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Tony Fang
Memorial University of Newfoundland, Hefei University, University of Toronto, Rutgers University, IZA and Chinese Economist Society

Morley Gunderson
Centre for Industrial Relations and Human Resources, Institute for Policy Analysis, Centre for International Studies, Institute for Human Development, Life Course and Aging and Royal Society of Canada

Byron Lee
CEIBS

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IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Can Older Workers Be Retrained? Canadian Evidence from Worker-Firm Linked Data*

Based on Statistics Canada's worker-firm matched Workplace and Employee Survey, our econometric analysis indicated that the average probability of receiving training was 9.3 percentage points higher for younger (25-49) compared to older (50+) workers. Slightly more than half of that gap is attributed to older workers having a lower propensity to receive training after controlling for the characteristics that affect training. Their lower propensity to receive training tended to prevail across 54 different training measures. We find that older workers can be trained, but this requires training that is designed for their needs including: slower and self-paced instruction; hands-on practical exercises; modular training components that build in stages; familiarizing them with new equipment; and minimizing required reading and the amount of material covered.

JEL Classification: J14, J18, J24

Keywords: training, older workers, worker-firm matched data, Canada

Corresponding author:
Tony Fang
Department of Economics
Memorial University of Newfoundland
St. John's, NL, A1C 5S7
Canada

E-mail: tfang@mun.ca

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1. INTRODUCTION

Issues related to the *older workforce* are taking on increased importance from a policy and practical perspective for a variety of reasons. The workforce is ageing, living longer and retiring later so that their work-life is extended with larger portions of the workforce in the older age brackets, making them a more important group simply in terms of numbers as well as their potential contribution to mentoring and synergies with younger workers.[1] Evidence drawn from the field of personnel economics (Lazear and Freeman 1997), for example, indicates that a mix of young and old workers is likely to produce the most productive work environment.

Older workers may be working longer to the extent that the recession and financial crisis of 2007, 2008 has dissipated their saving and increased the debt load of workers nearing retirement (Marshall 2011). As well, the increased time spent in acquiring higher education provides an incentive to work longer to amortize their education costs. The continued employment of older workers will be further enhanced by the uncertainty of receiving employer-sponsored pension plans and the fact that early retirement incentives in defined-benefit pension plans are no longer prominent. Moreover, mandatory retirement policies have been largely banned by legislation (Conference Board of Canada, 2005).

In their transition to retirement and increasingly back from retirement, older workers are often leaving their career jobs and engaging in alternative "bridge" jobs, many of which are non-standard (e.g., part-time, limited-term contracts, self-employment, telecommuting) and quite different from their earlier career jobs (Cohen 2008; Monette 1996; OECD 2019a, 2019b). Although our research deals with the training of *all* older workers, including those who have

been dismissed or lost their life-long job, their human capital and skills are often industry-specific and tend not to fit with the requirements of the new knowledge economy (Neal 1995). As an example, many older workers have been displaced through mass layoffs from their earlier career jobs in declining industries like steel, pulp and paper and auto manufacturing, with harmful effects on their mortality (Morissette, Zhang and Frenette 2007; Sullivan and von Wachter 2009). Such displaced older workers are often considered in a state of limbo – too old to begin a new career, but too young to retire. Due to these reasons, an understanding of how this ageing workforce is utilized will have increased importance given the growing knowledge economy and the decline in physically arduous blue-collar work (Beach 2008).

The literature on the effects of permanent job loss tends to focus on job loss from plant closings and mass layoffs. More recently, the pandemic has also led to massive job losses. The hope is that much of this is temporary and individuals will eventually return to their former jobs when the pandemic is over. However, Barrero, Bloom, and Davis (2020) estimate that 42 percent of recent layoffs from COVID-19 in the United States will result in permanent job loss, and that there are only 3 new hires for every 10 layoffs caused by the pandemic. This restructuring and reallocation of labour in response to the pandemic clearly will affect older workers who are also more likely to be at health risks because of the pandemic.

