

Self-regulation and Autonomy in the Job Search: Key Factors to Support Job Search Among Swiss Job Seekers

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Technology integration in the workplace context has led to substantial growth in high- versus low-skilled jobs, and thus, further disparities between workers and those who were already unemployed. Technology use is also being used more frequently in the job search process, which could further lead to disparities, especially for job seekers experiencing marginalization. Thus, we conducted a controlled longitudinal field deployment of two employment-based tools—RevueCV and InterviewApp—among 46 Switzerland-based unemployed job seekers. Using the theory of planned behavior (TPB), we sought to understand how the tools affected job search self-efficacy, subjective norms and job search attitudes—the three factors that influence a job seekers’ job search intention. Although participants appreciated the support the two tools provided, and the inherent study benefits, our interview and survey results showed no substantial changes in their TPB values, primarily because the tools provided overlapping services with the local job placement offices. However, results of our interviews found *autonomy*, or the lack thereof, to be a key factor contributing to job seeker dissatisfaction. We introduce the concept of self-regulation to the TPB as an explanatory construct and contribute design and theoretical implications to support autonomy among job seekers with less control of their job search.

RESEARCH HIGHLIGHTS

- To understand whether technologies envisioned in past HCI work are applicable in non-US contexts, we conducted a 4-month long deployment of two employment tools — RevueCV and InterviewApp — among 46 Switzerland-based unemployed job seekers, that was heavily inspired by a study performed among underrepresented job seekers in the US
- While there were similarities across job seekers in terms of experiencing labor market disadvantages such as discrimination and fewer social networks, our results show that the technologies envisioned in past HCI work are not applicable, at least not in the Switzerland-based job context due to restrictive institutions that lessen job seeker autonomy in their job search process. We found that the policies applied by these institutions lower self-awareness, self-efficacy, and self-regulations of the job seekers
- Interventions that provide self-regulation training could provide better support to job seekers in autonomy-constrained environments—these interventions could help them to be more resilient in such environments and provide individual-level coping strategies, which are more likely to support a sense of ownership over the job search activities

Keywords: employment; self-determination theory; theory of planned behavior; underrepresented job seekers

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1. INTRODUCTION

New technologies and a globalized labor market offer opportunities to bring previously underrepresented groups into the labor market (Organisation for Economic Co-Operation and Development (OECD), 2019). Per the Organisation for Economic Co-operation and Development (OECD), this promise will depend greatly on a country's policy decisions. While employment rates in most OECD countries had been increasing prior to the COVID-19 pandemic, most OECD countries had experienced substantial growth in high-skilled versus low-skilled jobs. Transitions to these new jobs were difficult, especially for those with less than a tertiary education and young people.

Human-Computer Interaction (or HCI) and technology-related research further suggests that promises to bring these underrepresented groups into the labor market remain unfilled (e.g. Dillahunt *et al.* (2016), Dillahunt & Malone (2015), Dombrowski *et al.* (2016), Gershon (2017), Hayes *et al.* (2015), Hendry *et al.* (2017ab), Hui *et al.* (2018), Li *et al.* (2019), Smith (2015), Wheeler & Dillahunt (2018)). Most of this work, however, has been conducted in the context of the US labor market where the majority of the unemployed includes ethnic and racial minorities, people with disabilities and those with less than a college education (Bureau of Labor Statistics, 2018a, b, c, d). However, it is unclear whether technologies discussed in prior literature (e.g. job search tools, resume and interview feedback tools, tools to identify skill set, crowdfunding) would be applicable outside of the US. Understanding whether such technologies generalize is important because context plays a key role in how technology is adopted, and technology cannot be designed in isolation. Factors impacting job context include job markets, regulations and the types of job seekers that exist in a market. While the share of foreign-born population is increasing in the US, the number of immigrants in Europe doubled between 1990 and 2015 to reach 12.9%; a much higher percentage increase than that of the US in the time span (Edo, 2019).

