How to Support Job Seekers? Evidence from Skill-Based Online Advice and Cognitive and Mindfulness Training[a]

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Preliminary and incomplete

Abstract

Job search is difficult, frustrating and many job seekers appear to search too narrowly. We provide job seekers with access to the job search platform *Job for You* and offer a random subset of them access to one of the following interventions addressing these challenges. The first intervention consists of occupation recommendations based on the job seeker's previous occupation profile. The second intervention consists of occupation recommendations that take into account the job seeker's measured skill profile. The aim of these two interventions is to provide individual suggestions for suitable occupations. The third intervention consists of cognitive and mindfulness online training to help organize the job search and deal with setbacks. Our randomized controlled trial consists of more than 1,850 participants at baseline. Preliminary results show that the interventions tend to increase the probability of finding a job, and these effects are substantial and statistically significant for the subgroup of men.

Keywords: Online job search, occupation recommendations, cognitive and mindfulness training

JEL Codes: J24, J62, J64

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1 Introduction

For most job seekers, finding a job requires an active search. Job seekers need to develop their own job search strategy, select the relevant information and deal with rejections. The literature shows that a common strategy is to look for jobs in the previous occupation (Belot *et al.*, 2018). At the same time, reasons for unemployment can be a mismatch between one's own skills and the previous occupation requirements or structural change that affects job opportunities. Such factors do not always make it a good strategy to return to the previous occupation.

In this study, we test the impact of individual online advice on where to apply and access to cognitive and mindfulness trainings on job search. The online advice consists of ten occupation recommendations consistent with the job seeker's profile. We define the profile in one treatment on the basis of the previous occupation requirements and in another treatment we take into account the skill profile that we measure in an online assessment. The goal is to encourage job seekers to engage in a comprehensive job search tailored to their profile. The cognitive and mindfulness online training aims to reduce stress and anxiety and increase well-being. These skills should help to organize the job search and cope with setbacks.

We create an online job search platform named *Job for You* (J4U), available in German and English. In a randomized controlled trial, we provide job seekers registered at the Public Employment Services in Switzerland access to the J4U platform's control job search interface and offer a random subset of them access to one of three interventions. In the *J4U1* intervention, job seekers receive occupation recommendations based on the overlap between the requirements of the search occupation and all available occupations. In the *J4U2* intervention, the recommendations are based on the overlap between a combination of the job seeker's measured skill profile and the requirements of the search occupation compared to all available occupations. In the *COG* intervention, job seekers receive invitations to cognitive and mindfulness online trainings. Both the COG group and the control group *CONT* have access to the J4U platform's control interface, which is a standard job search website displaying the vacancies of the entered search occupation.

Recruitment of study participants took place in collaboration with the Public Employment Services in the Swiss canton of Zurich between September 2022 and June 2023. Enrollment into the study was ongoing, and our sample consists of 1,852 enrolled job seekers assigned to a total of 34 cohorts defined by the week of enrollment. Job seekers were randomly allocated to one of the three treatment groups (J4U1, J4U2, COG) or the control group (CONT) with equal probability at the time of signing up on the J4U platform. Each

group consists of between 415 and 519 participants at baseline. The treatment and control groups are balanced regarding age, gender, education, country of birth, weeks of unemployment and unemployment benefit recipients, measured at baseline. As part of the study, we collect data from various surveys and the clicks on the J4U platform. In addition, we link the self-collected data with administrative data on personal characteristics and job search outcomes provided by the Swiss Federal Statistical Office and the Swiss State Secretariat for Economic Affairs. This allows us to measure our main outcomes of interest with high-quality data.

The intervention phase is twenty weeks from enrollment. At enrollment, each job seeker completes an online assessment of twelve skills, abilities and work styles that are important in many occupations, allow us to discriminate across occupations and are measurable online (Aschwanden *et al.*, 2023; Bächli *et al.*, 2024). On the J4U platform, the CONT and COG groups have access to the control job search interface and the J4U1 and J4U2 groups have access to the ten recommended occupations and the corresponding vacancies throughout the study period. In weeks 1–8, the CONT group and the two J4U groups receive a weekly job search survey with a reminder to use the J4U platform. The COG group receives two invitations per week to the online training courses. In weeks 9 and 10, all participants can update their skill profile by completing the online assessment again. In weeks 11–18, the same group-specific measures are carried out as in the first eight weeks, and in weeks 19 and 20 the skill profile can be updated again.

Preliminary results show that all three interventions tend to increase the probability of finding a job compared to the control group over a period of eight months after enrollment. For the subgroup of men, these effects are substantially larger and statistically significant for each of the intervention. We find that the J4U2 intervention increases the probability of finding an occupation other than the target occupation in the full sample, and these effects are driven by the subgroup of men. This is evidence that the J4U2 treatment indeed encourages job seekers to take into account new information into their search.

Job search is nowadays largely online (see Faberman and Kudlyak, 2016; Kircher, 2020, for an overview). This form of job search involves a growing number of information from which job seekers have to choose. A number of studies have conducted information experiments on existing public platforms in Denmark (Altmann *et al.*, 2022), France (Ben Dhia *et al.*, 2022; Bied *et al.*, 2023), U.K. (Belot *et al.*, 2018), Sweden (Barbanchon *et al.*, 2023). Our online platform J4U was developed specifically for the purpose of this study conducted in Switzerland and draws on the same pool of vacancies as the Swiss Public Employment Services.

Previous studies that provide occupation recommendations to job seekers are largely

based on past occupation choices or stated preferences. For example, the online advice provided by Belot *et al.* (2018) is based on actual occupation mobility data or on matrices from O*NET about transferable occupations. Similarly, Altmann *et al.* (2022) use actual occupational mobility data and Barbanchon *et al.* (2023) use clicks of job ads recorded on an online job search platform in their recommendation treatment. Finally, the approach by Bied *et al.* (2023) is based on Machine Learning. They look into the hiring probabilites by investigating hiring chances based on the job seekers' characteristica and the job postings and on the job seekers' search criteria as a proxy for preferences. While these studies implicitly take into account the likelihood of successful applications of workers with a similar profile, we know from the literature that there is considerable mismatch in the labor market (Şahin *et al.*, 2014). We address this by providing occupation recommendations based on the job seeker's skill profile that is not directly linked to past occupation and education choices in one of the interventions.