In addition to these issues of an ageing workforce and the effects of economic restructuring, *training* issues have attracted increased attention in the current economy. Employers often face skill shortages associated with the retirements of the large baby-boom cohort of workers (Cohen 2008; Conference Board 2005; OECD 2019a, 2019b). The decline of life-time jobs associated with the old standard employment contract means that individuals can

expect to change jobs more often, with obvious implications for training needs. This has also put a premium on continuous life-long learning – and relearning – with retraining being an important component of that process (OECD 2019a, 2019b; Steffens 2015). For example, vocational rehabilitation and workplace accommodation requirements often involve training components (Campolieti, Gunderson and Smith 2014). Training is generally regarded as a key component of active labour adjustment programs that facilitate the reallocation of labour from declining sectors and regions to expanding sectors and regions, with the twin benefits of reducing unemployment in the declining sectors and decreasing skill shortages in the expanding ones (Cohen 2008). Such active adjustment programs like training are generally preferred to passive income maintenance programs that can support the "stay" option and exacerbate unemployment and labor shortages. With the dramatic increase in higher education, and the notion that such education is no longer a ticket to secure employment, increased attention is being paid to vocational training that can make individuals "job ready."

Training can not only equip workers to adjust to technological change, it can also *foster or induce* such endogenous technological change as likely occurred with the computer revolution starting in the mid-1970s (Beaudry and Green 2005). Says Law may well apply, with increases in the supply of skilled labour fostering technological change (Acemoglu 1996, 1998, 2002). Training has also fostered the innovation that is regarded as crucial to sustain productivity in a high-wage economy.[2] The literature on *high-performance work practices* that foster competitiveness emphasises the importance of "bundling" training with other *complementary* workplace practices such as employee involvement, job rotation, multi-tasking, broader-based job classifications and performance-based compensation.[3]

Clearly *each* of the issues of an *aging workforce* and *training* are of increasing importance from a policy and practical perspective. The intersection of *both* of those two issues – the training of older workers – compounds that importance. That intersection is the focus of this analysis.

The paper begins with a discussion of some of the theoretical issues that are related to the training of older workers. Particular attention is placed on how those issues shed light on the incentives of employers and older workers related to training, and the barriers that older workers face as well as what organizations can do to overcome those barriers. The paper then moves to a discussion of the data that will be used in the empirical analysis. The empirical framework and estimating procedures are then discussed. This is followed by empirical evidence on three relevant dimensions: First, we *profile* how 54 different training indicators differ for older and younger workers, without controlling for any of the other factors that may influence such indicators. Second, we provide an *econometric analysis* of the effect of being an older worker as opposed to a younger worker, after controlling for the effect of other determinants of training for the 54 training indicators. Finally, we use a *decomposition analysis* to illustrate the extent to which differences in the average probability of receiving training between younger and older workers is due to differences in the mean value of their *characteristics (explanatory variables)* that affect training indicators, as opposed to differences between older vs. younger workers in their *propensity to undertake or receive training (i.e., regression coefficients)*. The paper concludes with a summary and policy discussion.

II. THEORETICAL ISSUES RELATED TO THE TRAINING OF OLDER WORKERS

Implications for the training of older workers can be gleaned from various disciplines and perspectives, highlighting the importance of a multi-disciplinary perspective for analysing the training of older workers. The different theoretical perspectives and their inter-relatedness are discussed below, highlighting their implications for the training of older workers.

The basic *human capital framework of economics* suggests that older workers are less likely to receive training and to receive less of it, given that the benefits of training are likely to be smaller for them and the costs higher than for younger workers. Specifically, the benefits for older workers are likely to be less since they have a shorter remaining work-life from which to amortize the costs of training (Picot and Wannell, 1987). This is so whether employers or employees bear those costs (Xu and Lin, 2011). As workers age, they are more likely to be matched with the requirements of their job and not engaged in the frequent job turnover that characterize younger workers (and that require re-orientation or re-training) as they search for a good job match (Park 2012). The accumulated experience of older workers may also function as a substitute for training.

In addition to the benefits of training being smaller for older workers, the costs may also be higher for older workers because of their higher wage and hence opportunity cost from time spent in training. As well, the psychic and learning costs may be higher to the extent that they find it more difficult to absorb the new training, in part because they are further away from their earlier period of formal education.

Related to the costs and benefits of training older workers, the *health and safety literature* documents the strong positive relationship between age and disability (Arin 2015; Cossette and

Duclos 2002) as well as days lost due to injuries (Dillingham 1981) and greater absences due to illness and longer recovery times (Rosen and Jerdee 1985, p.27). This highlights the need for vocational rehabilitation training as well as workplace accommodations for older workers.