Thus, to begin to understand whether employment-based technologies envisioned in past HCI work (Dillahunt & Hsiao, 2020, Dillahunt *et al.*, 2018) are applicable in non-US contexts, we conducted a controlled longitudinal field deployment of two employment-based tools, RevueCV and InterviewApp, among 46 Switzerland-based unemployed job seekers. In Switzerland, the majority of the unemployed population slightly varies from that in the US—they are from immigrant groups (Auer *et al.*, 2017), less-educated youth (Organisation for Economic Co-Operation and Development (OECD), 2016), women (Lalive & Lehmann, 2020) and older job seekers in the 55–65 age range (Lalive & Lehmann, 2020). We began by using the theory of planned behavior (TPB) to understand how the tools affected job search self-efficacy, subjective norms and job search attitudes—the three constructs that influence a

job seeker's job search intention (Hooft, 2018a). Overall, our qualitative results suggested that a lack of *autonomy* played a role in their job search. Thus, we followed our work with a *post hoc* analysis informed by the self-determination theory (SDT) (Ryan & Deci, 2006), for which autonomy is one of the main constructs. Our results show that the lack of autonomy (i.e. job seekers' ability to make independent decisions in their job search) in job-search tools and Swiss policies were key factors that contributed to our results.

We contribute design and theoretical implications to support autonomy among job seekers who experience less autonomy in their job search. Our research contributions include new factors to consider when designing and deploying tools across different geographic contexts and new implications for digital employment tools to support underrepresented job seekers.

2. RELATED WORK

We begin our related work by introducing the TPB (Ajzen, 1991), a theoretical perspective frequently used to assess the effectiveness of job search interventions on employment effectiveness and the underlying theory we used to frame our work. We conclude with a brief summary of combined career assessment, information, and guidance systems, and highlight HCI opportunities to span this work outside of the US context. We provide additional context later in Sec. 3.

2.1. Theory of planned behavior

The TPB suggests that perceived behavioral control, or self-efficacy, subjective norms and attitudes regulate intention, the central determinant of behavior (Ajzen, 1991). The theory provides a perspective to model effects of social and psychological factors (e.g. Hooft *et al.* (2004), Hooft & De Jong (2009), Vinokur & Caplan (1987)) and employment interventions (Ryn & Vinokur, 1992).

According to Bandura, self-efficacy is individuals' inner belief about their aptitude to complete a task, or in the employment context, individuals' perceived ability to execute a successful job search (Bandura, 1982). The perceived amount of social pressure from close family, friends or the community is referred to as subjective norms. This could also relate to the degree to which a person perceives social pressure to carry out a task or not and a person's motivation to meet these expectations. Attitudes refer to individuals' *evaluation* of their job search efforts (Yizhong *et al.*, 2017), or whether their job search will lead to employment outcomes (Hooft *et al.*, 2004). Job search self-efficacy, subjective norms and job search attitudes all contribute to job search intentions that inform actions, or a person's willingness to perform a behavior. The greater the person's intention and perceived ability to engage in the specific behavior, the higher the chances that they will perform the behavior. Prior studies have shown the three factors

to positively predict job attainment (Liu *et al.*, 2014). For conciseness, we remove ‘job search’ from the following terms: self-efficacy, attitudes, intention and behavior.

2.2. Expanding technology and employment research and tools in HCI

A review of past and more recent literature draws attention to the need to explore the benefit of career and employment-based technological tools outside of US contexts. Harris-Bowlsbey (2013) provides a review of career development research studies published between 1950 and 1996 and the emergence of computer-assisted career guidance (CACG) systems. Harris-Bowlsbey’s research spoke to the widespread use of career guidance technologies in the US. They acknowledged the increasing international market demands and opportunities for the worldwide distribution of CACG systems given the rise of technologies such as smartphones and computers. Our work addresses these opportunities by targeting a region *outside of* the US and identifying ways for such systems to provide support in non-US contexts.

A more recent review of past employment research in HCI also focuses predominantly within a US context and particularly among job seekers experiencing marginalization. These include homeless (Hendry *et al.*, 2017a, b) and autistic youth (Hayes *et al.*, 2015) and resource-constrained populations (Dillahunty & Hsiao, 2020, Dillahunty & Malone, 2015, Hendry *et al.*, 2017a, b, Wheeler & Dillahunty, 2018). Researchers have conceptualized several employment tools to support the unique needs and challenges that these job seekers face and categorized them as social, societal and personal (Dillahunty *et al.*, 2018). Using these categories as a guide, Dillahunty *et al.* (2018) conceptualized 10 employment tools in a speed-dating study, aimed to address these categories. While they anticipated that concepts aiming to provide social support would be highly ranked, they found that job seekers most preferred tools to address their immediate and practical needs, which were personal and social in nature, including Review-Me (provides resume feedback), SkillsIdentifier (provides support for articulating job skills), DreamGigs (helps to determine concrete paths to achieve employment goals) and Interview4 (aids job seekers with interview feedback). Tools aimed to support societal needs (e.g. discrimination, lack of transportation and day care) were only highly ranked among some job seekers but not on the whole, suggesting further investigation is needed among specific marginalized groups (e.g. older adults, single parents). At the time, very few, if any, of the tools had been deployed, and very few longitudinally. Since the study, researchers have deployed and evaluated the top-ranked tools: Review-Me and Interview4 (Dillahunty & Hsiao, 2020), SkillsIdentifier (Cherubini *et al.*, 2021, Dillahunty & Hsiao, 2021) and DreamGigs (Dillahunty & Lu, 2019). However, only Cherubini *et al.* (2021) and Dillahunty & Hsiao (2020) aimed to conduct a longitudinal study, and

Cherubini *et al.* (2021) was one of the few studies conducted outside of a US context, two gaps our work aims to fill.