The potential effects of mindfulness training have been studied in various contexts such as academic performance (Cassar *et al.*, 2022), trust and pro-social behavior in investment games (Di Bartolomeo and Papa, 2016) or mental health of US adults (Shreekumar and Vautrey, 2024). In the work context, mindfulness training has become a common tool offered by many firms (Lyddy *et al.*, 2021). However, we are not aware of any study that has investigated the impact of mindfulness training on job seekers.

There are few studies that address the psychological and behavioral challenges of job search. For example, Abel *et al.* (2019) investigate in a field experiment how plan making affects job search behavior and job offers. Falk *et al.* (2006) study the role of imperfect information about relative ability in a laboratory experiment and conclude that self-confidence matters in search decisions such as on the labor market. Caliendo *et al.* (2015) find based on survey data that unemployed with an internal locus of control find a job faster than those with an external locus of control. In this study, we focus on the cognitive and mental challenges of job search by providing online training to improve cognitive and motivational-affective strategies to overcome discouragement and setbacks.

The remainder of the paper is structured as follows. Section 2 outlines how the study is set up. Section 3 provides information about the data, sample and the empirical method. Section 4 presents preliminary results and Section 5 concludes.

2 Study setup

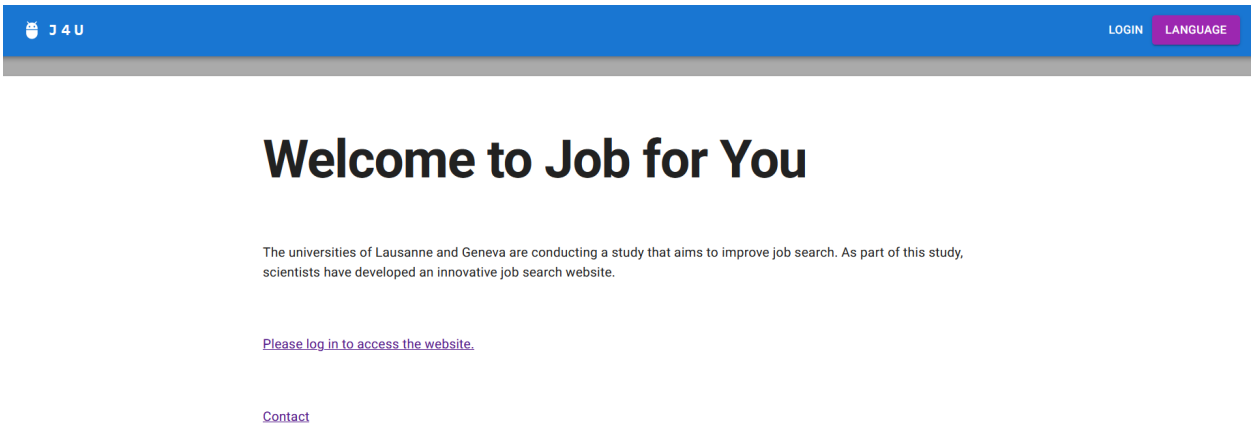
This section gives an overview of the study setup with a focus on the J4U job search platform, the interventions, and the recruitment of participants.

2.1 Online platform

We specifically built the online platform *Job for You* (J4U) to investigate job search. The platform offers a job search page and includes API access to Qualtrics so that invitations to surveys and other materials can be sent directly through the J4U platform. The platform tracks clicks on the different tabs and buttons to measure job search behavior. Figure 1 shows the landing page.

Access to the J4U platform is by invitation to ensure that only eligible participants participate in the study. The self-administered platform can be accessed from a personal computer. The platform is available in German and English and is built on an earlier version available in French, which was used in two studies conducted in the Swiss French speaking cantons of Neuchâtel and Vaud (Benghalem *et al.*, 2023).

Figure 1: J4U platform – Landing page



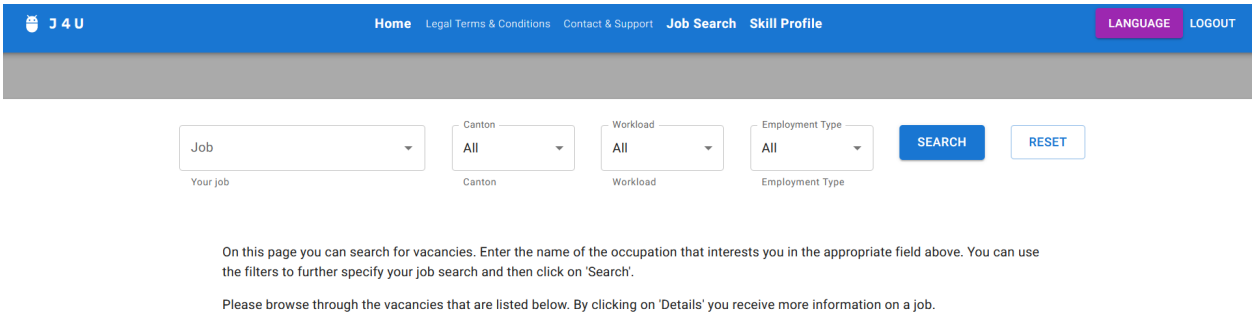
Note: This figure shows the landing page of the J4U platform. Users can log in with their email address and password. The platform is available in German and English.

The J4U platform has two different interfaces. The control platform consists of an ordinary job search interface as shown in Figure 2, where we rely on the pool of vacancies of the public employment agency (`www.job-room.ch`), provided by the Swiss State Secretariat for Economic Affairs (SECO). The control interface is used for the CONT and COG groups. The J4U1 and the J4U2 groups are given access to an extended user interface that displays occupation recommendations with the corresponding vacancies.

2.2 Occupation recommendations (J4U1 and J4U2 interventions)

Job seekers in the J4U1 and J4U2 groups receive ten occupation recommendations that have a high overlap with their profile. The goal is to encourage job seekers to conduct a

Figure 2: J4U platform – Control job search interface



Note: This figure shows the job search page of the control interface. The field "Job" contains a dropdown menu with ISCO 4-digit occupation names from which we know the occupation profiles based on O*NET data. The field "Canton" contains a dropdown menu with all 26 cantons. The field "Workload" contains a dropdown menu with the options All, Full-Time, Part-Time. The field "Employment Type" contains a dropdown menu with the options All, Permanent, Temporary.

comprehensive job search that matches their profile. Figure 3 shows the job search page of the J4U platform for participants receiving occupation recommendations. When participants enter a specific occupation name in the search field, they receive a list of ten occupations. By clicking on one of the occupation names, all available vacancies will be displayed.