The *discrimination literature* highlights that older workers are subject to discrimination and age stereotyping and there is little reason to believe that this would not apply to the training of older workers as evidenced by the phrase "you cannot teach an old dog new tricks." Such discriminatory stereotypes of ageism are documented in various reviews[4] as well as in resume studies where older workers receive fewer call-backs compared to equally qualified younger workers (Baert et al. 2016; Postuma and Campion 2009; Riach 2015; and Richardson et al. (2013). However, Kunze et al. (2013) provide evidence that, contrary to stereotypes, older workers are less resistant to change compared to younger workers.

The literature on how *productivity changes with age*, suggests that there is little or no clear relationship between productivity and age.[5] The heterogeneity across individuals of the same age is greater than the heterogeneity between individuals across age groups. Some skills like strength, dexterity, memory and reaction speed decline with age; however, older workers often compensate for these declines through other inputs such as institutional knowledge, firm-specific human capital, wisdom, diligence and experience as well as the ability to mentor younger workers.

The *organization behaviour/psychology literature* highlights how retirement, and especially involuntary retirement, has negative effects on cognitive functioning and the health and well-being of older workers (Bonsang et al., 2013; Mazzonana and Peracchi 2012: and

Rohwedder and Willis 2010). Training could not only facilitate continued employment, but also provided cognitive learning.

Closely related to the organization behaviour literature, the *psychology and training literature* dealing with cognitive and non-cognitive skills does suggest that older workers perceive themselves as having less need for training as well as having concerns over their ability to absorb and utilize training (Guthrie and Schwoerer 1996 and references cited therein). Importantly, the literature also finds that older workers have more difficulty in absorbing training: they take longer to be trained and may have limited productivity gains from training.[6] This difficulty of training older workers reflects a variety of factors including: declines in cognitive, physical, memory and motor skills; difficulty of keeping up with the pace of instruction; difficulties with conceptual as opposed to hands-on learning; lacking the foundations in computer skills and IT; lack of familiarity with new equipment and technology; and awkwardness in being retrained with younger workers.

Importantly, however, these difficulties can be overcome if training is structured to meet their needs. Such elements that can facilitate the training of older workers include:[7] slower and self-paced instruction allowing sufficient time; hands-on practical exercises; ensuring that the training is relevant; building on their current knowledge base; modular training components that can build on previous components going from the simple to the complex; providing feedback; familiarizing them with new equipment; emphasizing experiential and practical as opposed conceptual learning; minimizing required reading and the amount of material to cover; training in small groups; and training older workers separate from younger workers.

While these various perspectives can shed light on the issue of the training of older workers, we find the *human capital perspective* and the *psychology and training literature* to be most useful for interpreting our subsequent empirical results. The human capital perspective highlights the incentives faced by both employers and employees, while the psychology and training literature highlights the barriers faced by older workers and how employers can design training to overcome those barriers.

Our analysis using a worker-firm matched data set that has 54 different indicators of training enables us to shed light on the features of training that can be barriers to the productive training of older workers. The different indicators of training can also highlight factors that can accommodate the needs of older workers in the training area.

While our 54 indicators of training contain the usual suspects reflecting the cost and benefits of training as well as the barriers for older workers, it also yields some surprises such as older workers not refusing training because of health reasons or because they perceived their courses being too difficult. Instead, the factor that was most important for older workers that disproportionately refused training was because they felt the courses were not suitable. This puts the onus on employers and training institutions to design courses that are suitable to the needs and capabilities of older workers.

III. WES DATA

Our empirical analysis is based on Statistics Canada's worker-firm matched data set, the Workplace and Employee Survey (WES). The survey has (unfortunately) been discontinued so our

analysis is based on 2003 data. Only odd-year WES data contains information on organizational factors that can affect training decisions.

On the employer side, the target population was defined as all business locations operating in Canada that have paid employees in March, except for employers in the Yukon, Nunavut and Northwest Territories as well as employers in crop or animal production, fishing, hunting and trapping, private households, religious organizations and public administration. On the employee side, the target population was all employees working or on paid leave in March in the selected workplaces who receive and income tax form. The WES drew its sample from the Business Register (BR) which is a list of all businesses in Canada that is updated each month, which may combine the information the businesses provide with data from other surveys or administrative sources to reduce the response burden (Statistics Canada, 2021).