Dillahunty and Hsiao’s past investigation of job seekers (2020) heavily inspired our work. However, this work was conducted in a Midwestern US region, consisting primarily of ethnic minorities, lower-income people and those who had earned less than a college degree. In a longitudinal study, their goal was to assess the effect Review-Me and Interview4 had on job seekers’ job search self-efficacy, subjective norms and job search attitudes. Job search intention fosters job search behavior, eventually contributing to job search outcomes.

Our study contributes additional qualitative insights of another category of underrepresented job seekers—immigrants—and in a different geographic context. Our work addresses the call for more qualitative research in the field (Pernice, 1996). Qualitative inquiry is important to provide deeper insights into the day-to-day situations and settings job seekers experience, which will balance the quantitative research that dominates occupational and organizational psychology (Pernice, 1996). Our work also helps to investigate whether past work generalizes to non-US-based underrepresented job seekers.

3. THE CONTEXT OF UNEMPLOYMENT AND JOB SEEKING IN SWITZERLAND

We conducted our study in the French-speaking regions of Switzerland, particularly in the Vaud and Neuchâtel cantons.¹ The duration of our study lasted from August 6, 2019, to December 3, 2019. Because qualitative findings (Marshall & Rossman, 2014) and job search are intrinsically linked to the context studied, we use this section to provide details of the current Swiss job market, relevant employment and demographic information and job-security benefits. As we detail later, the Swiss context provides substantial financial support when compared to the US context. However, the Swiss system also constrains the actions that job seekers can take much more than what happens in the US. We see these factors potentially influencing the sense of self-efficacy of the job seekers and their job-search activities long term.

The job market in Switzerland had undergone important changes in the last few years. The number of workers were 4.5M, in comparison to a population of 7.7M as of 2019 (Deplazes, 2019). In the same period, the employment rate was 65.5% and the unemployment rate was 4.6%. The remaining 30% were represented by students and retirees. It is notable that a large portion of the workforce were also foreign nationals (~20%) and two thirds of them originated from neighboring EU countries. An additional 5% of the workforce were *frontier workers*, who lived in neighboring countries and commuted across borderlines.

Immigrant groups, especially those from non-European countries, tend to experience labor market disadvantages

¹ Cantons in this study refer to semi-sovereign states.

(Auer *et al.*, 2017) and face periods of unemployment up to 3 months (50%) longer than Swiss natives (Auer & Fossati, 2019). The unemployment rate among Swiss nationals (3.1%) is less than half of their foreign-born counterparts (7.2%) (Organisation for Economic Co-Operation and Development (OECD), n.d.). This observable trend has been attributed to fewer social networks, but it is also largely due to employer discrimination (Auer *et al.*, 2017). The OECD asserts that a failure to address these disparities will likely lead to a work future with deeper social divisions, which could lead to negative well-being, social cohesion and overall growth. Other disproportionate rates of unemployment are among less-educated youth (those without post-compulsory schooling) (Organisation for Economic Co-Operation and Development (OECD), 2016).

In the past few years, youth unemployment has increased in Switzerland. Currently, the youth unemployment rate is around 8% (Secrétariat d'Etat à l'économie, 2021). The difficulty of accessing the labor market of this group is accentuated when the economy is not doing well (e.g. during a pandemic). Education plays an important role in the integration of this group in the workforce. Youth with tertiary education tend to have the best chances of integration because the number of low-skilled jobs has been considerably reduced due to the growth of the service sector (European Commission, 2021). Concerning the labor market positions of older people (55–64), Switzerland presents higher employment rates compared to the EU. Senior workers compose 3.1% of the overall population (European Commission, 2021). The unemployment rate of older workers is lower than that of the general population due to the relative stability of the job market and the tendency of companies in Switzerland to keep these workers (and their accumulated knowledge) until retirement. However, if these workers lose their job, they are confronted with long-term unemployment because it is very difficult for them to re-enter the labor market due to their higher cost, lower geographic mobility and outdated qualifications (Lalive & Lehmann, 2020, Secrétariat d'Etat à l'économie, 2013).

