UPSKILL HEALTH STUDY

UPSKILL Health study — Knowledge synthesis report

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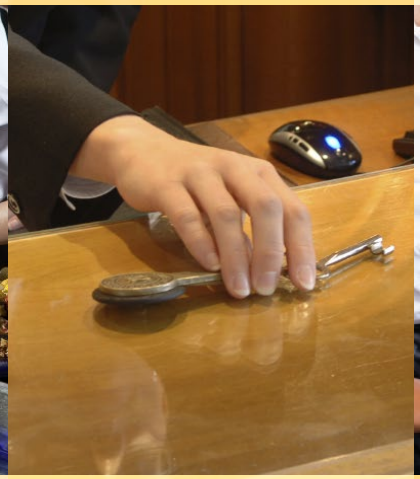


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Executive Summary

What is UPSKILL Health?

UPSKILL Health was a research project designed to explore the relationship of literacy and essential skills (LES) — such as numeracy, document use, and oral communication — with health and performance, using data from a large, rigorous intervention study. The original UPSKILL trial tested the effectiveness of workplace-based LES training for employees in the tourism accommodations sector. While health was one of many outcomes of interest in UPSKILL, this was studied in much greater depth in UPSKILL Health.

The Social Research and Demonstration Corporation (SRDC) is the Canadian non-profit research organization that developed and managed both UPSKILL and UPSKILL Health. Funding for UPSKILL was provided by Employment and Social Development Canada; UPSKILL Health was funded by the Public Health Agency of Canada.

Why was this study needed?

While most Canadians are able to read, research shows that almost half have literacy and essential skills (LES) such as numeracy and document use that are below levels needed to engage in a knowledge-based economy. For instance, many Canadian workers have LES levels that do not equip them to meet the typical skill demands of their jobs. Since education and literacy can greatly influence health, this means workers with low levels of LES may be vulnerable to poorer health outcomes than those with higher skills.

Most of the research in this area is theoretical, however, and does not test interventions that might improve population health. UPSKILL Health aimed to develop a conceptual model of LES and health, test that model empirically with UPSKILL data, and refine it with new qualitative data.

What does this document do?

This report is the final deliverable for the UPSKILL Health project. It synthesizes the main findings from all study components: an extensive review of the research literature, the development and testing of a conceptual model, an analysis of quantitative UPSKILL data, and focus groups and interviews with a sample of UPSKILL participants and trainers. In addition to highlighting the study's results, this report also outlines the implications of UPSKILL Health for policy, research, and practice.

What were the main findings?

The original UPSKILL trial yielded little evidence of *direct health* effects from workplace LES training, likely because of the time frame of the study and the measures used. Nevertheless, the training had clear impacts on many factors that, when analyzed in the UPSKILL Health study, were found to be associated with either mental health, or more modestly, physical health.

On this basis, UPSKILL Health has identified three ways in which LES training can have beneficial effects for workers' health, mental health, and job performance:

1. by affecting their **psychosocial capital** or assets such as self-confidence, resilience, and trust in others;
2. by influencing their ability to understand and use health-related information (**health literacy**), such as about safe work practices; and
3. through **work stress** caused when workers perceive their skills as too limited to deal with the demands of their jobs.

In terms of job performance, UPSKILL Health found that workers' mental health and reduced work stress were associated with better communication, teamwork, and/or reduced absenteeism. Workers with high work stress or low self-efficacy prior to LES training experienced greater job performance benefits. Many workers described feeling more confident interacting with colleagues and hotel guests following training, and reported using a greater range of coping strategies to deal with job-related challenges.

Finally, UPSKILL Health found that a reduction in employees' work stress was related to positive business outcomes such as revenue, productivity, absenteeism and staff costs. Likewise, workers' self-esteem was found to be important for business outcomes.

Why is this study important?

UPSKILL Health has made several important contributions to the understanding of LES and health.

For employers, UPSKILL Health underscores the message that mental health matters — to workers and the bottom line. Study results suggest that LES training can have many benefits for workers, including mental health. Even small investments in training can have big payoffs in terms of workers' job satisfaction, reduced stress, improved performance, and reduced business costs. Vulnerable workers and firms with a breadth of business needs may benefit even more from training.

For LES trainers, UPSKILL Health provides evidence that workplace LES training can have a wide range of direct and indirect benefits, including for physical and mental health. It is possible these benefits could be enhanced if curricula were designed to include specific health content, actively promote skills use and practice, and teach workers a wide range of coping strategies.

For policy makers, UPSKILL Health provides additional justification to evaluate the health and related psychosocial outcomes of non-health interventions such as training. The workplace has been shown to offer a unique opportunity to promote population health, particularly through strategies that support workers' capabilities.

Future research should build on UPSKILL Health by collecting more in-depth health data, even for non-health interventions. More research is needed on possible spillover effects of LES training on family health, on *how* LES can reduce work stress, and on better tools to measure health literacy.

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1. Introduction

While most Canadians are able to read, research shows that almost half have limited literacy and essential skills (LES) such as numeracy, document use, and oral communication.[1] The issue affects not only the unemployed; 75 per cent of Canadians with low LES are employed at some point during the year (Canadian Council on Learning, 2008), which means many do not have the skills to meet the minimum performance standards of their jobs.

Not only are literacy and education acknowledged to be social determinants of health, but there is an inverse relationship in Canada between industries that invest in LES training and those that require high levels of health and safety (Conference Board of Canada, 2008). This means workers who need training most are least likely to receive it. Given the increasing prevalence of workplace mental health problems,[2] workers with low levels of LES may be at greater risk of poorer mental health as well as physical health outcomes.

Most of the research in this area is theoretical, however, and does not empirically test interventions that might improve population health. Yet understanding how LES can affect health is fundamental to identifying ways to act on social determinants of health, including potential policy levers, programs and services, and workplace practices.

With support from the Public Health Agency of Canada, UPSKILL Health aimed to address many of these research gaps. This study set out to explore how LES are related to health and performance for workers and businesses. More particularly, UPSKILL Health sought to assess how workplace LES training can influence health and performance.

Defining literacy and essential skills

Literacy and essential skills (LES) refers to a set of foundational skills, upon which further learning — including development of technical skills — is based (ESDC, 2014). Through extensive research, nine essential skills have been identified and validated:

- Reading
- Writing
- Document Use
- Numeracy
- Computer Use
- Thinking
- Oral Communication
- Working with Others
- Continuous Learning

UPSKILL Health used the rich dataset from the original UPSKILL trial, which tested the effectiveness of workplace LES training for workers in the hotel sector. The original UPSKILL trial demonstrated clear benefits and a high return on investment from workplace LES training, but its results were somewhat ambiguous in terms of health. UPSKILL Health was able to take advantage of UPSKILL's comprehensive data set and rigorous research design to dig deeper into the question of how workers' health, LES, training, job performance, and business outcomes are related.

This document synthesizes the main findings from each of UPSKILL Health's lines of inquiry, places them in the context of existing research, and outlines the implications of the study for policy, research, and practice. In so doing, the document not only contributes new knowledge to address important research gaps, but it provides a good indication of how workplace interventions such as LES training can be enhanced to improve workers' health and performance, while also addressing important business outcomes.

1 According to Statistics Canada (2013), 49 per cent of adults function at Level 2 (of five) or lower on the International Adult Literacy Survey.

2 According to the Mental Health Commission of Canada, workplace mental health problems account for approximately 30 per cent of short- and long-term disability claims, and are rated one of the top three drivers of such claims by more than 80 per cent of Canadian employers. The annual productivity impact of mental illness in the workplace has been estimated to be over $6.4 billion (MHCC, 2013).

The UPSKILL trial

The original UPSKILL trial was designed and implemented by SRDC from 2010 to 2014 with support from the Office of Literacy and Essential Skills (OLES) at Employment and Social Development Canada (ESDC). Its objectives were to:

- measure the impacts of LES training on workers and workplaces;
- understand the pattern of impacts on different types of workers and firms;
- establish a clear business case for LES training by measuring the returns to workers and firms;
- describe the conditions in which LES training can be most successfully and strategically implemented.

The UPSKILL trial focused on four occupations in the tourism accommodations sector. The LES training intervention was based on industry certification and occupational standards for these positions and was customized to the skills and business needs of participating employers.