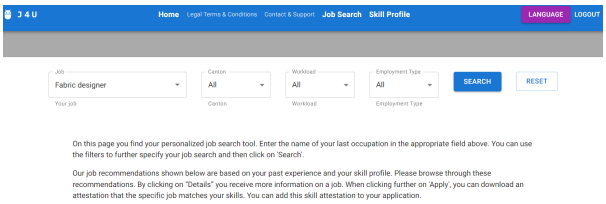
We define the job seeker's profile on the basis of two components (Bächli *et al.*, 2024). First, we measure twelve skills, abilities and work styles of each study participant in an online assessment at enrollment (Aschwanden *et al.*, 2023). These items are characterized by O*NET as worker-specific and are likely transferable across occupations.[1] Second, we consider 232 other items from O*NET that relate to the profile of the search occupation, which is a proxy of the previous occupation and thus of worker experience. The underlying assumption that participants typically search for jobs in their previous occupation is well-founded in the literature (Belot *et al.*, 2018).

The occupation recommendations of the J4U1 and J4U2 groups are based on different weights on the two components of the job seeker's profile. For the J4U1 group, we construct occupation recommendations based on the search occupation profile. This specification is similar to the existing literature, which typically uses the job seekers' occupation history for deriving application advice (Belot *et al.*, 2018). Intuitively speaking, we measure the profile of the search occupation entered on the J4U platform based on occupational descriptors available on O*NET and compare it with all occupation profiles available on O*NET. The occupations with the largest overlap are the those that best match a job seeker. More

[1] Abilities: fluency of ideas, memorization, inductive reasoning, category flexibility, and perceptual speed. Skills: reading comprehension, time management, and monitoring. Work styles: adaptability, tolerance to stress, leadership, and self-control. O*NET provides detailed information on these dimensions here https://www.onetcenter.org/overview.html.

Figure 3: J4U intervention – Job search interface with occupation recommendations

(a) Job search



(b) Display of occupation recommendations

Note: This figure shows the job search page of the J4U intervention. When entering an occupation in the search field in Subfigure (a), the participant saw ten ranked occupation recommendations that are either based on her past occupation profile or in addition on her skill profile. When clicking on one of the ten boxes in Subfigure (b), all available vacancies are displayed.

formally, the distance $d^1(i,o)$ in Equation 1 is the average of the Euclidean distance between the previous occupation profile o_i and any occupation profile o over the twelve measured items m and the previous occupation profile o_i and any occupation profile o over the other 232 items s that are categorized into nine groups by topic, following O*NET.[2]

$$d^1(i,o) \quad = \quad \frac{d^m(o_i,o) + \frac{1}{9}\sum_{s=1}^{9} d^s_{-m}(o_i,o)}{2} \tag{1}$$

For the J4U2 group, we define the worker profile based on the search occupation profile and the worker profile measured in the online assessment of this study. The distance $d^2(i,o)$ in Equation 2 is the average of the Euclidean distance between the worker profile i and any occupation profile o over the twelve measured items m and the previous occupation profile o_i and any occupation profile o over the other 232 items s.

$$d^2(i,o) \quad = \quad \frac{d^m(i,o) + \frac{1}{9}\sum_{s=1}^{9} d^s_{-m}(o_i,o)}{2} \tag{2}$$

Finally, we show the study participants the ten occupations with the shortest distance, i.e. with the smallest mismatch between the job seeker's profile and an occupation.

[2]For example, the Euclidean distance $d^m(o_i,o)$ is computed as following: $\sum_m \sqrt{(a_m - b_m)^2}$, where a_m is the score of the item m of the previous occupation profile o_i and b_m is the score of the same requirement m in occupation o. More information on the distance measure can be found in Bächli *et al.* (2024).

2.3 Cognitive and mindfulness online training (COG intervention)

Job seekers from the COG group receive email invitations for cognitive and mindfulness online exercises twice a week. These exercises were available to the participants for three to four days and could be completed once. The goal is to train skills that are required for organizing the job search and coping with setbacks. An exercise should last about 30 minutes. Figure 4 shows two examples from each type of training.

Cognitive training. These exercises aim at strengthening the ability to plan activities, work on multiple tasks in parallel, and make decisions. They train eight cognitive domains: perceptual speed, verbal comprehension, working memory, inductive reasoning, flexibility, fluency of ideas, monitoring, and memorization. Each exercise is designed to train four cognitive domains and consists of a combination of three training types. In the baseline-based training, participants perform tasks very similar to the online assessment of the skill profile at baseline. In the process-based training, participants perform tasks relying on the same cognitive processes as in the online assessment. In the strategy training, participants learn strategies and techniques related to task performance, which should be applicable to everyday life. In the invitation email sent to the participants, we describe the objective of the exercises as "to help you identify the most effective strategies for solving various tasks as adequately and quickly as possible".

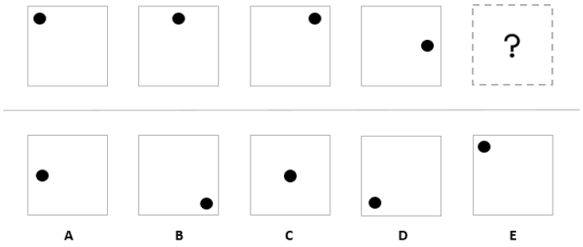
Mindfulness training. Mindfulness exercises are practices that regulate attention and the ability to make experiences in the present moment with openness and acceptance. Review articles summarize that mindfulness exercises have positive effects on the physical and emotional health, and cognitive performance (Keng *et al.*, 2011; Tang *et al.*, 2015). A recent study by Mora Alvarez *et al.* (2023) shows that online mindfulness meditation training reduces stress and anxiety and increases overall well-being and attentional performance. In the context of job search, mindfulness exercises aim at strengthening motivational-affective strategies to overcome discouragements, setbacks and rejections. In the invitation letter sent to the participants, we describe the goal as "to provide you with simple and effective tools to improve your daily well-being. This will allow you to benefit from the positive effects of relaxation on your brain and body in the long run".