Recent reports also highlight how women are more likely to be unemployed than men (Lalive & Lehmann, 2020). The unemployment rate of women is 0.5% higher than that of men. Several inequalities still exist in Switzerland in terms of job opportunities and pay gap for this group.

Another group that experiences difficulty in the job market is disabled people, representing about 14–15% of the working-age Swiss population (Gärtner & Flückiger, 2006). The country broadly defines this group as people who suffer from chronic health problems that prevent them from performing professional and daily domestic tasks (Inspires, 2014). To further discuss this group, a distinction should be made between *moderately* and *severely* disabled people (this second group is closer to the definition used internationally). In Switzerland, this second group is supported by the invalidity and work injury insurance schemes, and in many cases these people are

not counted in the workforce or unemployed statistics. Disabled people compose 4.1% of the overall population (Inspires, 2014). As compared to the non-disabled, the overall rate of inactivity in the job market has been higher among the disabled: 26.3% of disabled people are currently not in the labor force, compared to 12.3% of non-disabled citizens (European Commission, 2021). In this group, the barriers to find a new job once unemployed are particularly high. However, the labor market conditions in Switzerland protect disabled workers against rapid dismissal and provide part-time employment options that are often adapted to compensate for health problems. There is no significant difference in labor market integration of disabled people depending on regions or gender. However, there are differences in employment rates among disabled people based on age and educational level attained (European Commission, 2021): the lower their age and education level, the lower their chances to retain labor market attachment. Also, recent reports indicate that health problems might not only create vulnerability but also be the consequence of other vulnerabilities.

Country-wise, the majority of workers was employed in the service sector (71%), a quarter of workers were in industry and trade (25%) and about 4% in agriculture. While the unemployment rate is very low in comparison with the rest of Europe, the unemployment rate grew considerably during the past few years of this study. The regional distribution of unemployment shows that the cantons of Neuchâtel and Jura reported the highest increase. In this part of the country, the job market had been shifting due to the pivoting watchmaking industry. The watchmaking industry represents the third largest export for Switzerland after chemicals and machinery, and the country is known for its high level of quality in mechanical watchmaking. The Jura and Neuchâtel regions are considered to be the 'Silicon Valley' of the watchmaking industry. Unfortunately, starting in 2016 this industry experienced dramatic shifts due to the advent of 'smart watches'. While the luxury segments were untouched by the changes, the retail segments moved online and were attracted by new manufacturers that could offer better integration with mobile technology (e.g. Apple, Samsung and Fossil). As a result, the Swiss manufacturing industry experienced a reduction of exports and had to let go a significant portion of the workforce.²

Social security benefits in Switzerland, however, are among the best in the EU region, and all workers pay an unemployment insurance that provides an allowance in case of unemployment to compensate the loss of income. Typically, the monthly allowance is 80% of the average pay the person has received during the past six months, and this is provided for a period of two years and varies in terms of the age of the recipient and duration of their last employment. The situation is more complex in the US because the duration in which unemployment insurance is allocated is not federally mandated and varies by

² See <https://www.bbc.com/news/business-46822929>, last retrieved November 2021.

state. While the nationally recommended amount is 26 weeks, some states run for as little as 14 weeks (Penketh *et al.*, 2015). Earlier reports found that unemployed workers received less than half of their previous salaries, and benefits in some states were as low as 27% of income for average earners (Forbes Media LLC, 2008). In short, the OECD places the US average payment rate near the bottom of the international table (Penketh *et al.*, 2015), and the original study took place in a state that was among the worst states in which to be unemployed (Stebbins, 2019).

Job seekers in Switzerland are required to register to job-placement offices of the canton of residence (ORP). Upon registration, Swiss job seekers are required to complete mandatory training and are assigned a case worker with whom they meet once a month. The case worker discusses job search strategies, defines a minimum number of applications for job seekers to complete each month and defines additional training courses the seeker might need to take during the unemployment to complement their current training and skills. The case worker can veto applications to occupations in which the seeker might not have the necessary qualifications or those judged outside the scope of the candidate's background. Job seekers are required to keep track of their job applications and provide proof that they have submitted their CV to the companies. Entitlement to unemployment benefits may be suspended or reduced in various circumstances, depending on the severity of the infringement.