In total, 88 firms (hotels) with 1,438 workers from eight provinces participated in the UPSKILL trial. Participating firms were randomly assigned to either the program group or the control group, and training was delivered to the program group. Data was collected at least twice during the UPSKILL trial to obtain pre- and post-intervention information to generate repeated measurements of literacy, skills, performance, health, workplace factors and various psychosocial characteristics of UPSKILL participants, as well as employer data on workplace characteristics, organizational needs, and changes in employee performance and business outcomes.

The UPSKILL trial results showed that even modest investments in workplace LES training can translate into substantial gains in skills and job performance of workers with accompanying increases in employment and earnings. Training also produced a wide range of improvements in business outcomes, including increased job retention, productivity gains, and costs savings from reduced errors and waste. Participating firms ultimately realized an average return on their training investments of 23 per cent within the first year alone.

2. Methods

Objectives

The specific objectives of UPSKILL Health were to:

- enhance conceptual understanding of how literacy skills and other factors can influence workers' physical and mental health;
- measure the effect of workplace literacy and essential skills (LES) training, personal traits of workers, and characteristics of the workplace on worker health;
- measure the influence of worker health on job and organizational performance; and
- examine differences/inequities in health and performance outcomes experienced by selected subgroups of workers such as immigrants and women.

Approach

UPSKILL Health used a mixed methods approach[3] that involved quantitative and qualitative inquiry and a literature review to achieve these objectives. The development of a comprehensive conceptual model, the explicit focus of the quantitative analysis on health, and the addition of a qualitative component considerably deepened and extended the already substantial contribution of the original UPSKILL trial. Figure 1 on the next page illustrates the connection between the two studies.

Whereas the UPSKILL trial was designed to test the effectiveness and value of a particular intervention, UPSKILL Health was an exploratory study designed to guide future thinking about the development of policy and interventions to improve health in a workplace context. In other words, UPSKILL Health focused on *developing* hypotheses about relationships among different variables, and empirically *testing* them, using UPSKILL's rigorous research design and datasets with unprecedented breadth and detail on a range of health, psychosocial, and performance indicators. UPSKILL Health's mixed-method approach allowed the research team to refine and nuance these hypotheses as the project progressed and further insights emerged.

Consistent with this exploratory approach, UPSKILL Health used a different standard or threshold for analysis than would be used in a confirmatory study. Looking for a wide set of relationships within a large and comprehensive dataset meant the team chose to focus on relationships with the highest correlations, even if those correlations may not have been defined as strong by standards that apply to other types of studies.

Likewise, the qualitative analysis looked at both how participants *explicitly* described and linked different aspects of their experience at work — especially LES training — and the *implicit* meaning we as researchers ascribed to those experiences. An example of this is our analysis of the participants' coping strategies, which they seldom described in the same terms as the typology we used for the analysis.

Where the results of the qualitative analysis reinforced those of the quantitative analysis, those associations are described as particularly strong, consistent with mixed methods methodology. These associations represent the most promising avenues for further analysis, development, and testing.

Literature review and conceptual model

UPSKILL Health began by reviewing the research literature on adult learning and literacy, health, and employment. The results of the literature review informed the development of a conceptual model to illustrate how individual and workplace factors — and interventions such as LES training — could in theory affect workers' physical and mental health, as well as job and firm performance. A targeted search of academic and grey literature also provided an overview of similar programs to UPSKILL in both Canadian and international contexts, their structures, goals and outcomes.

3 UPSKILL Health used a sequential, exploratory research design, meaning that it followed the original UPSKILL trial, and its qualitative component was implemented and analyzed after much of the quantitative analysis had been completed. While the qualitative component of UPSKILL Health contributed to the objectives of the overall study, it focused particularly on how participants coped with limited LES and the perceived effects of LES training on their work and health. For these questions, the results of both components were analyzed together, to develop the integrated knowledge synthesis presented in this report.

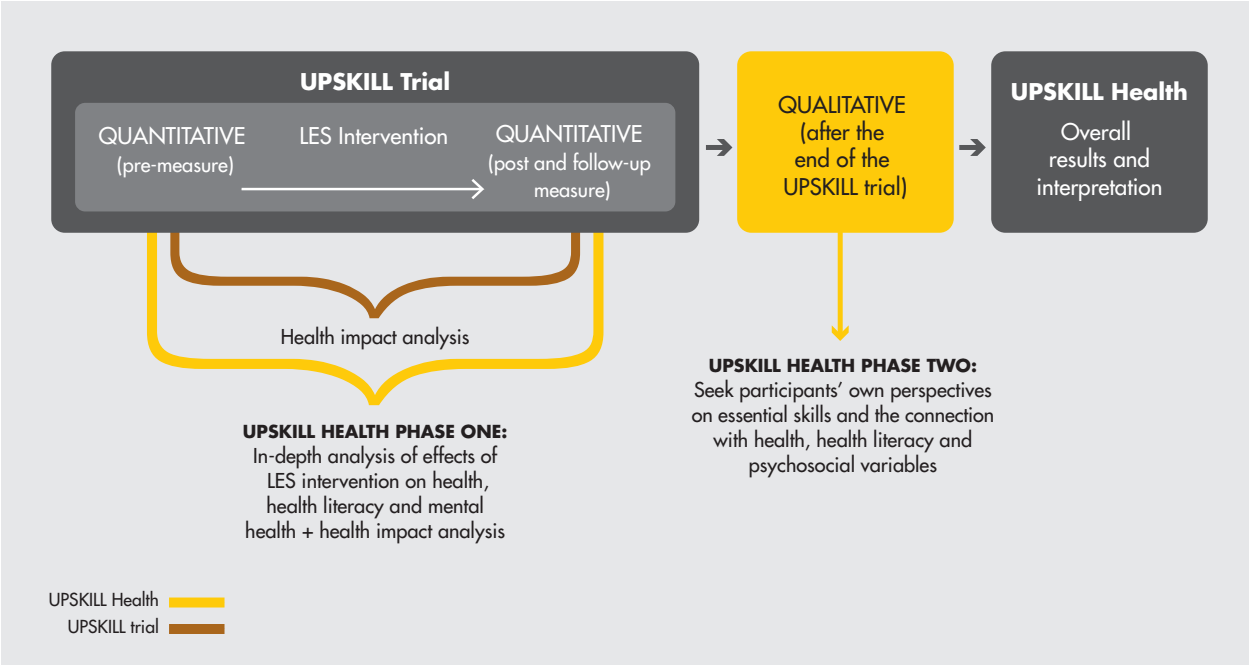

Figure 1 Links between the UPSKILL trial and UPSKILL Health

Once the conceptual model was developed, the empirical work for UPSKILL Health began, which was divided into two phases: (1) secondary analysis of UPSKILL trial data, focusing specifically on health; and (2) gathering new qualitative data from selected participants in the UPSKILL trial. Both components were approved by the Health Canada and Public Health Agency of Canada Research Ethics Board.

Quantitative component

UPSKILL Health was able to take advantage of the UPSKILL trial's experimental design and expansive data set,[4] with over 1400 workers and 88 firms. The quantitative methods employed included:

- **Correlations** to test what variables were related to each other and should be included in regression analyses. Correlational analysis was also used to estimate the relationship between workers' health on business outcomes, as the small firm-level sample size prevented a more direct estimation of effects. The correlations used workers' baseline and follow-up survey data, as well as employer surveys conducted post-training.
- **Regressions** to test the most promising relationships of factors influencing workers' health and job performance. Regressions explored the relationships among personal characteristics (including LES), workplace factors, and workers' physical and mental health, as well as the potential mediating effects of psychosocial variables, health literacy and safe work practices, and work stress. Regressions were also used to estimate the *direct* effects of health on job performance, and potential *mediating* effects of psychosocial variables and work stress. Regressions used data from UPSKILL workers' baseline surveys.
- **Difference-in-difference (DID)** regression analysis to identify differences in impacts[5] among sub-groups of UPSKILL participants. Differential impacts of the LES training for specific sub-groups related to immigration and gender were assessed, as well as other possible moderators of the program for

4 UPSKILL's data collection involved at least two waves of pre- and post-intervention assessments of Essentials Skills (TOWES), job performance measures linked with National Occupational Standards (NOS), participant surveys covering a rich set of labour market, socio-demographic, and psychosocial indicators of health and well-being, along with firm-level data on business outcomes. For a complete description of UPSKILL data sources, see Gyarmati et al. (2014).