Our analysis is based on the individual file of WES. It is restricted to workers age 25 and older, broken down into older workers age 50 and older (as defined by the OECD 2006), and non-older workers 25-49. It is also restricted to for-profit organizations since they were the only ones that had information on whether there was competition and, if so, if it was local, regional or global.

The WES is an ideal data set for analysing the training of older workers because it is a worker-firm matched data set and hence has information on both workers and firms, and one of its primary focuses is on job training. It has a rich set of 54 *indicators* relevant to the training of older workers, including: whether the worker *received* training in the past year; the *type and duration* of training; *instruction* for on-the-job training; the *nature* of class-room courses taken; *instruction* for classroom training; whether training was offered but *refused* and *reasons for refusing* training,

including being too old or too late in one's career. The sample size is substantial involving about 4,000 older workers over the age of 50 and 12,000 between the ages of 25 and 49.

Table 1 compares the mean values for the 54 training indicators, separately for older workers (50+) and younger workers (25-49). For categorical indicators these are the percentage who received that type of training. They are raw or unadjusted differences, not controlling for the effect of other factors besides their age. They are the dependent variables used in our subsequent regression analyses that controls for other factors influencing those outcomes.

As indicated by the negative magnitudes in column 3 of Panel 1, the incidence and magnitude of training for older workers is lower than for younger workers in almost all of these dimensions of training. This is a common result found in the literature across different countries.[8]

IV. REGRESSION ANALYSES

These *gross* difference between older and younger workers in the extent and nature of a wide range of training indicators can reflect differences in both the extent to which older and younger workers have different *characteristics* that are associated with the training indicators as well as differences in their *propensity* to take different types of training after controlling for or netting out the effect of the other factors that influence the training indicators. That net effect can be considered a pure older worker effect since it controls for the effect of the other determinants of the training indicators. It is estimated here as simply the coefficient on an older versus younger worker dummy variable based on separate regressions for each of the 54 training indicators that also control for a wide array of other variables that can affect those training indicators.[9] As indicated at the bottom of Table 2, these variables include: gender; visible

minority status; Aboriginal status; immigrant status; marital status; education; the presence of dependent children; full-time vs. part-time status; regular permanent vs. non-standard work; presence of a collective agreement; use of a computer at work; use of technology at work; number of employees at the firm; the % part-time, the % temporary; new goods or processes being introduced at work; whether there is no competition or competition that is local, regional or global; the existence of individual or group incentive plans; whether overtime is worked; whether there was downsizing; occupation; industry and region. These full regressions are estimated separately for each of the 54 different training indicators.

Table 2 presents the pure or net older worker effect (i.e., the coefficient on the dummy variable coded 1 if the worker was age 50 or older and zero of age 25-49).[10] A negative older worker coefficient means that older workers are less likely than are younger workers to receive that training outcome or use that type of training or instruction or use that reason for refusing training. A positive coefficient implies the opposite. It is important to emphasise at the outset that in the absence of causal estimation procedures, the relationships here reflect associations and not causality.

As indicated in the first row of the top panel of Table 2, after controlling for the effect of other determinants of training, older workers have a statistically significant 5.2 percentage point lower probability of receiving some form of training compared to younger workers. This is a substantial 10% lower probability relative to the average probability of 53.1%.

The coefficient for the days of training received also indicates that older workers receive fewer days of training than do younger workers. Specifically, after controlling for the other determinants of training, older workers receive a statistically significant 2.3 fewer days of

training than do younger workers. While this appears as a small number, it is half of the average of 4.6 days of training received by both older and younger workers.

The fact that older workers have a lower probability of receiving training and they receive fewer days of training compared to younger workers after controlling for the effect of other factors that affect training, may reflect the likelihood that the benefits of most types of training are lower for older workers (given their shorter time horizons for amortizing the costs, and any lower productivity gains from taking training) and the costs are higher (given their higher wages and hence higher opportunity cost, as well as possible psychic costs).

The negative effects for *all* of the separate *incidence and magnitude* indicators indicate that older workers generally have a lower probability of receiving training and they receive fewer days of training even after controlling for other factors that influence the incidence and magnitude of training. The magnitudes of these pure older worker effects are also generally substantial relative to the mean values given in column 1. Only for the indicators of having received *only* on-the-job training or *only* classroom training are the effects statistically insignificant and small.