In terms of the job-search process, the workflow is similar to that of the US and other countries. Open positions are typically identified through online databases and newspaper advertisements. The Federal Secretariat for Economic Affairs provides an online repository where most companies publish open positions and that covers ~80% of the jobs available in the country (SECO, 2020). Employers typically provide a postal address to submit job applications and an email address or web form for online applications. Today, most applications must be completed online. Job seekers in Switzerland are typically required to submit a CV³ together with a cover letter that explains why they are interested in applying to the position. In Switzerland, employers might additionally require job seekers to submit a work certificate issued by the previous employer (in case the job applicant had previously worked). This document is regulated by law and employers are required to issue it when the contract ends. After an initial selection process, companies invite selected job applicants to one or multiple onsite interviews. Unfortunately, and as we discuss later, not all job applicants receive a response from the companies at this stage, which is a source of stress for many unsuccessful job seekers. Depending on the company, the job interview could be conducted by the managers and employees of the department

wishing to fill the position, HR professionals or both. A few days or weeks after the interview, the candidate receives a written message either containing the job offer or a message of rejection.

4. METHOD

We gained inspiration from the longitudinal field study described in Dillahunty & Hsiao (2020). Informed by this study, we applied our study design across underrepresented job seekers; however, we did so in a Swiss context.

4.1. Study design

We conducted a 1-month randomized field experiment, which consisted of three parts: a pre-treatment session, a month-long tool deployment and a post-treatment session. Both pre- and post-treatment sessions included interviews and surveys. We opted for a longitudinal study because we expected that the effect of the support provided by the tools we tested in the study would become salient only after repeated use and in connection with job-search-related activities. Pre-treatment sessions in the treatment conditions included tutorials for the use of the aforementioned employment tools. Building on prior work expressing the need for a larger sample size of participants and the difficulty of retaining job seekers (Dillahunty & Hsiao, 2020), we sought to recruit as many participants as possible.⁴ Screened participants who agreed to join the pre-treatment session were randomly assigned to one of three conditions: RevueCV, InterviewApp and Control. Participants in the experimental conditions had access only to the corresponding tool during the longitudinal part of the study. Participants in the control group did not have access to the tools. We used sequential randomization (Pocock & Simon, 1975) to mitigate bias in balancing group assignments. To achieve balance in our tool assignments and ensure that job seekers most interested in improving their CV were not all assigned to RevueCV, we asked our participants to rank their job search interests (e.g. practicing job interviews, creating and polishing resumes and identifying skill sets). We did not inform participants of their assigned tool until the onboarding session (Fig. 1 presents the various stages of the field experiment). The study was approved by the ethics board at the Swiss institution.

4.2. Tool design

We employed two digital tools to support the job-seeking process: RevueCV and InterviewApp (DEDAL S.A.S., 2020). RevueCV was adapted from an open-source application that allowed job seekers to upload their resumes and receive

³ In Switzerland most people apply to a job position with a curriculum vitae (or CV). In most cases these are more succinct than the CVs used in the US, and similar to résumés.

⁴ More details about how we adapted the study materials from Dillahunty & Hsiao (2020) to our study are described in B.

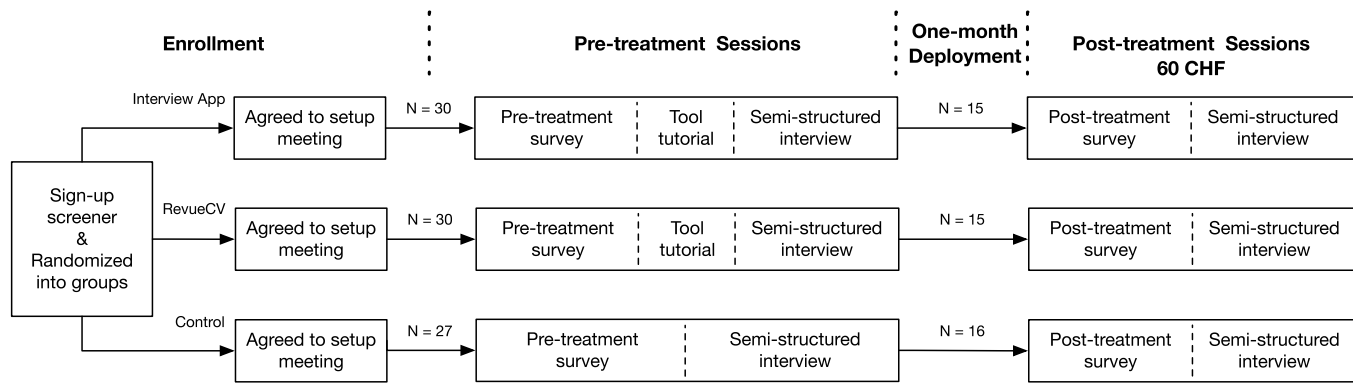


FIGURE 1. The stages of the randomized field experiment (adapted from Dillahunt & Hsiao, 2020).