5 That is, the differences from baseline to follow-up, comparing those UPSKILL participants who received the LES training (the program group) and those who did not (the control group).

job performance (work stress, self-efficacy). The DID analysis used data from both the baseline and follow-up survey completed by UPSKILL workers. Unlike the other analyses, the experimental design of the UPSKILL trial permits consideration of causal relationships in the sub-group analyses.

Qualitative component

UPSKILL Health also gathered new qualitative data to further the objectives of the project. Qualitative methods included:

- **Key informant interviews** with LES trainers on the role of LES in daily activities (both at work and home), and in relation to health literacy and health outcomes. LES trainers were also asked about perceived effects of the LES training on participants, in terms of both what they observed and what participants may have shared with them in a general way, especially in terms of coping strategies. While participants' perspectives were prioritized, the interviews with trainers helped the research team prepare for the focus groups and understand the ways in which health and other variables may have affected the take-up and observed outcomes of LES training for UPSKILL trial participants, as well as the influence of training context.
- **Focus groups** with a sample of UPSKILL participants in British Columbia and Ontario who had received LES training. These groups were designed to seek participants' perspectives on how LES influenced their daily lives and work, especially with regard to health. The focus group protocol included questions that encouraged participants to share their experiences of the training, and its potential effects on their work and their health, both generally and in terms of work stress and job satisfaction.

What this study doesn't do

- UPSKILL Health did not evaluate whether or not poor physical or mental health outcomes *cause* poor job performance. Rather, this study examined trends and associations among health and performance.
- UPSKILL Health did not compare the effectiveness of UPSKILL's LES training to other interventions, such as other types of training or workplace wellness programs.
- UPSKILL Health did not evaluate the monetary benefits of investing in programs that target work stress, or other mental health promotion programs.

Challenges and limitations

Every research study has its limitations, and UPSKILL Health was no exception. The following are a few of the challenges encountered in the course of the study, and their implications.

- **External validity** — The extent to which UPSKILL Health results can be generalized to other occupations and sectors is somewhat limited, since decisions about which sector, hotels, and workers were invited to participate in the original UPSKILL trial were made deliberately[6] and not at random. Nevertheless, UPSKILL used an extremely rigorous research design that randomly assigned firms to either receive the intervention or not. This means that where impacts were detected, these can be confidently attributed to the training as opposed to other

6 On the basis of expressed interest, readiness and capacity, and perceived needs. It is important to note that all hotel managers and workers provided informed consent to participate, and had the right to withdraw from the study at any time.

factors. Generalization of results from both the UPSKILL trial and UPSKILL Health may be particularly appropriate for industries that share similar characteristics with the hotel sector, such as restaurants and retail.

- **Statistical power** — Despite the large data set available through the UPSKILL trial, some of the UPSKILL Health analyses had limited statistical power to detect effects, largely due to the complexity and comprehensiveness of the models. The research team tested a series of relationships that included multiple variables, and as a result, missing data quickly reduced sample sizes. As a result, the strength of some relationships has likely been under-estimated, and others weren't detected that might have appeared if analyzed differently, or in other contexts.
- **Secondary study** — While the UPSKILL data set was extensive, that study was not purpose-built to study health. Consequently, it did not have either the long-term time frame or the variety of robust health measures (e.g., on pre-existing chronic diseases or other conditions, health behaviors, access to services) that would have allowed exploration of a greater variety of health outcomes. The secondary nature of the UPSKILL Health study also meant that some UPSKILL participants had difficulty understanding the relevance of questions about health on either the UPSKILL surveys or in the UPSKILL Health focus groups. This resulted in some missing survey data (which in turn reduced sample sizes for some analyses), and at times, limited discussion in focus groups.
- **Focus group challenges** — The UPSKILL Health team encountered a number of logistical challenges organizing the focus groups, mostly due to the time that had passed since the original UPSKILL trial — in some cases, as much as two and a half years. Several participants had difficulty recalling their experiences in UPSKILL and differentiating them from other training they had received. It is also possible that some participants with limited language skills may not have felt fully comfortable expressing themselves in a group. Participation among housekeepers — the largest occupational category of UPSKILL participants — was also somewhat limited. This group may have been more willing to participate if there had been time to develop onsite contacts with a 'champion' who could vouch for the credibility of the study.

Despite these challenges, the results and conclusions emerging from UPSKILL Health are grounded in an extensive review of the research literature and rigorous analysis of diverse variables related to health, LES and job performance. The study presents a thorough examination of how LES is related to health, by what means or mechanisms, and in relation to what other factors. While a purpose-built study would have been able to explore health effects in greater depth, UPSKILL Health has the advantage of breadth, in having included a range of psychosocial, human capital, and social capital variables, as well as intermediary mechanisms such as health literacy and health practices, and outcomes for both workers and firms.

3. Results

This section synthesizes what was learned from the research literature, from applying UPSKILL data to the conceptual model, and from speaking with a sample of UPSKILL trainers and participants. Only statistically and qualitatively significant results are presented here, and in summary form. More detailed results and citations can be found in the technical reports on each of these components (SRDC, 2015; Smith Fowler, Mák, Brennan, Hui, & Gyarmati, 2015; Smith Fowler, Leonard, Brennan, & Mák, 2015).

How is LES related to workers' health?

According to the research literature, there are two main ways in which adult learning — and by extension, literacy and essential skills — have been shown to influence health:

- One channel of influence is through *health behaviors* such as smoking, drinking, and exercise and safe work practices. More learning is generally associated with healthier behaviors and, in turn, with better physical and mental health.
- Another channel of influence is through *health literacy*, which is defined as the ability to understand, evaluate, and act on health information in spoken, written, and visual formats (Zarcadoolas, Pleasant, & Greer, 2006). There is considerable evidence that health literacy is associated with better health outcomes such as knowledge about health service use and physical health, as well as health indicators such as fewer hospitalizations. LES are thought to be foundational to health literacy.

While both channels may act separately, they are often linked, such that high levels of health literacy lead to healthy behaviors and good physical health. In a workplace context, for instance, higher reading and document use skills can improve one's ability to interpret and apply workplace health and safety regulations. These skills may also result in greater awareness of and advocacy for workplace safety rights and/or better communication with health and safety officials.

A third, less studied channel of influence of LES on health is related to *psychosocial factors* of both the individual (such as resilience and motivation) and the workplace (such as through job demands, control, and reward or recognition). Researchers have theorized that health outcomes can be associated with psychosocial factors such as self-esteem, self-efficacy, and resilience,[7] but the link to adult learning or LES has not been empirically demonstrated.

In terms of the relationship between health and job performance, recent research shows that workers' poor physical and mental health has substantial costs for firms. These costs consist not only of disability claims but also diminished productivity due to absenteeism and a host of issues related to presenteeism,[8] such as fatigue, errors, diminished interest in work, and withdrawal from colleagues. While LES can obviously have a direct effect on job performance,[9] to our knowledge, the UPSKILL trial and UPSKILL Health are the first studies to examine the role of health in this relationship.

The three channels described above — health behaviors, health literacy, and psychosocial factors — were incorporated into the conceptual model for UPSKILL Health to help explain how LES relates to health in general, and specifically, how an intervention such as LES training might improve workers' health and job performance. Health was defined in terms of both physical and mental health, and business outcomes were also included to enhance the analysis of performance.

7 While all these constructs have multiple definitions, elements, and manifestations, self-esteem is commonly understood to involve the experience of being capable of meeting life's challenges and being worthy of happiness (Reasoner, 2010); self-efficacy is the strength of belief in one's own ability to complete tasks and reach goals (Bandura, 1997); and resilience is the process of adapting well in the face of adversity (APA, 2015).