2.4 Recruitment of job seekers

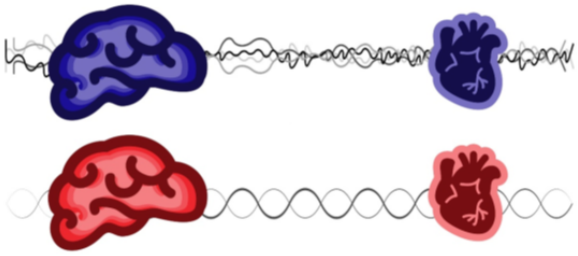
To recruit participants, we collaborated with the Public Employment Services (PES) in the Swiss canton of Zurich. Zurich is located in the German speaking part of Switzerland. It is the canton with the largest number of inhabitants. The average unemployment rate was 1.78% in 2023 with 15,281 registered unemployed and 25,532 registered job seekers. In

Figure 4: COG intervention – Cognitive and mindfulness trainings

(a) Exercise to train "category flexibility"



(b) Breathing exercise to reach cardiac coherence



– 5/5 breathing: inhale and exhale 5 seconds
– 6/4 breathing: inhale 4 seconds and exhale 6 seconds

Note: Subfigure (a) shows an example of an exercise to train the ability "category flexibility". Subfigure (b) shows an example of a mindfulness exercise.

comparison, the average unemployment rate in the German speaking part of Switzerland was 1.7% and in overall Switzerland 2.0% in the same year. As for the canton of Zurich and Switzerland, the average unemployment rate in 2023 is the lowest since 2001.

Eligible job seekers had to fulfill four criteria to participate in the study. They had to be at least 18 years of age, have an upper-secondary degree and a B1 language level in German or English (assessed by the PES) and need to be less than 5 months before the end of their unemployment benefit period. Our aim was to recruit between 1,800 and 2,000 job seekers. Case workers from the PES invited eligible job seekers for study participation. In the beginning, recruitment was solely based on the distribution of flyers and was later complemented with email invitations. Recruitment started in September 2022 and was completed in June 2023. A total of 1,852 job seekers registered for the study, most of them in 2023, and completed their skill profile. This corresponds to a participation rate of around 14.2% relative to the number of job seekers who received an invitation by email.

2.5 Experimental procedure

The study flyer and the email invitation contained a QR code and a link, both of which led to a form in which interested job seekers could sign up for study participation. Based on this list, we sent them an email with a link to register on the J4U platform. The registration required the creation of a platform account by providing their name, date of birth, email address, name of the previous occupation and voluntarily the old-age and survivors' insurance number that simplifies linkage with administrative data. To complete the registration, participants had to confirm their email address used.

Table 1: Overview interventions

Group	Access to J4U platform	Occupation recommendations	Cognitive & mindfulness trainings	Job search survey
J4U1	✓	✓	-	✓
J4U2	✓	✓	-	✓
COG	✓	-	✓	✓
CONT	✓	-	-	✓

Note: This tables gives an overview of the study interventions by treatment and control group. All groups received access to the J4U platform. The J4U1 and J4U2 groups received personalized occupation recommendations through the J4U platform, while the COG and the CONT group had access to the control interface job search page on the platform. The COG group received twice a week an invitation to an online session; once with cognitive trainings and once with mindfulness trainings. All groups received a weekly job search survey.

At the time of registration, job seekers were randomized into one of the three treatment groups or the control group. The probability to be allocated to one of the groups was set to 0.25.

Table 1 summarizes the interventions. Every participant receives access to the J4U platform, but with different interfaces. The two J4U1 and J4U2 groups receive occupation recommendations (see Figure 3), while the COG and the control groups get a control job search interface (see Figure 2). The COG group receives invitations for online cognitive and mindfulness trainings. Every participant receives the weekly job search survey, either as a separate survey (J4U1, J4U2, CONT groups) or as part of the cognitive training invitation (COG group). Every other job search survey was short and every other was long, and both versions include a reminder to use the J4U platform. Each activity was incentiviced with a lottery.[3]

As a necessary condition to enroll, job seekers had to complete the baseline questionnaire including the conset, a demographics survey and an online skill assessment. After completing this step, participants receive access to the J4U platform with the job search interface and could see their skill profile. The study was conducted over a period of twenty weeks from enrollment as shown in Table 2. The interventions are structured into two blocks of eight weeks each. The weekly job search survey with a reminder to use the platform was sent to everyone on Mondays during the two treatment blocks of 2×8 weeks. The J4U1 and J4U2 groups received occupation recommendations on the J4U platform that were available throughout the study period. For the COG group, the invitation to the cognitive exercises

[3]Completing the baseline questionnaires and the skill profile updates yield each 20 lottery tickets. Completing the job search survey, the cognitive or the mindfulness training yields each 5 tickets. Using the J4U platform for job search yields max 3 tickets per day. The more lottery tickets, the higher the chances to win the lottery. We draw the first lottery of CHF 500 when all participants passed study week 10. We draw the second lottery of CHF 1,500 when all participants passed study week 20.

Table 2: Study program by week since enrollment

	w 0	w 1-8	w 9-10	w 11-18	w 19-20
Baseline questionnaire	✓	-	-	-	-
Access to J4U platform	-	✓	✓	✓	✓
Access to J4U1 and J4U2 occupation recommendations	-	✓	✓	✓	✓
Job search survey	-	✓	-	✓	-
COG trainings	-	✓	-	✓	-
Update skill profile	-	-	✓	-	✓

Note: This tables shows the availability of the different study components over the study period of 20 weeks after enrollment.

was sent weekly on Mondays and included the job search survey. The invitation to the mindfulness exercises was sent weekly on Thursdays. The content of the exercises sent in the first study period was the same as in the second study period. All participants could update their skill profile twice during the study period – halfway through and at the end. Occupation recommendations for the J4U2 group are based on the most recent skill profile available.

3 Data and method

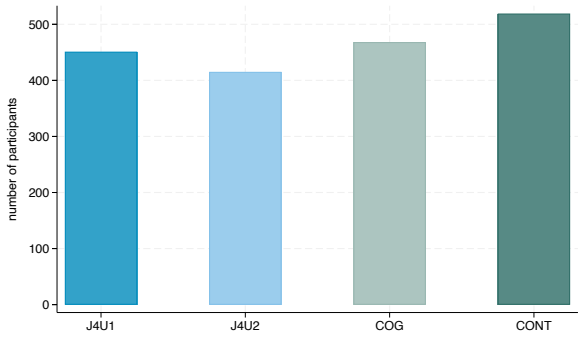
This section gives an overview of the data, sample, and the empirical strategy.