feedback from volunteers.⁵ ReviewCV is a website that was originally developed for an English-speaking audience. We therefore localized the service to French. After users have logged in, they can create an entry in the system consisting of a job title (see Fig. 2a) and a job description (Fig. 2b). Then, users are required to upload the PDF of their resume (Fig. 2c). Once this phase is complete, the users can submit their resume for review. Using a separate view of the service, reviewers can analyse the resume and provide section by section commentaries. These commentaries are made available to the user the feedback page of the website and appear on the right-hand side of their resume (Fig. 2d). The feedback is organized by subsection of the CV. In addition to commentaries and advice for improvement, the reviewer also provides a 1-to-5 star rating for how well the resume communicates the qualifications of the job seekers with regard to the targeted job position.

InterviewApp is a website that allows job seekers to record mock interviews, self-reflect on their performance and optionally send their videos to friends and family to receive feedback. Once logged in, the user can record a mock interview. Each user is given a batch of five interview questions, which are displayed sequentially. For each question, the user receives a question prompt (see Fig. 3a) and then the user is given 5 minutes to provide an answer (Fig. 3c). The answer is recorded using the webcam connected with the PC (or laptop). A thumbnail image provides the user with a preview of the recording (Fig. 3b). The recording ends automatically at the 5-minute mark. Alternatively, users can manually terminate the recording if they complete their answer beforehand (Fig. 3d). After the fifth question, the user is given the possibility to download the recording of the answer provided for each question (see Fig. 3e) or a single zip file containing all the recorded answer videos (Fig. 3f). These files can be used to replay the interview, and they can be shared with peers or family members to receive

feedback. While ReviewCV automatically provided external feedback to participants, InterviewApp did not require participants to share their interview recording with their contacts for feedback.

4.3. Participants

There were four eligibility requirements for the study: (i) participants needed to have been actively seeking employment for the last six months; (ii) participants needed to have less than a master's degree; (iii) they needed to have either a digital or physical copy of their resume; and (iv) they needed Internet access. The first criterion was established to make sure the participant had enough time to follow the mandatory courses imposed by ORP and prepare their resume. The second criterion was established to screen out job seekers who would traditionally have a very short unemployment spell and who typically would benefit less from the tools tested in this study. The last two criteria were imposed to ensure participants could fully benefit from their participation in the study. However, some of our participants misunderstood the meaning of actively seeking employment for the past six months. There were a few job seekers who joined based on how long they had been on 'chômage' (or unemployment), which they interpreted as 'Assurance-chômage'—the unemployment insurance program that they joined after becoming unemployed, which could vary from the time they lost their jobs, although in most cases they tend to occur around the same time. We also managed to recruit one participant, P24, who had been put on 'hold' at work, which meant that she was still receiving pay but was not able to go in to work.

We employed both offline and online recruitment methods. A connection and data protection agreement with the regional employment center (Office régional de placement, or ORP) meant we were given access to contact information to 3200 active job seekers who could be contacted to take part in our research. Out of this initial group, we further filtered job seekers who had been enrolled in the ORP for at least six months

⁵ The code is available at <https://github.com/UMICTResearch/resume-me>, last accessed November 2021.