8 Presenteeism is defined as working while unwell.

9 Measuring this was one of the main goals of the original UPSKILL trial.

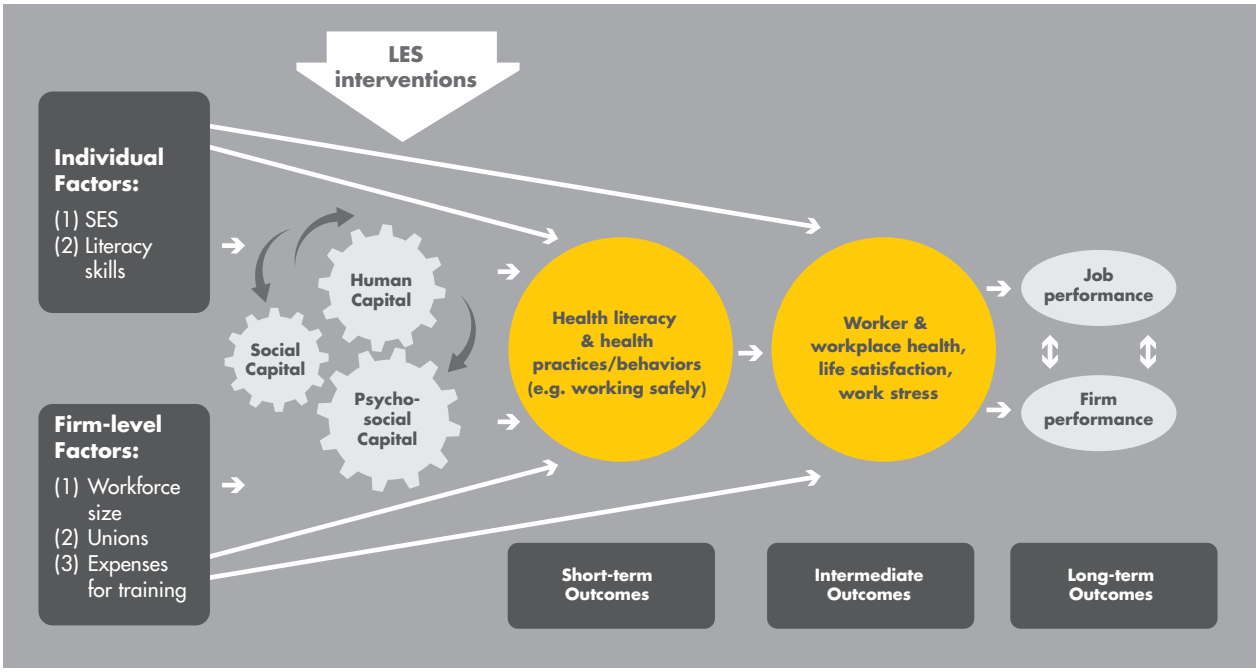

Figure 2 Conceptual model of Worker/Workplace Health

As seen in Figure 2, the UPSKILL Health conceptual model also includes (at the far left hand side) worker and workplace factors identified in the literature as potentially affecting worker's physical or mental health. These health determinants include individual socio-demographic, lifecycle, human capital (including LES), psychosocial, contextual and employment characteristics, along with characteristics of the firm such as size and working conditions.

The LES training intervention (the arrow at the top of the diagram) is understood to achieve its effects primarily by enhancing human capital or learning (in this case, literacy and essential skills), but also by building psychological capital (e.g., confidence, motivation) and social capital (e.g., relationships and trust).

The middle part of the model specifies the main channels by which changes in workplace health and workplace mental health are thought to occur, particularly through the influence of health literacy and behaviors related to safety at work.

The right hand side of the model illustrates outcomes, and shows how worker and workplace health can enhance job performance and business outcomes.

How are personal traits and workplace characteristics related to workers' health?

UPSKILL Health results generally supported the research literature in terms of associations with mental health, physical health, and health literacy/health behaviors.

PERSONAL TRAITS

- First, workers' psychosocial capital was associated with mental health,[10] especially self-esteem, self-efficacy, resilience, and to a lesser degree, motivation and engagement. Although there are associations in the literature between socio-demographic characteristics (i.e., income-level, education, gender, and immigration status) and mental health, we did not find any, with the exception of age (i.e., being older), possibly due to measurement issues.
- Psychosocial variables such as self-efficacy and resilience were also associated with physical health, although not as strongly as mental health. The size of workers' social networks, motivation and engagement, age, and education were also modestly associated with physical health.
- Socio-demographic variables, LES levels, psychological capital, and social capital were all associated with health literacy. The most important of these were resilience, self-efficacy, motivation and engagement, and attitudes to learning, but social capital, income and education were also significantly related.
- In turn, health literacy was associated with better mental health, although mechanisms to explain this association are unclear at this point. Health literacy was also associated with better physical health, along with literacy and confidence in one's literacy.

WORKPLACE CHARACTERISTICS

- Work stress and quality of work life were strongly associated with mental health. Other workplace characteristics such as control over one's work, working conditions and work-home satisfaction presented important associations with mental health, life satisfaction, work stress, and quality of work life.
- Associations between workplace characteristics and physical health were present, but very modest. However, workers who had a higher level of health literacy also had safer work practices, which were in turn positively associated with workforce size and the proportion of employees enrolled in a union.

How does LES training influence health?

Overall, the results of our analysis fit the conceptual model quite well, and in fact, expanded our understanding in several areas. As noted above, the research literature indicates that LES improvements have health effects primarily through health literacy and health behaviors. Other potential channels of influence — such as psychosocial factors — have been underexplored to date. UPSKILL Health results confirmed the influence of health literacy and health behaviors, but also provided new insights into the role of psychosocial capital and work stress. We discuss each of these channels in turn, below.

Channel 1: Increased health literacy and potentially healthier behaviors in the workplace

The original UPSKILL trial demonstrated that LES training had the expected positive effect on health literacy and safe work practices. In particular, training participants had significantly higher increases in confidence utilizing health information and social supports to manage their health, compared to the control group. Participants were also 12 percentage points more likely to surpass national standards for safe working practices following LES training.

UPSKILL Health provided more detail about these relationships. The study showed that the improvements in health literacy and safe work practices were associated particularly with better numeracy, as well as document use.

- In particular, both knowledge of safety and emergency procedures and awareness of safe work practices improved following LES training. In focus groups, front desk agents reported being more aware of protocols for emergency preparedness, and several participants — mostly housekeepers — said they were more careful about handling cleaning supplies, and using protective equipment such as gloves.

10 As measured by the Mental Health Composite Score of the SF-12. This is a short measure of mental health status and activity limitation, based on self-report.

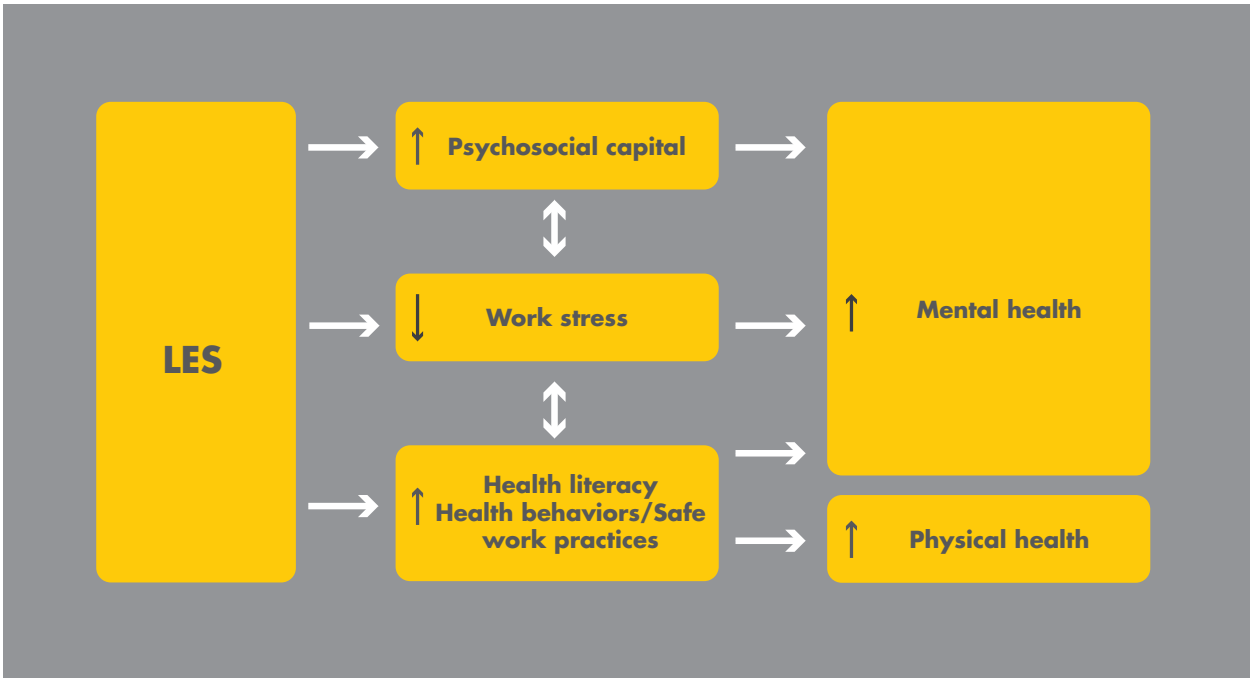

Figure 3 Channels by which LES training influences workers' health

> *"We talked about chemicals and personal protective equipment… They showed us that we have to care."* (Housekeeper)

- In addition, health literacy, numeracy, document use, and self-efficacy were all related to safe work practices. This confers a potential role for LES training to improve physical health through safer behaviors in the workplace.