3.1 Data

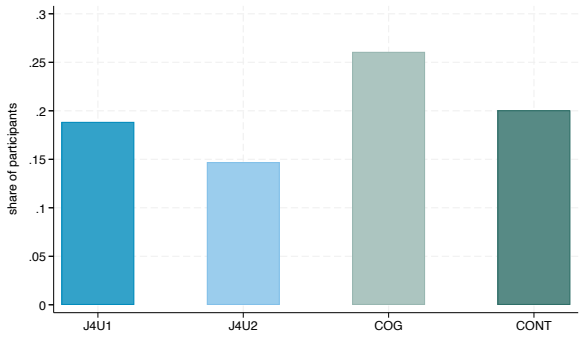
Study data. The study was conducted between fall 2022 and summer 2023. We collected data through the various surveys and also tracked the clicks on the platform. We define the sample of eligible participants as those who have successfully registered on the platform, including the completion of the skill profile. The sample consists of 1,852 study participants. The size of the groups is not balanced which is partly related to technical issues with importing the Qualtrics survey data of the online skill assessment with the J4U1 and J4U2 groups being most affected. The J4U2 group is the smallest with 414 participants and the control group the largest with 519 participants. Around 20% of the participants who initially enrolled completed the first update of the skill profile (mid-evaluation) and around 10% the second update (post-evaluation). As shown in Figure 5, participants from the COG group most often update their skill profile. This is likely related to the structure of their treatment. In particular the cognitive training they receive weekly is based on the online

Figure 5: Enrollment by group

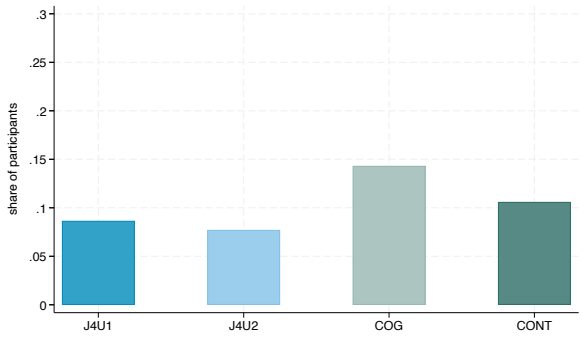
(a) Nr of enrolled participants by group



(b) Share of participants with mid-evaluation



(c) Share of participants with post-evaluation



Note: This figure shows the number of enrolled job seekers and the share of those who updated their skill profile throughout the study by treatment and control groups.

skill assessment, which may serve as a motivating factor to update the skill profile and see how the profile evolves over time.

As summarized in Table 3, the average age of the study participants is 45.3 years. 40.4% of the participants are female, 38.7% are married, 70.2% have a tertiary degree and 39.4% are born in Switzerland. 73.3% of the participants receive unemployment benefits, while the rest is still employed or the maximum duration of 18 months has been exceed. Finally, the average week of unemployment is 28.6. The means of these variables do not statistically differ across the four groups.

The participation rate in the surveys decreased over time as shown in Figure 6. This trend can be linked to both attrition from the study and disinterest in completing the surveys. Between 55 and 62% of participants of the J4U1, J4U2 and CONT groups completed the job search survey in the first week. This share dropped to around 10% in the last two weeks. Patterns across these three groups are similar, while the participation rates of the control group is highest, especially in the first half of the study. Similarly, the COG group also

Table 3: Summary statistics

	(1) J4U1	(2) J4U2	(3) COG	(4) CONT
Age	45.091	45.255	45.472	45.267
	(10.540)	(10.719)	(10.332)	(10.338)
Female	0.397	0.366	0.423	0.422
	(0.490)	(0.482)	(0.495)	(0.494)
Married	0.395	0.386	0.393	0.376
	(0.489)	(0.487)	(0.489)	(0.485)
Tertiary Education	0.705	0.701	0.714	0.688
	(0.457)	(0.458)	(0.453)	(0.464)
Born in Switzerland	0.370	0.376	0.423	0.403
	(0.483)	(0.485)	(0.495)	(0.491)
Benefit Recipient	0.742	0.715	0.752	0.720
	(0.438)	(0.452)	(0.433)	(0.449)
Weeks of Unemployment	27.405	28.234	29.236	29.474
	(32.434)	(42.408)	(33.583)	(81.802)
Observations	451	415	468	519

Note: This table shows the mean and in brackets the standard deviation for a subset of demographic variables by treatment group. All variables are measured at baseline.

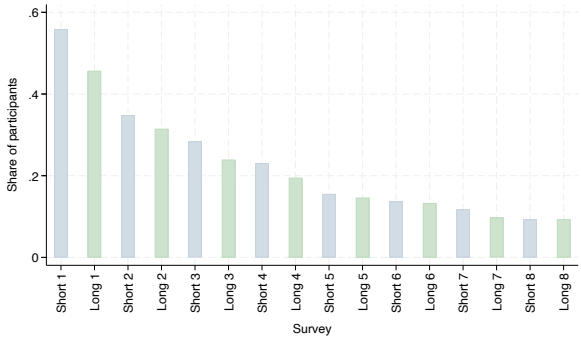
shows a decreasing pattern in participation rates, with a rather large drop between the first cognitive and the first mindfulness training in the first week (1A). The cognitive exercises were overall more often completed than the mindfulness exercises.

Administrative data. We use a combination of administrative data that can be linked to the study data. The data linkage is provided by the Swiss Federal Statistical Office (FSO). We rely on personal characteristics data from the FSO (STATPOP). This dataset includes information on age, gender, maritial status, place of residence from the most recently available year 2022. We also use data on the job search from the Swiss State Secretariat for Economic Affairs (SECO) that is available up to January 2024. This dataset includes information on the months of being registered as a jobseeker, the previous occupation(s), the target occupation, and the new occupation found – all reported in 5-digit ISCO. Given the available data, we can build a panel covering eight months from enrollment.