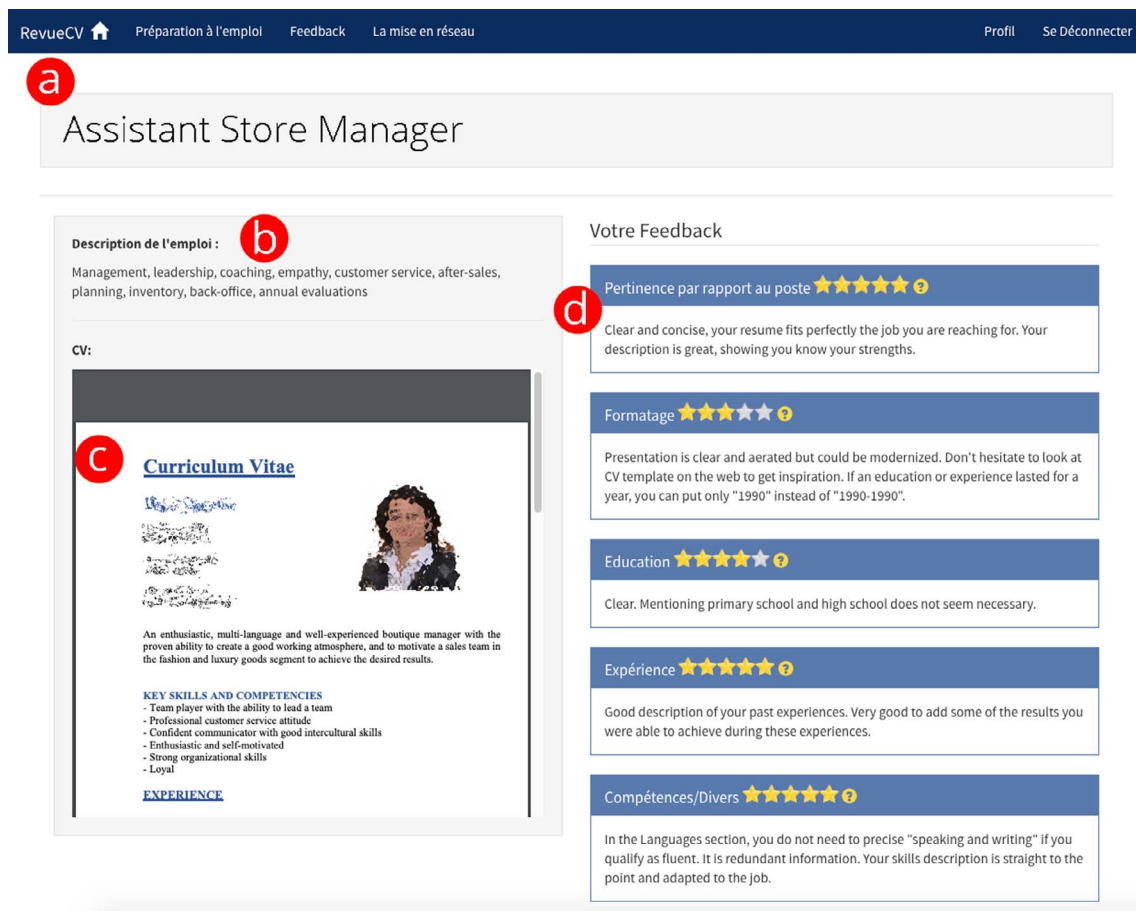


FIGURE 2. A screenshot of RevueCV. This screenshot shows the interface where a job seeker can review comments left on their CV by expert reviewers. At the top, a title (a) and a short description of the position the user is applying to (b). The CV is visible on the left hand-side of the page (c). The feedback is available on the right-hand side, organized by sub-sections of the CV (d). The reviewer provides a 1 to 5 star rating for how well the CV addresses each subsection.

and who held less than a master's degree. Matching candidates were sent an email invitation to fill an online screener that contained an informed consent and a few questions to capture demographic information and to check they were willing to participate in a month-long study and had Internet access throughout the duration of the study. We additionally provided job counselors at ORP with physical flyers and posted flyers around the city in shopping malls, university campus cafeterias and bulletin boards. Finally, we posted digital advertisements to similar Facebook groups such as those used in the original study and to Anibis.⁶ The flyers and the digital ads contained a short description of the study and a link to the same online screener described above.

Eighty-seven (N=87) job seekers signed up for the study and 46 of them finished it (control: N=16; InterviewApp: N=15; RevueCV: N=15), which was an attrition rate of 47.1%

(Table 1). Known reasons for attrition included: loss of contact or invalid contact information (N=21); participants landed jobs (N=5); preference to spend more of their time on job interview and related training (N=4); health and family problems (N=4); loss of interest (N=4); the cost of travel for the study was too expensive (N=2); and unspecified reason (N=1). There were no key differences found among those who remained in the study from those who started (see Table 2). In terms of age bands, we had a total of ten participants in the 'younger' segment (i.e. 15–24 years old), and five participants getting closer to retirement (i.e. 55–64 years old). The remaining 31 participants were in the middle age group (i.e. 25 to 64 y.o.). The average age of participants who finished was 36 years. There was good gender balance among participants who finished the study: males 20 (or 43.5%), females 26 (or 56.5%).

As suggested earlier (i.e. Section 3: Context), immigrants have a higher unemployment rate than Swiss natives, and made up approximately three-quarters of boarded participants and half of the job seekers who completed the study (23 partic-

⁶ See <https://www.anibis.ch/>, last accessed January 2021.