In turn, health literacy was moderately correlated to mental health, and to a lesser degree with physical health. Unfortunately, the original UPSKILL trial did not include sufficient data about health conditions and work-related injuries that would have allowed us to further explore the relationship between improved safe work practices and physical health.

Channel 2: Psychosocial capital

In different ways, both the original UPSKILL trial and UPSKILL Health showed that LES training had a positive impact on psychosocial variables.

UPSKILL trial analyses demonstrated that, when compared to the control group, training participants showed higher levels of both general self-efficacy (such as confidence in their ability to solve problems), as well as increased confidence utilizing specific essential skills in work-related tasks; positive impacts ranged from 5 to 12 percentage points. Furthermore, training participants showed higher levels of trust and increased motivation and engagement with colleagues in the workplace.

Participants in UPSKILL Health focus groups — again, front desk agents and housekeepers in particular — frequently mentioned improved self-confidence as a benefit of training, especially in terms of communicating with colleagues and guests. Trust and bonding among employees also improved.

> *"People that took [UPSKILL] seemed to have a better relationship than new people who came in after the course was offered. I can tell the difference between the groups. The new group talks a lot more behind your back, rather than going to the person involved. A big part of training was about talking to each other, which is very important in the restaurant industry."* (Food and beverage server)

Several employees reported that LES training had improved their job satisfaction and motivation at work. These participants commented that UPSKILL had re-engaged them at work by giving them an opportunity to work through conflict, and an "outlet" to discuss problems and to work collectively toward solutions.

As noted earlier, UPSKILL Health's quantitative analysis showed that a number of psychosocial variables — notably, self-efficacy, self-esteem, and motivation and engagement at work — were related to mental health. This analysis suggests that by producing positive impacts on psychosocial variables, LES training could be expected to yield mental health benefits in the longer term or with more sensitive measures.

Channel 3: Reduction in work stress

In the original UPSKILL trial, participants who undertook the LES training reported a substantial reduction in work stress compared to those in the control group. LES training resulted in about a 25 percentage point reduction in the incidence of participants reporting work-related stress, which they attributed to UPSKILL. As noted above, UPSKILL Health's quantitative analysis established a strong association between work stress and mental health, which suggests that LES training and other interventions could have potential benefits for workers' mental health to the extent they help alleviate work stress.

One of the unique contributions of UPSKILL Health was to explore the ways in which participants in each occupation identified and described the specific challenges they encountered as a result of having low levels of LES in their jobs, and how work stress affected their mental health.

Many focus group participants noted that challenges related to having limited LES at work affected how they performed their jobs. They described how, prior to LES training, they were "*inefficient*", "*running around*", or doing "*unnecessary work*". Moreover, they described these situations as extremely stressful, and that this had negative effects on their performance at work. Employees from larger hotels (i.e., with more than 200 employees), women, and housekeepers were more likely to report stress than their counterparts.

Moreover, about three-quarters of the focus group participants identified some type of change related to their health after LES training, mostly through better management of stress at work.

> *"My health has improved because my job pressure has reduced."* (Food and beverage server)

> *"Before, we had no confidence. After, we have more confidence for work. Before, we have stress, we have tension, everything."* (Housekeeper)

How is health related to workers' job performance?

PHYSICAL HEALTH

The UPSKILL Health research team hypothesized that physical health would be associated with various aspects of job performance such as productivity and absenteeism, as suggested in the literature. However, the quantitative analysis found only one significant association: between physical health and absenteeism. Moreover, this connection was not made by participants in any of the focus groups discussions.

The lack of results in this area does not mean that physical health is unimportant for job performance. The vast majority of UPSKILL participants were working at the time they completed the surveys and can therefore be assumed to have had relatively good health. This "healthy worker effect" means there were not enough study participants in poor physical health to serve as a comparison, or to provide in-depth information about their circumstances and experiences. Understanding the link between physical health and performance would likely be more feasible with research that focused on a sector with greater demands on physical health, or with more data on injury and chronic health conditions.

MENTAL HEALTH AND WORK STRESS

Results from the UPSKILL Health analysis of mental health and job performance were more robust.

- Mental health was modestly linked to more effective teamwork and better functional communication (i.e., workers' ability to meet national occupational standards in engaging effectively with customers and workplace colleagues).[11] Reduced work stress was likewise associated with better communication.

> *"Training helped [me] to not be so stressed out… Before, [it was] stressful, [I was] running around, looking for people. After the training [I was] more polite, more patient, calm."*
> (Food and beverage server)

- Both mental health and work stress were associated with a decrease in self-reported absenteeism.
- Mental health was also associated with several other variables that were themselves associated with aspects of job performance. For example, positive attitudes to learning were associated with knowledge of safe work practices, working safely and effective teamwork. Likewise, higher life satisfaction was also associated with effective teamwork.

LES TRAINING

As seen in the previous sections, one of the main findings of UPSKILL Health was that LES training influenced workers' health *indirectly*,[12] by affecting intermediary factors that were, in turn, related to health. These intermediary factors include health literacy and safe work practices, psychosocial capital, and work stress. Given these indirect effects, UPSKILL Health researchers went back to the analysis of LES training outcomes to look at health-related elements of job performance.

- Improvements in numeracy were strongly associated with meeting national occupational standards for knowledge of safety and emergency preparedness procedures.
- Document use was strongly associated with working safely, again, in accordance with national occupational standards.

11 Communication was assessed in accordance to national occupational standards established by Canadian Tourism industry associations.

12 Though it is possible that direct effects might have been detected with a longer timeframe, additional health measures that were more sensitive to change, or a study population with more variability in health status.

These results are consistent with the findings from the qualitative analysis regarding the influence of LES training on health literacy, particularly in terms of helping workers understand the importance of safety procedures, and learn how to implement them in their work. When these procedures are important elements of job performance, it stands to reason that improvements in LES would in turn help workers do their jobs better.

The UPSKILL Health focus groups also allowed us to look at *how* LES training influenced other aspects job performance. We found these to be primarily related to reduced work stress, echoing — but also extending — the findings from the quantitative analysis.

- As noted earlier, when focus group participants described the kinds of challenging situations they encountered in the workplace regarding LES, these situations generally concerned numeracy, critical thinking, oral communication and working with others. Workers talked about how the LES training they took helped them learn new communication tools, which helped them interact more effectively with guests. They described how this in turn reduced their stress.
- Likewise, focus group participants said they felt more confident as a result of the skills they had learned in training, and that this enabled them to bring about changes in their on-the-job attitudes and behaviors. Workers attributed this to having had a chance to gain relevant experience with a specific skill or task by practicing and observing it in the training environment, and/or to receiving positive reinforcement and feedback.

For the most part, however, we found that LES training influenced workers' work stress and job performance through *changes in coping strategies*. These refer to the variety of ways in which workers coped when facing a challenging situation related to limited LES, and their associated stress. We heard from many focus group participants that as a result of the strategies they learned in LES training, they were better able to simultaneously manage their stress-levels and improve their performance at work. Examples of these changes include the following:

- Participants who took the training changed the way they approached a given problem. For example, prior to UPSKILL asking for help was the most common strategy workers used, followed by trying to find the solution on their own. Workers also described using emotion-focused strategies such as avoiding a challenging situation (such as talking to guests), blaming themselves or others, or venting about a problem.
- After the LES training, participants reported using a broader range of problem-focused strategies such as logically analyzing the situation, evaluating the pros and cons of different options, and better planning.
- Changes in the pattern of emotion-oriented coping were also observed, with fewer participants describing situations in which they used strategies such as avoiding or disengaging from a challenging situation, and more re-framing or re-interpreting the problem in a positive fashion.
- *How* the LES training reduced work stress — in other words, the types of coping strategies workers used — differed by occupation group. For example, front desk agents told us they learned skills to deal more effectively with difficult guests, but kitchen staff found ways to deal with frequently changing group dynamics due to high turnover.