As indicated in Panel 2 of Table 2, the negative effects for the *nature of the different types of on-the-job training* highlight that this generalization of older workers having a lower probability of receiving training applies to most types of on-the-job training, and especially for managerial, supervisory and professional OJT. In many cases, however, the differences across older and younger workers are statistically insignificant and small. The notable exception is that older workers are much more likely to receive on-the-job training in computer software. This is understandable given that they likely did not have such training in their earlier education or as

part of their lifestyle. The fact that they are more likely to receive training in computer software, however, suggests that it is relevant to their work and that they are able to absorb such training – otherwise it would not likely prevail.

With respect to the instruction for on-the-job training (Panel 3), older workers have a much lower probability of being instructed by a supervisor or a fellow worker. This makes sense since they will likely have fewer supervisors since they are older, and fellow workers are likely to be younger and hence reluctant to train older workers. The mentoring and on-the-job training is likely to go in the other direction, coming from older workers.

With respect to *classroom training* (both the 13 indicators related to its *nature* (Panel 4) and the 6 related to *instruction* (Panel 5), the differences between older and younger workers are statistically insignificant and quantitatively very small. The same applies to the probability of having refused training.

With respect to *reasons* for refusing training (Panel 6), older workers have a much greater probability of indicating that the courses are not suitable. It is that they are not suitable rather than being too difficult that is a barrier, as evidenced by the fact that the courses being too difficult is not a significant predictor of refusing training. The fact that the lack of suitable courses is the reason for refusing training is informative since it highlights the importance of employers and training institutions to design and implement courses that are suitable to the needs and capabilities of older workers as discussed previously. The concept of "one-size-fits all" obviously does not apply to the design and implementation of training courses for the older workers.

While older workers obviously also have a higher probability of refusing training because they say they are too old or it comes too late in their career, the magnitude of this effect is extremely small, in part because few workers give that as a reason in the first place. Older workers are less likely to refuse training because they are too busy with their job duties, presumably because they have already found a fit with their duties and are capable of handling them. Family responsibilities and health factors are not significant reasons for older worker refusing training, in spite of the fact that health declines with age.

V. DECOMPOSITION ANALYSIS

The previous analysis of Table 1 indicated that the unadjusted or raw difference in the average probability of receiving training was 9.3 percentage points higher for younger compared to older workers (based on the probability of receiving training of 55.2% for older workers and 45.9% for younger workers). By estimating separate equations for older and younger workers, that overall training gap for the probability of receiving training can be decomposed into two component parts (Oaxaca, 1973). One component can be attributed to differences between older vs. younger workers in the mean values of their *characteristics (explanatory variables)* that affect training indicators. The other component can be attributed to differences between older vs. younger workers in their *propensity to undertake or receive training (i.e., regression coefficients)* for a given set of characteristics.

As shown in Table 3, the decomposition indicates that of the 9.3 percentage point differential in the probability of receiving training, 4.1 percentage points or 44% can be attributed to differences in the mean values of the explanatory variables or characteristics

between older and younger workers. Those characteristics pertain to personal characteristics, employment and workplace characteristics, human resource practices pertaining to incentive schemes, and occupation/industry/region. That is, almost half of the lower probability of older workers receiving training is due to the fact that older workers have more of other characteristics that lower the probability of receiving training, and those other characteristics lower the probability of receiving training for both older and younger workers alike.

The remaining 5.2 percentage points or 56% of the training gap can be attributed to a lower propensity to receive training on the part of older workers (i.e., differences in the regression coefficients including the constant terms in each equation). This lower propensity to receive training on the part of older workers reflects the higher likely cost of training older workers (higher opportunity cost of lost wages during the time spent in training as well as possible physic costs) and lower expected benefits due to their shorter remaining time horizon and any lower productivity from taking training as discussed previously.

VI. SUMMARY OBSERVATIONS FOR INDIVIDUALS AND EMPLOYERS

The evidence presented here is generally consistent with older workers and their employers making rational decisions with respect to various aspects of training. Almost half of the lower probability of older workers receiving training is because older workers have more of other characteristics (personal, employment, workplace, human resource practices and occupation/industry/region) that lower the probability of receiving training for both older and younger workers. The remaining half of the training gap can be attributed to a lower propensity

to receive training on the part of older workers, likely reflecting their expected higher costs as well as lower expected benefits as discussed previously.

