise*. Cambridge, MA: Harvard University Press.

Potter, G. G., Helms, M. J., & Plassman, B. L. (2007). Associations of job demands and intelligence with cognitive performance among men in late life. *Neurology*, **70**, 1803–1808.

Pronyk, P. M., Hargreaves, J. R., & Morduch, J. (2007). Microfinance programs and better health—Prospects for sub-Saharan Africa. *Journal of the American Medical Association*, **298**, 1925–1927. doi:10.1001/jama.298.16.1925

Rajan, I. (2010). *Demographic aging and employment in India*. Bangkok, Thailand: International Labor Organisation.

Rix, S. E. (2011). *The employment situation, April 2011: Average duration of unemployment for older jobseekers exceeds one year*. Washington, DC: AARP Public Policy Institute.

Sahlgren, G. H. (2013). *Work longer, live healthier: The relationship between economic activity, health and government policy*. London: Institute of Economic Affairs in association with the Age Endeavour Fellowship. Retrieved from /files/Work%20Longer,%20Live_Healthier.pdf

Schooler, C., Mulatu, M. S., & Oates, G. (2004). Occupational self-direction, intellectual functioning, and self-directed orientation in older workers: Findings and implications for individuals and societies. *American Journal of Sociology*, **110**, 161–197.

Schulz, J. H., & Binstock, R. H. (2006). *Aging nation: The economics and politics of growing older in America*. Westport, CT: Praeger Publishers.

Skirbekk, V., Stonawski, M., Bonsang, E., & Staudinger, U. M. (2013). The Flynn effect and population aging. *Intelligence*, **41**, 169–177. doi10.1016/j.intell.2013.02.001

Sonnet, A., Olsen, H., & Manfredi, T. (2014). Towards more inclusive aging and employment policies: the lessons from France, the Netherlands, Norway and Switzerland. *The Economist*, **162**, 315–33. doi:10.1007/s10645-014-9240-x

Staudinger, U. M. (2015). Images of aging: Outside and inside perspectives. *Annual Review of Gerontology and Geriatrics*, **35**, 187–210. doi:10.1891/0198-8794.35.187

Staudinger, U. M., & Bowen, C. E. (2011). A systemic approach to aging in the work context. *Zeitschrift für Arbeitsmarktforschung*, **44**, 295–306.

Staudinger, U. M., & Kocka, J. (2010). *More years, more life. Recommendations of the Joint Academy Initiative on Aging (Translation)*. Halle (Saale), Germany: Deutsche Akademie der Naturforscher Leopoldina-Nationale Akademie der Wissenschaften.

Sundén, A. E. (2006). The Swedish experience with pension reform. *Oxford Review of Economic Policy*, **22**, 133–148.

The Organisation for Economic Cooperation and Development. (2014). *Working better with age: Netherlands; Assessment and main recommendations*. Retrieved from http://www.oecd.org/els/emp/Older%20Workers% 20NETHERLANDS_Assessment%20and%20main%20recommendations.pdf

The Social Protection Committee (2007, April). *Promoting longer working lives through pension reforms; first part: flexibility in retirement age provision*. Retrieved from ec.europa.eu/social/BlobServlet?docId=745&langId=en

Thiamwong, L., McManus, M. S., & Suwanno, J. (2013). Development of the Thai healthy aging model: A grounded theory study. *Nursing & Health Sciences*, **15**, 256–261. doi:10.1111/nhs.12028

United Nations. (2013). *World Population Aging 2013* (ST/ESA/SER.A/348). New York: UN Department of Economic and Social Affairs, Population Division.

Yang, D. U., & Meiyan, W. (2010). *Demographic aging and employment in China*. Geneva: International Labor Office.