This overall improvement in positive or adaptive coping strategies could explain why the UPSKILL trial found improvements in many dimensions of job performance. Figure 4 illustrates the six key ways in which LES training decreased work stress for UPSKILL participants.

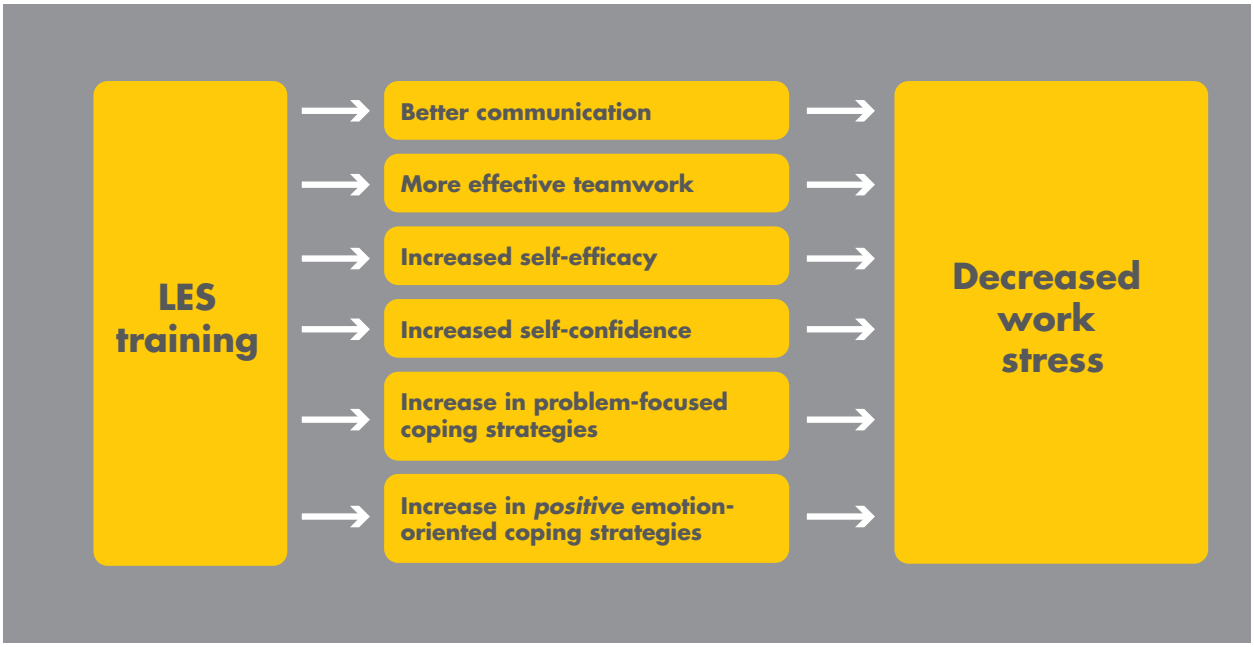

Figure 4 Mechanisms by which LES training decreased work stress

How is health related to business outcomes?

The in-depth analysis conducted in UPSKILL Health found several factors that had a positive influence on business outcomes for participating firms:

- Reducing work stress is important for business outcomes. In UPSKILL Health, we observed a significant association between low and declining work stress and positive business outcomes, including revenue, productivity, absenteeism, and labour costs.
- Workers' self-esteem is also important for business outcomes. Workers' self-esteem at follow-up was associated with positive changes in their job satisfaction and morale, their receptivity to new challenges, their desire for further training and certifications, their likelihood of staying with the firm (as reported by management), and better sales and upselling by servers.
- An unexpected finding was that the relationship between health literacy and business outcomes was not always positive or consistent, likely as a result of measurement issues.[13] In order to better understand the links between health literacy and business outcomes in future research, it will be important to develop measures that can capture participants' health in both work and non-work settings, and ideally, the perspective of employers as well.

Together, these results reaffirm the importance of psychosocial factors not only to workers' well-being, but also to firms' bottom line. They illustrate the important role that psychosocial factors can play, not only in achieving better business outcomes through enhanced job performance, but also in the influence the business environment may have on workers' experiences.

13 Not only is measurement of health literacy still very much an emerging field, but the measures developed for UPSKILL did not explicitly refer to the workplace context or align with business needs. Instead, they measured participants' ability to utilize health information, including outside the workplace. The negative correlation arises when the business had health and safety as a priority, but these expectations weren't fully met, even while LES training produced health literacy effects.

How did results differ for specific sub-groups?

We had limited opportunities to examine differences in program impacts among different subgroups, due to small sample sizes available (three-quarters of the UPSKILL sample was female, for example) and the logistical challenges experienced during qualitative data collection. Nonetheless, several interesting results did emerge:

- Quantitative findings suggest that men and women benefitted equally from the LES training with respect to most aspects of job performance, and health-related outcomes such as reduced work stress.
- Housekeepers — all of whom were women — were the least likely occupational group to report reductions in stress during the focus groups. In fact, a few housekeepers and food and beverage servers reported increased work stress due to training, as a result of the additional demands placed on their schedules without a corresponding adjustment in their workload. For example, housekeepers were still required to clean the same number of rooms during their shift, even if they had training that day.
- Although the UPSKILL trial determined that immigrants experienced larger skill and job performance improvements from LES training, UPSKILL Health analysis suggested they did not derive more health benefits than Canadian-born workers. Immigrants also tended to report less reduction in work stress. Future research should examine to what extent length of time since immigration could be a factor influencing health at work, given existing research showing that recent immigrants tend to have better health than the Canadian-born population.
- Workers' levels of work stress and self-efficacy at baseline were significantly associated with job performance gains, though not health impacts. Those who reported higher stress at baseline experienced greater impacts with regard to communication and teamwork than those who had lower stress. Similarly, workers who reported lower self-efficacy at baseline had significantly better job performance assessments at follow-up than those with higher self-efficacy.
- There were several differences in the use of coping strategies reported by different sub-groups in our focus group discussions. For example, while help-seeking strategies did not differ by gender, immigrant status, or unionized/non-unionized workplace, differences were found based on occupational role. For instance, front desk agents and food and beverage servers were much more likely to report approaching management for help compared to kitchen staff and housekeepers. This may be related to the higher LES and language skills in the first two occupational groups.
- Participants from small hotels (i.e., fewer than 50 employees) were also more likely to report seeking help from coworkers than those working at medium-sized or large hotels, implying that close relationships among employees at smaller hotels may be an important source of support for those coping with low levels of LES. However, the small number of participants in our qualitative sub-study makes us cautious to generalize these results.

4. Summary and discussion

The conceptual model developed by the UPSKILL Health study team incorporated a number of areas of research related to adult learning and health, and situated these in the workplace context. The result is a comprehensive model of LES, health, and job performance that incorporates pre-existing characteristics, intermediary factors, and outcomes for workers as well as firms. Empirical testing with data from the original UPSKILL trial generally supported the conceptual model, and results from UPSKILL Health's qualitative component provided considerable depth and nuance to this understanding in several areas, as described below.

How personal and workplace characteristics relate to health

Workers' personal characteristics — especially psychosocial capital such as self-esteem and resilience — were more strongly related to mental health than to physical health; likewise, work stress and quality of work life, along with other working conditions, appeared to influence workers' mental health more than their physical health.

A wide variety of workers' personal traits were also associated with health literacy, which in turn was strongly related to mental health. These results suggest that interventions to enhance workers' psychological and social capital could yield benefits for mental health. Interventions that combine with improvements in human capital (learning) and working conditions could have even more impact.

How LES training can influence health

Although the original UPSKILL trial found few direct effects of LES training on health, UPSKILL Health provided compelling evidence of *indirect* effects. This study's results provided important insights into the *channels of influence* by which LES training can affect health — for example, it confirmed that LES training influences workers' health by improving *health literacy and health behaviors* such as safe work practices.