The fact that the lower incidence of training for older workers prevailed across most types of on-the-job training likely reflects that the benefits of training are lower for older workers and the costs are higher. As discussed previously, the benefits are lower because of their shorter expected remaining time in the labour force and their experience may be a substitute for training. As well, the costs may be higher because of their higher pay and hence higher opportunity cost, as well as higher psychic cost and difficulties in absorbing training. Discrimination may also be a barrier inhibiting their provision of training.

An exception to the pattern of a lower incidence of on-the-job training for older workers is for training in computer software. This is consistent, however, for making up for their lack of such exposure to computers in their much earlier formal education and the fact that they did not acquire it as a natural part of their lifestyle as is the case with younger workers. The fact that so many older workers engage in such computer software training also highlights that it is required in their work and that they are able to absorb it, otherwise it would not likely to be common.

The other exception where older workers were more likely to receive more on-the-job training is for health and safety. This can reflect a rational response on the part of employers to provide such training to the extent that the costs of time-lost accidents are higher for older workers given their generally higher wage and slower recovery period.

The fact that supervisors and fellow workers are a less common source of on-the-job training for older workers likely reflects the fact that there are fewer supervisors for older workers (older workers themselves being supervisors) and the fact that younger workers are not

likely to train older workers. In contrast, self-learning is more common for older workers likely reflecting the importance they attach to self-paced learning.

Identical proportions of both older and younger workers refused training. Perhaps surprisingly, older workers were not hampered in their decision to take training by such factors that may have been expected to be barriers such as the courses being too difficult, or their having health problems or family responsibilities. The factor that was most important was that older workers disproportionately refused training because they indicated that this was due to the courses not being suitable. This highlights the importance for employers and training institutions to design and implement training courses with the needs and capabilities of older workers in mind.

Our answer to the question "Can older workers be trained" is: yes. But this requires training that is designed for the needs and capabilities of older workers. Such features include: slower and self-paced instruction; hands-on practical exercises; modular training components that build in stages; familiarizing them with new equipment; and minimizing required reading and the amount of material covered. The concept of "one-size-fits- all" does not apply to the design and implementation of training courses for older workers.

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Table 1 – Profile of Training Indicators for Older and Younger Workers, WES 2003
(% responding yes for categorical measures; mean magnitude for continuous measures)

Training Indicator	Older Worker 50+	Younger 25-49	Difference
	(1)	(2)	(3) = (1) – (2)
Panel 1			
Incidence and Magnitude (7)			
Received either OJT or classroom	0.459	0.552	-0.093
Received on-the-job (OJT) only	0.145	0.173	-0.028
Received classroom only	0.228	0.244	-0.016
Received both OJT and classroom	0.086	0.136	-0.050
Days of any training received	2.721	5.105	-2.384
Days of OJT training received	1.105	2.894	-1.789
Days of classroom training received	1.617	2.211	-0.594
Panel 2			
Nature of OJT (13)			
Orientation	0.049	0.075	-0.026
Managerial/supervisory	0.037	0.103	-0.066
Professional	0.141	0.197	-0.056
Apprenticeship	0.027	0.021	0.006
Sales and marketing	0.077	0.088	-0.011
Computer hardware;	0.057	0.061	-0.004
Computer software	0.303	0.264	0.039
Other equipment	0.090	0.071	0.019
Group decisions, problem solving	0.026	0.055	-0.029
Teams, leadership, communicate	0.048	0.071	-0.023
Health, safety, environment	0.139	0.105	0.034
Literacy or numeracy	0.003	0.006	-0.003
Other	0.236	0.250	-0.014
Panel 3			
Instruction for OJT (7)			
Self-learning	0.139	0.120	0.019
Supervisor	0.317	0.388	-0.071
Fellow worker	0.212	0.299	-0.087
In-house trainer	0.286	0.267	0.019
Outside trainer	0.220	0.175	0.045
Equipment supplier	0.090	0.059	0.031
Other	0.038	0.027	0.011