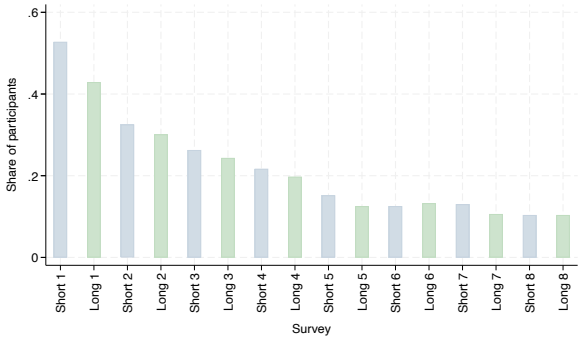
Our sample for the statistical analysis consists of study participants who are registered jobseekers in the month of enrollment and have not yet found a job in the month of enrollment. Currently, 1,556 out of 1,852 study participants fulfil these two conditions and also

Figure 6: Participation in surveys by group and week since enrollment

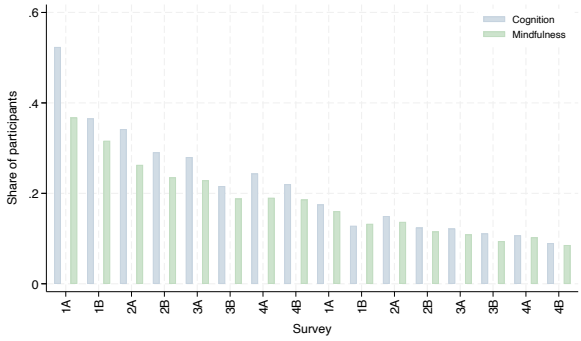
(a) J4U1: job search survey



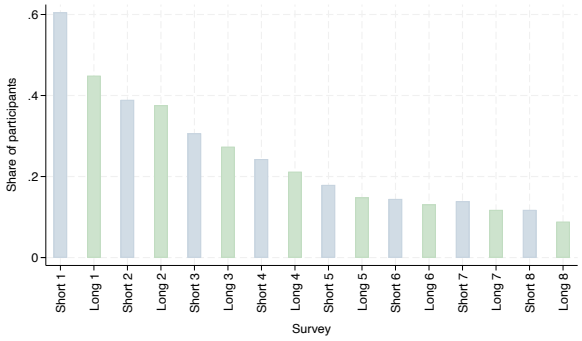
(b) J4U2: job search survey



(c) COG: online trainings



(d) CONT: job search survey



Note: This figure shows the share of individuals who completed a survey relative to those who initially enrolled in the study. The job search survey, sent separtely to the J4U1, J4U2 and the COG groups, alternates between short (blue bar) and long (green bar) surveys. COG participants receive cognitive exercises including the job search survey (blue bar) and mindfulness exercises (green bar). The set of exercises sent in weeks 1-8 are the same as the ones in weeks 11-18.

be linked to the STATPOP dataset.

3.2 Empirical strategy

We are interested in the impact of the interventions, relative to the control group, on finding a job. In our empirical specification shown in Equation 3, i is individual and m month since study enrollment. The available data covers eight month since enrollment, with the month of enrollment indicated as 0.

$$y_{im} = \alpha_0 + \alpha_1 J4U1_i + \alpha_2 J4U2_i + \alpha_3 COG_i + \beta X_i + u_{im} \tag{3}$$

Our main outcomes of interest y are "being a registered job seeker" and "having found a job". Being a job seeker is a dummy variable that equals 1 if a person is registered at the Public Employment Services (PES) in a given month and 0 otherwise. When creating this variable, the entire history of a job seeker is taken into account, so that it can vary over time due to multiple registrations and deregistrations. Having found a job is a dummy variable that equals 1 if a job seeker deregisters at the PES because of finding a job. It equals 0 if the job seeker remains registered or deregisters due to other reasons than finding a job (e.g., not suitable for placement, moved away, failed to comply with obligations). We only consider the job seeker's dossier (i.e., the spell) that falls in the month of study enrollment. Thus, if a job seeker finds a job, for example, three months after enrollment, this person appears as having found a job in the months three to eight after enrollment. We further use dummy variables that equal 1 if the job found is different or the same as the target occupation, defined at baseline, to study possible mechanisms.

The vector of control variables X includes time-invariant personal characteristics such as age, being born in Switzerland, being female, being married, length of being registered as job seeker at study enrollment. This information is taken from the STATPOP dataset as of December 2022. The vector also includes cohort fixed effects. Some of the estimates that we will present relate to specific months, while others show the average impact over several months. In the latter case, the standard errors are clustered at the individual level.

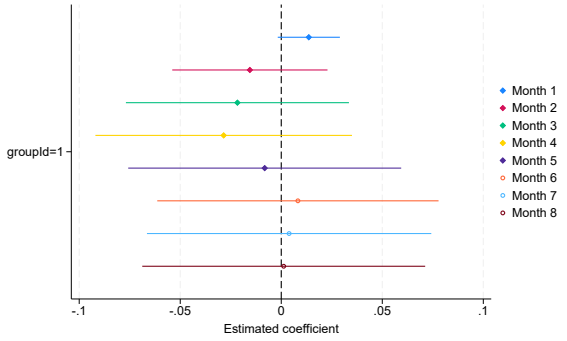
4 Preliminary results

We begin the analysis by examining the effects of the interventions on being a registered job seeker at the PES. Figure 7 shows that the interventions had no significant impact on job

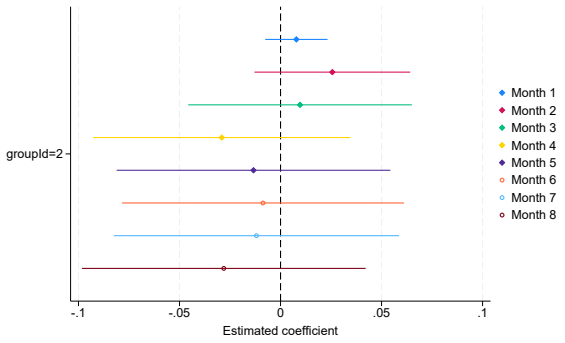
seeking in each of the eight months after study enrollment. However, the effects are negative and largest towards the end of the study period, four months after enrollment. Table 4 presents the average effect of the interventions on job seeking eight months after enrollment for the full sample and separately for men and women. Column (1) without controls and column (2) with controls show that the average effect on job seeking is close to zero for the J4U1 and J4U2 treatments and around -2 percentage points for the COG treatment. When looking at the subgroup of men only, column 4 shows that all three interventions similarly reduce job seeking. Specifically, the J4U1 and J4U2 interventions reduce job seeking on average by 5.4 - 5.6 percentage points and the COG intervention by 6.6 percentage points. The effects on women are of opposite signs; the J4U1 and J4U2 interventions tend to increase job seeking by around 5 percentage points, while the COG intervention has no significant effect (see column 6).