Furthermore, UPSKILL Health highlighted the role of *psychosocial capital* as influencing the effect of LES training on health, which had been underexplored in the literature. Improved self-efficacy and self-esteem, for example, were shown in UPSKILL's quantitative analysis to be benefits of LES training. Likewise, in UPSKILL Health's focus groups, self-confidence was often cited by participants as an important benefit of training, along with improved job satisfaction and motivation at work. In turn, this study found all these variables to be significantly associated with mental health.

UPSKILL Health was also able to substantiate and explore the significant reduction in self-reported *work stress* found in UPSKILL among training participants, and to quantitatively and qualitatively establish a relationship between work stress and mental health. The majority of focus group participants, for instance, identified better management of stress at work as a key benefit of training.

Together, these results point to the value of interventions that act on intermediary factors that influence health in the longer-term, of which health literacy, psychosocial factors, and work stress appear to be most promising.

How health affects job performance

Contrary to expectations, UPSKILL Health showed little direct association between physical health and job performance except in terms of reduced absenteeism, though this may be due to the generally healthy status of the participants. Again, study results were more compelling in terms of mental health, which was strongly associated to improvements in absenteeism, communication, and teamwork, as well as other factors related to job performance (e.g., life satisfaction).

UPSKILL Health also found evidence of *indirect* relationships between health and job performance, such as through improved LES, health literacy and safe work practices. Housekeeping staff, for example, remarked on their improved knowledge of safety procedures and protocols, such as wearing protective equipment when using cleaning products.

A key contribution of UPSKILL Health's qualitative component was its examination of how LES training affected workers' health and work. Focus group participants noted improved communication skills, reduced work stress, and especially, *changes in coping strategies* to deal with stress associated with limited LES at work. In particular, they described using a broader range of adaptive coping strategies such as planning ahead to deal with challenges, which reduced their stress and in turn, improved their job performance.

How health relates to business outcomes

Though this analysis had limited statistical power, UPSKILL Health found evidence that employees' reduced work stress was associated with positive business outcomes such as revenue and productivity; workers' self-esteem was likewise associated with positive business outcomes. The role of health literacy in business outcomes was less clear, however, which suggests employers and workers might understand and value this concept differently. More research in this area is needed, as noted below.

Sub-group differences

This study found few sub-group differences in terms of health-related effects, implying that LES training may be beneficial for all workers. In terms of *indirect* benefits and job performance gains, however, workers who reported high work stress and/or low self-efficacy at baseline experienced greater impacts. Defining workers who are vulnerable to poorer health outcomes is important; a recent study by Smith (2015) identified these as younger workers, non-permanent employees, and those working in small workplaces as vulnerable groups. Identifying "vulnerable workers" has merit if it means workers have an opportunity to participate in potentially beneficial interventions without feeling targeted.

While there is more to learn about how certain groups derive benefit from interventions such as LES training, UPSKILL Health findings suggest training benefits are likely enhanced by strengthening sub-group ties (within occupational groups, for example).

Promising directions

Taken as a whole, UPSKILL Health findings reinforce the workplace as an important life domain for health, and an under-explored setting for health interventions. Both the UPSKILL trial and UPSKILL Health indicated benefits of workplace LES training for both workers *and businesses*. These benefits may extend to other workplace interventions that focus on enhancing workers' skills and capabilities and reducing work stress.

It seems clear that work stress is a critical influence, not only for workers' mental health and job performance, but also for business outcomes. Workplace interventions to reduce work stress are promising and should be seen as an investment for firms, as well as interventions promoting workers' self-efficacy. Interestingly, the LES training provided through UPSKILL enhanced workers' psychosocial capital and health literacy and reduced their work stress, while also enhancing their skills. De facto, it promoted positive mental health in the workplace, even if it was not itself a health intervention. This is in line with recent theoretical work in the field, which includes management practices and organizational development as important elements of an integrated approach to workplace mental health (LaMontagne, Martin, Page, Reavley, Noblet, Miner, Keegel, & Smith, 2014).

By influencing many important psychosocial and other determinants of health such as health literacy, LES training appears to have broad applicability and relevance for population health interventions. Findings from interventions similar to UPSKILL show the wide-ranging nature of reported training outcomes and underline the merit of taking a multi-dimensional and multi-level approach to designing, implementing and evaluating non-health workplace interventions.

Remaining research gaps

The comprehensive conceptual model developed in the UPSKILL Health study is a starting point for understanding the relationship among factors important to LES, health and performance. Ongoing refinement should focus on specific processes for improving physical and mental health, and incorporate the full spectrum of important worker-level characteristics, such as chronic health conditions, injuries, experience of stressful events and situations (e.g., stress at home), experience of distress, and health behaviors and practices.

Another important gap to address is determining how specific LES interventions can be developed for groups that may be vulnerable for poorer physical and mental health outcomes. UPSKILL Health identified that workers with higher work stress or low self-efficacy benefitted disproportionately from LES training. Further work to define vulnerability in relation to LES and physical and mental health outcomes could permit better targeting of interventions, if needed.

Further exploration of health literacy and its links with workers' characteristics (e.g., social capital, education) would help to better understand the *mechanisms* by which health literacy affects health, especially mental health. Better measures of health literacy are needed, especially those that are sensitive to context. In particular, considerable work needed to better define and understand health literacy in a workplace context, and to include the perspectives of employers as well as workers in assessing its relevance and value. This work should explicitly address mental health, and could examine health literacy in relation to workplace initiatives for mental health promotion and psychological safety at work.

Finally, UPSKILL Health has demonstrated the importance of evaluating the potential health effects of interventions *outside* the health sector, particularly those that are relevant to large segments of the population. While there is considerable research about the social determinants of health, knowledge about how to act on these in ways that will improve population health is sorely lacking. Workplace skills training holds considerable potential to achieve health outcomes at a population level. Testing modifications to training interventions that could enhance these outcomes is a clear next step.

5. Conclusions and implications

With its comprehensive, mixed methods and exploratory approach, UPSKILL Health fully met its goal to explore the relationship of LES to health and performance. The study has addressed existing research gaps by generating new evidence about how LES are related to health and performance, what factors influence this relationship, how, and for whom. By leveraging UPSKILL's rigorous research design and comprehensive dataset, UPSKILL Health has been able to explore these relationships conceptually and empirically, and examine the *effects* of workplace LES training on health and performance for workers and businesses. The qualitative component has added depth and nuance to these findings by providing an opportunity for participants to voice their own thoughts, opinions, and experiences.

Using data from employees and managers, UPSKILL Health brought together researchers, LES trainers/practitioners, and the Public Health Agency of Canada to better understand the connections between LES skills, job performance, and physical and mental health. Implications of the UPSKILL Health project for each of these sectors are outlined below, as well as some potential next steps in research to further develop knowledge on skills and health. While this discussion of implications is organized by sector/audience, there are clear points of connection — and potential overlap — among some of these observations. This suggests the value of efforts to work together across sectors to deepen and expand the evidence base, and to realize potential joint benefits from interventions such as LES training. In this respect, we feel UPSKILL Health has served its overall purpose, which was to guide future thinking about the development of policy and interventions to improve health in a workplace context.

Business

BENEFITS FOR EMPLOYERS OF LES TRAINING GO BEYOND IMPROVEMENTS IN LES SKILLS

From a business perspective, the UPSKILL trial demonstrated that LES training was an effective intervention with good return on investment — it improved workers' skills and these gains translated to better business outcomes. Both the UPSKILL trial and UPSKILL Health also demonstrated that investment in LES training led to many other gains in terms of workers' psychosocial capital and decreased work stress, which in turn were associated with improved job performance and business outcomes.

UPSKILL Health showed that psychosocial variables and work stress are both related to mental health. Recognizing that depression is the primary reason for absenteeism and increased costs for businesses (Wang, Beck, Berglund, McKenas, Pronk, Simon, & Kessler, 2004), innovative strategies to improve the well-being of employees should not be overlooked, including strategies that are not focused explicitly on health.

INVESTING IN EMPLOYEES' MANAGEMENT OF WORK STRESS

UPSKILL Health demonstrated that work stress is directly related to workplace characteristics, creating an opportunity for employers to improve the work environment of their employees. In addition to changing structural conditions of employment (e.g., working conditions, work-family arrangements), this study suggests that offering opportunities for employees to develop effective coping strategies to manage work stress will be beneficial. Further training to improve work stress management would increase both employees' productivity and well-being.