Panel 4			
Nature of Classroom Training (13)			
Orientation	0.008	0.009	-0.001
Managerial/supervisory	0.059	0.077	-0.018
Professional	0.207	0.222	-0.015
Apprenticeship	0.020	0.014	0.006
Sales and marketing	0.075	0.063	0.012
Computer hardware;	0.044	0.029	0.015
Computer software	0.171	0.180	-0.009
Other equipment	0.041	0.027	0.014
Group decisions, problem solving	0.006	0.009	-0.003
Teams, leadership, communicate	0.032	0.038	-0.006
Health, safety, environment	0.186	0.198	-0.012
Literacy or numeracy	0.002	0.005	-0.003
Other	0.329	0.344	-0.015
Panel 5			
Instruction for Class Training (6)			
Supervisor	0.116	0.113	0.003
Fellow worker	0.101	0.089	0.012
In-house trainer	0.315	0.270	0.045
Outside trainer	0.549	0.612	-0.063
Equipment supplier	0.090	0.083	0.007
Other	0.059	0.055	0.004
Panel 6			
Refused Training in Past Year (1)	0.088	0.088	0
Reasons for Refusing Training (7)			
Busy with job duties	0.401	0.457	-0.056
Courses not suitable	0.299	0.236	0.063
Courses too difficult	0.002	0.002	0
Health reasons	0.012	0.010	0.002
Family responsibilities	0.036	0.057	-0.021
Too old or late in career	0.049	0.004	0.045
Other	0.201	0.234	-0.033

Table 2 – Effect of Being an Older Worker vs. a Younger Worker on Various Training Indicators After Controlling for the Impact of Other Determinants of Training Indicators
(Coefficient from an older worker dummy variable in OLS regression)

Training Indicator	Mean Dependent Variable	Older Worker Coefficient	P-value
Panel 1			
Incidence and Magnitude (9)			
Received either OJT or classroom	0.531	-0.052***	0.008
Received on-the-job (OJT) only	0.166	-0.002	0.915
Received classroom only	0.240	-0.009	0.599
Received both OJT and classroom	0.124	-0.041***	0.001
Days of any training received	4.555	-2.276***	0.007
Days of OJT training received	2.481	-1.289***	0.002
Days of classroom training received	2.074	-0.987	0.145
Panel 2			
Nature of OJT (13)			
Orientation	0.070	-0.022	0.212
Managerial/supervisory	0.090	-0.037**	0.013
Professional	0.187	-0.075***	0.007
Apprenticeship	0.022	-0.006	0.627
Sales and marketing	0.086	-0.005	0.815
Computer hardware;	0.060	0.006	0.732
Computer software	0.271	0.065**	0.040
Other equipment	0.075	0.027	0.249
Group decisions, problem solving	0.050	-0.016	0.257
Teams, leadership, communicate	0.067	-0.008	0.631
Health, safety, environment	0.111	-0.000	0.985
Literacy or numeracy	0.006	-0.006	0.174
Other	0.247	-0.042	0.172
Panel 3			
Instruction for OJT (7)			
Self-learning	0.124	0.024	0.299
Supervisor	0.375	-0.078**	0.026
Fellow worker	0.283	-0.071**	0.033
In-house trainer	0.270	0.015	0.628
Outside trainer	0.184	0.048	0.113
Equipment supplier	0.065	0.024	0.218
Other	0.029	0.012	0.286

Panel 4			
Nature of Classroom Training (13)			
Orientation	0.009	0.001	0.919
Managerial/supervisory	0.073	-0.020	0.210
Professional	0.219	-0.023	0.400
Apprenticeship	0.015	-0.001	0.931
Sales and marketing	0.065	0.011	0.511
Computer hardware;	0.032	0.012	0.562
Computer software	0.178	0.013	0.572
Other equipment	0.030	0.016	0.201
Group decisions, problem solving	0.008	-0.001	0.794
Teams, leadership, communicate	0.037	0.000	0.968
Health, safety, environment	0.195	-0.012	0.645
Literacy or numeracy	0.004	-0.002	0.322
Other	0.341	-0.029	0.379
Panel 5			
Instruction for Class Training (6)			
Supervisor	0.114	0.007	0.762
Fellow worker	0.092	0.009	0.633
In-house trainer	0.279	0.011	0.735
Outside trainer	0.600	-0.028	0.417
Equipment supplier	0.084	0.016	0.426
Other	0.056	0.005	0.761
Panel 6			
Refused Training in Past Year	0.088	0.016	0.132
Reasons for Refusing Training (7)			
Busy with job duties	0.444	-0.102*	0.089
Courses not suitable	0.250	0.120**	0.014
Courses too difficult	0.002	-0.004	0.277
Health reasons	0.010	-0.006	0.564
Family responsibilities	0.052	-0.010	0.571
Too old or late in career	0.014	0.039***	0.004
Other	0.226	-0.037	0.432