Figure 7: Impact on job seeking

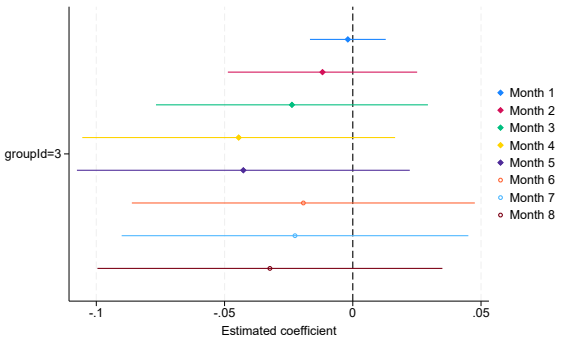
(a) J4U1



(b) J4U2



(c) COG



Note: The outcome is a dummy variable that equals 1 if a participant is registered as a jobseeker at the PES in a given month. Each estimate is from a separate regression with N = 1,556. Control variables included. The estimates are shown by months since enrollment, where the study period was twenty weeks. 95% confidence intervals shown. Sources: FSO, SECO.

Leaving the registered job search may be because of finding a job or because of leaving

Table 4: Impact on job seeking: average effects 8 months after study enrollment

	Full sample		Men		Women	
	(1)	(2)	(3)	(4)	(5)	(6)
J4U1	-0.006	-0.005	-0.053**	-0.054**	0.049	0.054*
	(0.020)	(0.020)	(0.026)	(0.026)	(0.031)	(0.031)
J4U2	-0.004	-0.005	-0.052**	-0.056**	0.050*	0.051*
	(0.020)	(0.019)	(0.026)	(0.025)	(0.030)	(0.030)
COG	-0.025	-0.022	-0.059**	-0.066***	0.020	0.031
	(0.019)	(0.019)	(0.025)	(0.025)	(0.029)	(0.029)
Mean outcome	0.739	0.739	0.761	0.761	0.712	0.712
Cohort FE	yes	yes	yes	yes	yes	yes
Controls	no	yes	no	yes	no	yes
N	14121	14004	7920	7920	6093	6084

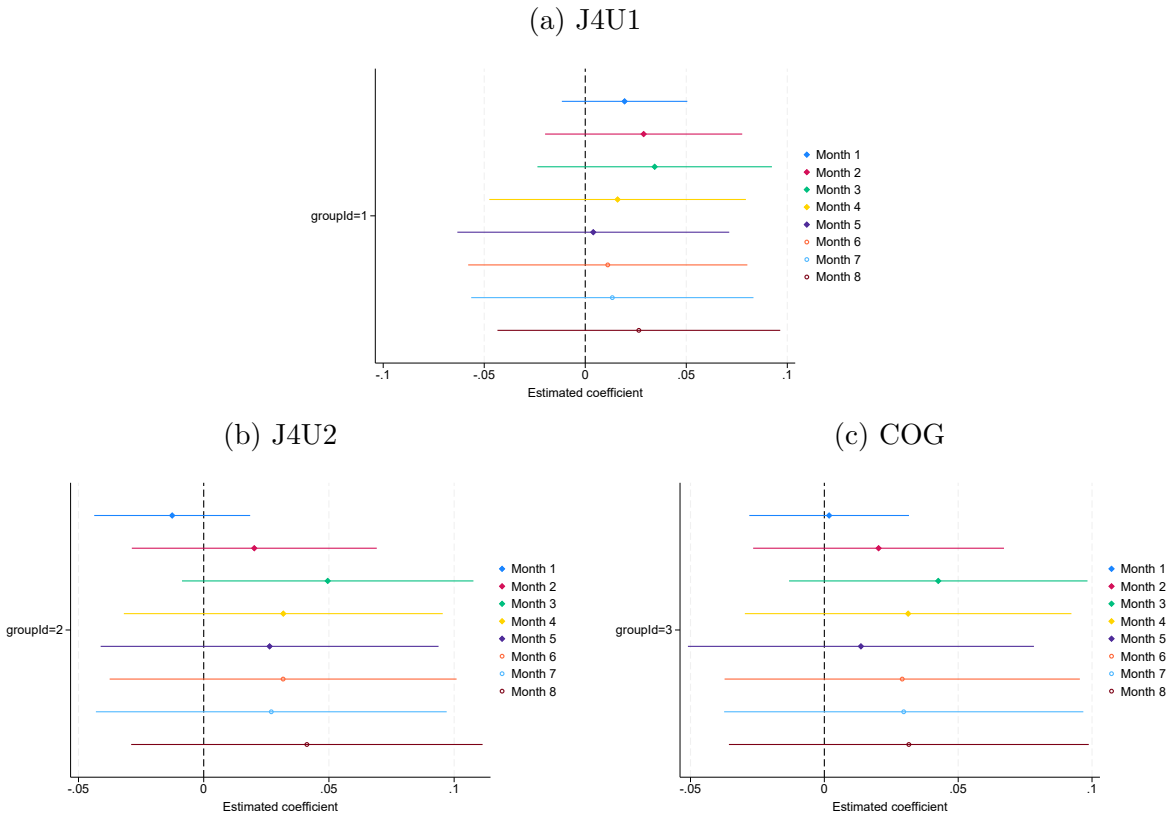
Note: This table shows average effects over an observation period of 8 months after study enrollment. The outcome is a dummy variable that equals 1 if a participant is registered as a jobseeker at the PES in a given month. Sources: FSO, SECO.

the PES for other reasons such as moving away or not being eligible for placement.[4] Figure 8 shows the impact of the interventions on finding a job. Overall, all interventions have a positive effect on job finding from the second month after study enrollment, with the largest impact in the third month. However, these effects are imprecisely estimated and not statistically significant at the 5% level. Table 5 summarizes these results by showing the average effects eight months after enrollment for the full sample in column (2). When splitting the sample into male and female job seekers, we find for the subgroup of men that all three treatments have a similar positive and statistically significant effect on job finding with estimates of around 6 percentage points (column 4). On the other hand, the estimates in the subset of women are negative, but not statistically significant (column 6).

To better understand what margin our interventions target, we examine the type of occupation found. We compare the target occupation with the occupation found. The outcome variable is a dummy that equals 1 if the 5-digit ISCO occupation found is the same (different) than the target 5-digit ISCO occupation and zero otherwise or if someone has not yet found a job, including cases where someone found a job but we lack information on the type of occupation. Our hypothesis is that people in the J4U2 group, to whom we provide occupation recommendations that take into account the job seekers' skill profile, search most differently to what they would have searched without the intervention. In column (3) of Table

[4]To receive unemployment benefit, applicants must be registered with the employment service and meet the monthly job-seeking requirements.