OTHER BUSINESSES MIGHT BENEFIT FROM LES TRAINING

The scale of the original UPSKILL trial and the scope of the LES training intervention make it reasonable to expect that businesses in sectors with similar employee populations as in tourism accommodations — particularly retail, catering and restaurants — could see results like those found in the UPSKILL trial and UPSKILL Health. However, UPSKILL Health results also suggest that *a broad range of businesses could benefit* from workplace LES training, insofar as they share similar business needs and skills-performance frameworks (e.g. how skills drive performance and business outcomes related to service provision, productivity, health and safety, and human resources). As with the UPSKILL trial, the specific curriculum of LES training interventions would have to be developed to meet the particular requirements and challenges of each sector and organization.

Skills training

LES PRACTITIONERS HAVE THE POTENTIAL TO HELP IMPROVE TRAINEES' HEALTH

LES trainers and curriculum developers should be aware that UPSKILL's LES training affected many factors related to physical and mental health, such as self-efficacy, resilience, social capital, and health literacy. Under the right circumstances, LES training might even be expected to affect health more immediately, if not directly (see below).

More importantly, UPSKILL Health results highlight the opportunity to design curricula and delivery methods that proactively enhance psychological and social capital, coping skills, and health literacy, including recognition of the stress involved in having low levels of LES. In the workplace, this could mean that employees are trained in occupational groups, and encouraged to practice new skills with each other, and to share and develop new coping strategies.

ENHANCE HEALTH LITERACY IN THE TRAINING CURRICULUM

There is no doubt that LES skill gains led to improvements in health literacy, which could potentially result in fewer physical injuries at work as well as stress reduction, as employees feel more confident reading, understanding, and using information that affects their health. To the extent that health literacy were to be explicitly incorporated into LES training curricula in the future — through both health content and developing specific related skills — these effects could be enhanced. While UPSKILL's training already included some elements of health literacy in the workplace (e.g., in relation to chemicals in cleaning products), workplace LES training curriculum could incorporate elements about workers' rights and awareness of corporate policies regarding health and safety. LES curricula could also incorporate health-related information and health literacy *outside* of the workplace. For example, reading, numeracy and document use exercises may include reading medication information, such as side effects and dosage instructions.

Incorporating health literacy considerations into LES training curriculum means that an equal focus needs to be on understanding, and *using* such information. Providing trainees with opportunities to practice their skills would reinforce skills acquisition in this area, as it did with LES more generally.

INCREASE FOCUS ON WORK STRESS REDUCTION

While improvements in *mental health* are not an explicit goal of workplace LES training, it would appear this is an area with considerable potential to improve workers' well-being and performance. In the same way that LES training focuses on developing strategies to improve and use LES skills, this could include a more explicit focus on adaptive ways to cope with the associated stress of limited LES, particularly in ways that promote social cohesion and connection. Providing employees with resources in case they need additional support may also be appropriate. In this vein, it may be beneficial to consider how LES training could combine with other skills development approaches such as mental health promotion and mental health literacy, to result in greater or more direct mental health outcomes.

Governments

SUPPORT STRATEGIES TO IMPROVE MENTAL HEALTH PROMOTION IN THE WORKPLACE

Mental health programs in the workplace often focus on mental illness prevention (e.g., detecting the signs of burnout, depression, anxiety), and directing employees to external professional resources if needed. However, programs that reinforce self-confidence and self-efficacy — such as through skills development — can also lead to better work experience through a reduction in the amount of stress experienced at work, better overall job satisfaction and better psychosocial outcomes.

EVALUATE OTHER NON-HEALTH INTERVENTIONS THAT HAVE POTENTIAL TO PROMOTE HEALTH

Non-health interventions such as UPSKILL's LES training had a significant effect on workers' stress reduction and other factors related to health, particularly mental health. UPSKILL Health showed that much of this was the result of better communication with teammates, managers and hotel guests, better teamwork, changes in participants' use of coping strategies, as well as an increase in self-efficacy and self-confidence, and safer work practices. In other words, a non-health intervention achieved substantial indirect effects on a number of areas known to influence health.

UPSKILL Health, therefore, provides additional justification for evaluating the health and related outcomes of non-health interventions. Other interventions that address workers' stress, coping strategies, and skills/capabilities could be valuable tools to decrease work stress and promote mental health.

SUPPORT MORE RESEARCH ON THE EFFECTS OF LES OUTSIDE OF WORK

UPSKILL Health has provided strong evidence that LES training has potential to generate a range of health-related and job performance benefits, and is therefore relevant to a number of different sectors and stakeholders. Indeed, we observed many impacts from LES training on various social determinants of physical and mental health. In the same way, workers' LES skill gains may be transferable to other life situations (e.g., increases in employability, involvement in civic life, health literacy at home). Future research that takes an intersectoral perspective is likely to be more comprehensive (and cost-efficient) than that which focuses on a single dimension or set of outcomes.

Although our exploration of such "spillover" effects was limited in UPSKILL Health, more research should focus on the potential for workplace interventions such as LES training — particularly those that involve improvements in skills, health literacy and work stress — to demonstrate benefits outside of work, such as at home with family. Focusing on the role of women as key health care decision makers in the family would be an important contribution in this area.

CONTINUE TO ENGAGE IN CROSS-SECTORAL RESEARCH INITIATIVES

Designing and implementing population-level, health intervention research will necessarily require a cross-sectoral, cross-departmental approach on the part of policy makers and funders. This collaboration can be cost-efficient — UPSKILL Health was able to capitalize on rigorous intervention research funded by another government department at a fraction of the cost of primary data collection. Moreover, this collaboration is essential to support research on effective ways to promote public and population health through action on social determinants such as training, education, and employment, given that many of the policy levers for influencing these determinants lie outside of the health sector.

Research

INCORPORATE PRIMARY COLLECTION OF MORE ROBUST HEALTH DATA

In the context of UPSKILL Health, where we explored the links between LES, physical and mental health and job performance, the use of a secondary data set was appropriate. It allowed the research team to identify key relationships not yet established in a Canadian context. However, a purpose-built health study — especially one with a longer timeframe — could include a greater number of health-related variables (e.g., chronic health conditions, injuries), and provide for a more in-depth analysis of direct and indirect health outcomes and changes over time. As well, primary data collection via a purpose built study would allow researchers to examine the causality of effects and confounding factors in particular (as in Marchand, Durand, Haines, & Harvey, 2014).

DEVELOP A THEORY THAT SPECIFICALLY LINKS LES AND WORK STRESS

Work stress is multi-dimensional and originates from different mechanisms related to both work factors (e.g., workplace harassment, task overload) and individual characteristics (e.g., self-confidence, personality traits, skill-levels). However, work stress that results from poor LES has not been extensively studied.

While UPSKILL Health allowed us to shed some light on how improvements in LES can decrease work stress through changes in coping strategies and better functional communication, a sensitive measure of work stress that considers skills has yet to be developed. Such a measure would enhance ability to adequately measure the work stress that results from limited LES, and any associated impacts on mental health.

DEFINE AND IDENTIFY VULNERABLE WORKERS

Given the wide range of impacts on psychosocial capital found in the UPSKILL trial, we expect that LES training may provide other, potentially stronger benefits for groups that could be considered vulnerable to workplace injury. On the basis of UPSKILL Health, this definition could be broadened to include workers with adverse mental health outcomes.

DEVELOP BETTER MEASURES OF HEALTH LITERACY IN A WORKPLACE CONTEXT

While health literacy in general has evolved as a concept and theory, its measurement is still in its infancy. There is not yet a validated health literacy measurement tool, and while there are screening tools, these are insufficient for the purposes of measuring change as a result of an intervention.

Given the gap identified regarding measurement of health literacy in the workplace, future research should also focus on the definition and measurement of health literacy in the workplace, and its links to physical and mental health outcomes. On the basis of UPSKILL Health, it would appear health literacy may operate differently in a workplace context, at least for employers; the question remains as to whether this implies differences in construct, and hence, the need for different tools to measure it and more targeted interventions to improve it.

DEVELOP AND TEST CUSTOMIZED SKILLS TRAINING

Now that UPSKILL Health has provided evidence of health-related benefits to workplace skills training, it raises the question as to whether greater effects could be derived from a skills training intervention that was deliberately designed with such goals in mind. Incorporating components to address work stress and mental health, coping, and social capital would be obvious candidates. Testing such an intervention in the context of a rigorous demonstration project would leverage the promise of both UPSKILL and UPSKILL Health.

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