Significance is denoted by *** at the 0.01 level, ** at the 0.05 level and * at the 0.10 level

Control variables include: gender; visible minority status; Indigenous status; immigrant status; marital status; education; the presence of dependent children; full-time vs. part-time status; regular permanent vs. non-standard work; presence of a collective agreement; use of a computer at work; use of technology at work; number of employees at the firm; the % part-time, the % temporary; new goods or processes being introduced at work; whether there is no competition or competition that is local, regional or global; the existence of individual or group incentive plans; whether overtime is worked; whether there was downsizing; occupation; industry and region.

Table 3 – Decomposition of Training Gap of 0.093, With Younger Workers Having a Higher Probability of Receiving Training (0.552) Compared to Older Workers (0.459)

Overall Younger – Older Training Gap $(\overline{Y}_y - \overline{Y}_o)$		**Explained, Due to Differences in Endowments** $(\overline{X}_y - \overline{X}_o)\beta_y$		**Unexplained, Due to Difference in Returns** $(\beta_y - \beta_o)\overline{X}_o$	
Amount	%	Amount	%	Amount	%
.093	100%	.041	44%	.052	56%

Endnotes:

[1] The importance of the aging population and its extended work-life is discussed in Carrière and Galarneau (2011), Krekula and Vickerstaff (2017), Milligan and Schirle (2018). Ní Léime et al. (2017) and OECD (2006).

[2] Studies that have documented the importance of training in fostering innovation include Acemoglu (1997), Belzil and Hansen (2006), Boothby et al. (2007), Castrillón and Cantorna (2005), Guidetti and Mazzanti (2005) and Xu and Lin (2005, 2011),

[3] The literature on the importance of bundling training with complementary high-performance work practices is reviewed, in Boothby et al. (2007) and Orlando and Johnson (2004).

[4] Evidence on age stereotyping and discrimination is reviewed in AARP (2000), Bayl-Smith and Griffin (2014), Butler (1980), Chou and Choi (2011), Cully et. al, (2000), Gunderson (2003), Harris et al., (2018), Kite and Wagner (2002), Nelson (2002), Taylor et. al. (2013) and Wilkinson and Ferraro (2002).

[5] Reviews of the relationship between age and productivity include Hellerstein, Neumark and Troske (1999), Jablonski, Kunze and Rosenblum (1990), Kuhn (2005), Posner (1995, pp. 66-98, 156-201), Posthuma and Campion (2009), Richter (1992) and Sterns, Sterns and Hollis (1996).

[6] Reasons for the difficulty of training older workers are discussed in Birren and Fisher (1995), Dostie and Léger (2014), Göbel and Zwick (2013), Hayslip and Kennely (1985), Knowles (1990), Kubeck et al. (1996) in a review of 32 studies, Park (1994), Spirduso and MacRae (1990) and Sterns (1986).

[7] Features of training programs that can meet the needs of older workers are outlined in Beier and Ackerman (2005), Belbin and Belbin (1972), Callahan, Kiker and Cross (2003), Dunn (2005), Kruse (2001), Simpson (2005) and Sterns and Doverspike (1987, 1989).

[8] The literature from different countries invariably finds that older workers engage in less training than younger workers (e.g., Cully et. al 2000: Frazis et. al 2000; Greenlaigh and Stewart 1987; Hurst 2008; OECD 2006; and Park 2012. Dostie and Léger (2014), Underhill (2006), Xu and Lin (2011) and Zeytinoglu et al., (2007) document similar effects for Canada.

[9] The coefficients are from an Ordinary-Least-Squares (OLS) regression and are very close to the marginal effects from a Probit function, available on request. The OLS procedure also facilitates the subsequent decomposition analyses. For categorical dependent variables with a mean that is less than 0.20 or greater than 0.80, however, caution should be used in interpreting the changes in the probabilities based on the OLS linear approximation to reflect the non-linear relationship.

[10] Space constraints prevent presenting the full range of results for the other determinants (i.e., 53 different regression results involving two pages for each). The full results are available on request.