Figure 8: Impact on job finding



Note: The outcome is a dummy variable that equals 1 if a participant who was a registered job seeker found a job in a given month. Each estimate is from a separate regression with N = 1,556. Control variables included. The estimates are shown by months since enrollment, where the study period was twenty weeks. 95% confidence intervals shown. Sources: FSO, SECO.

6 we find evidence in favor of this hypothesis for the full sample and in column (3) of Table 7 for the subgroup of men. We do not find statistically significant evidence that J4U2-treated women become more likely to find different occupations (see Table 8).

In an alternative specification in Table 9, we focus on the subgroup of those who found an occupation up to eight months after enrollment. In line with the full sample analysis, column 1 shows that the J4U2 intervention had a significant effect on finding a different than the target occupation. The effect of 12.5 percentage point relative to a mean outcome of 41.1% is sizeable. Column 2 provides consistent evidence for the subgroup of men. In contrast to the full sample (see Table 8), women who found a job are also more likely to work in an occupation other than their target occupation.

Table 5: Impact on job finding: average effects 8 months after study enrollment

	Full sample		Men		Women	
	(1)	(2)	(3)	(4)	(5)	(6)
J4U1	0.013	0.017	0.063**	0.068**	-0.044	-0.047
	(0.023)	(0.022)	(0.030)	(0.029)	(0.035)	(0.035)
J4U2	0.022	0.024	0.065**	0.064**	-0.039	-0.036
	(0.023)	(0.022)	(0.029)	(0.029)	(0.036)	(0.035)
COG	0.022	0.022	0.052*	0.063**	-0.017	-0.029
	(0.022)	(0.021)	(0.028)	(0.028)	(0.034)	(0.034)
Mean outcome	0.260	0.260	0.238	0.238	0.287	0.287
Cohort FE	yes	yes	yes	yes	yes	yes
Controls	no	yes	no	yes	no	yes
N	14121	14004	7920	7920	6093	6084

Note: This table shows average effects over an observation period of 8 months after study enrollment. The outcome is a dummy variable that equals 1 if a participant found a job in a given month. Sources: FSO, SECO.

Table 6: Impact on type of occupation found: average effects 8 months after study enrollment

	Job finding	Same as target occupation	Different as target occupation
	(1)	(2)	(3)
J4U1	0.017	-0.021	-0.003
	(0.022)	(0.018)	(0.014)
J4U2	0.024	-0.026	0.027*
	(0.022)	(0.017)	(0.016)
COG	0.022	0.002	0.001
	(0.021)	(0.017)	(0.014)
Mean outcome	0.260	0.113	0.077
Cohort FE	yes	yes	yes
Controls	yes	yes	yes
N	14004	14004	14004

Note: The outcome in column (1) is a dummy variable that equals 1 if the participant found a job and in columns (2) and (3) if the participant found the same / a different 5-digit ISCO occupation compared to the target occupation. Sources: FSO, SECO.

Table 7: Impact on type of occupation found for subgroup of men: average effects 8 months after study enrollment

	Job finding	Same as target occupation	Different as target occupation
	(1)	(2)	(3)
J4U1	0.068**	-0.002	0.009
	(0.029)	(0.023)	(0.018)
J4U2	0.064**	-0.014	0.039*
	(0.029)	(0.021)	(0.021)
COG	0.063**	0.013	0.019
	(0.028)	(0.022)	(0.019)
Mean outcome	0.238	0.101	0.077
Cohort FE	yes	yes	yes
Controls	yes	yes	yes
N	7920	7920	7920

Note: The outcome in column (1) is a dummy variable that equals 1 if the participant found a job and in columns (2) and (3) if the participant found the same / a different 5-digit ISCO occupation compared to the target occupation. Sources: FSO, SECO.

Table 8: Impact on type of occupation found for subgroup of women: average effects 8 months after study enrollment

	Job finding	Same as target occupation	Different as target occupation
	(1)	(2)	(3)
J4U1	-0.047	-0.049*	-0.011
	(0.035)	(0.028)	(0.022)
J4U2	-0.036	-0.048*	0.013
	(0.035)	(0.028)	(0.023)
COG	-0.029	-0.018	-0.022
	(0.034)	(0.028)	(0.020)
Mean outcome	0.287	0.128	0.076
Cohort FE	yes	yes	yes
Controls	yes	yes	yes
N	6084	6084	6084

Note: The outcome in column (1) is a dummy variable that equals 1 if the participant found a job and in columns (2) and (3) if the participant found the same / a different 5-digit ISCO occupation compared to the target occupation. Sources: FSO, SECO.

Table 9: Impact on type of occupation for subset of those who found a job: effects in month 8 after study enrollment

	Full sample	Men	Women
	(1)	(2)	(3)
J4U1	0.021	0.054	0.026
	(0.063)	(0.090)	(0.093)
J4U2	0.125**	0.162*	0.175*
	(0.062)	(0.090)	(0.094)
COG	0.023	0.091	-0.034
	(0.060)	(0.088)	(0.089)
Mean outcome	0.411	0.425	0.392
Cohort FE	yes	yes	yes
Controls	yes	yes	yes
N	541	288	243

Note: The sample consists of participants who found a job until month 8 after study enrollment. We exclude individuals without available information on the occupation found or on the target occupation (26.3%). The outcome variable is a dummy that equals 1 if the participant found a job with a different 5-digit ISCO occupation than the target occupation. Outcome variables measured in month 8. Sources: FSO, SECO.

5 Conclusion

In this paper, we test three interventions to improve job search in a randomized controlled trial. The J4U1 and J4U2 interventions provide individualized occupation recommendations to encourage a comprehensive job search that matches the job seeker's profile, whereby the two interventions differ in how we define the job seeker's profile. In the first intervention, we only use information on the search occupation profile that proxies for work experience, similar to the previous literature. In the second intervention, we rely on the job seeker's measured profile, which consists of transferable skills, abilities and work styles. The COG intervention includes invitations to cognitive and mindfulness online training to help organize the job search and deal with setbacks.

Preliminary findings show that all interventions tend to increase the probability of finding a job, while these effects are substantial and statistically significant for the subgroup of men. These insights have relevant policy implications especially because all interventions are cost-effective and scalable.

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