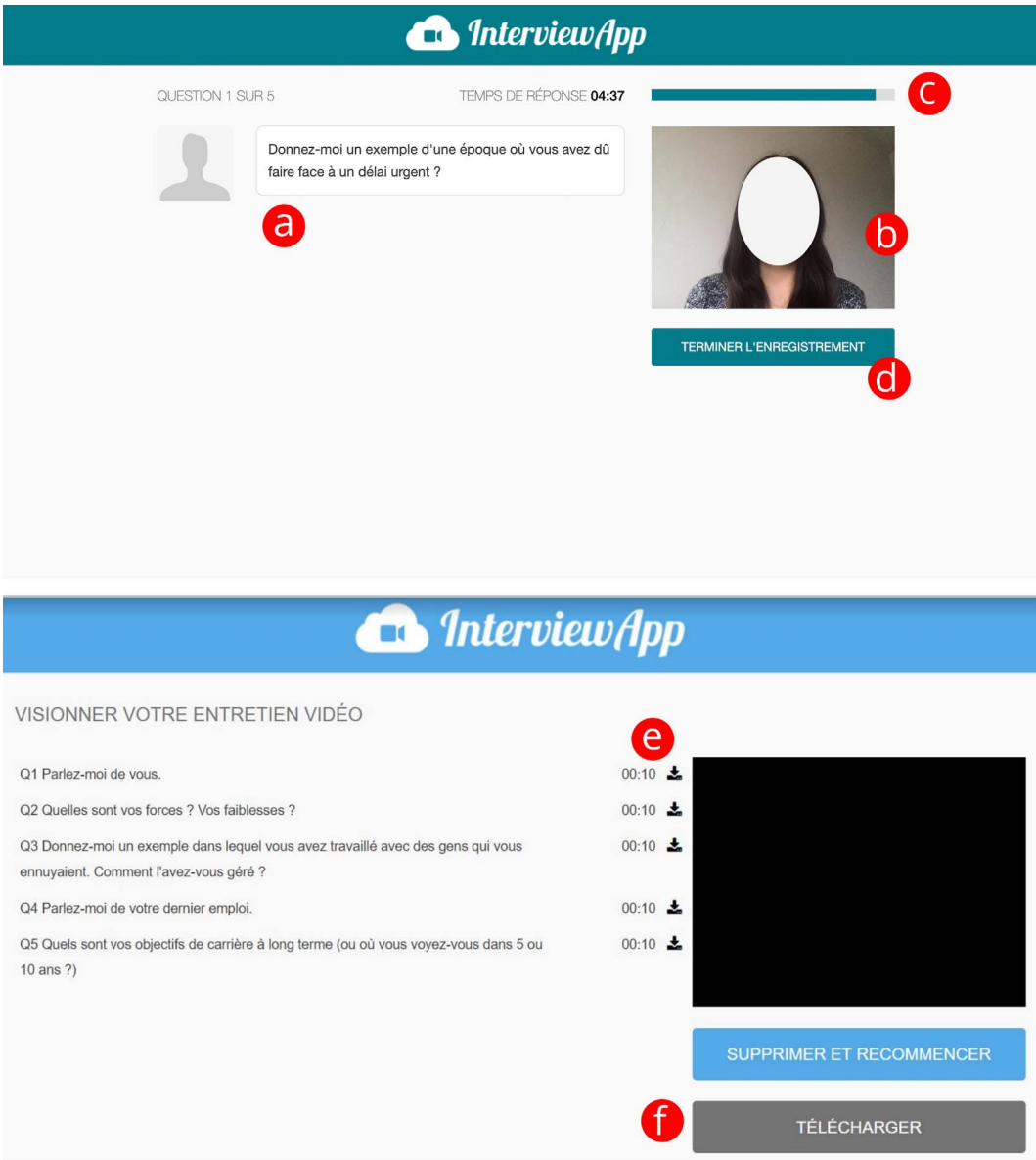


FIGURE 3. InterviewApp’s screenshots. Top: this screenshot shows the interface where a job seeker records interview practice videos. Users are given a batch of five interview questions. On the left-hand side users are provided with a prompt, or interview question (a). They then have 5 minutes to provide an answer and move to the next question (c). On the right-hand side, they can preview how they will appear in the recording (b), and stop the recording if they conclude their answer earlier (d). Bottom: this screenshot shows the last screen where a job seeker can rewatch a video by clicking on its title, or download the recordings for each training question by clicking on the download icon (e). By clicking the blue button ‘Supprimer et Recommencer’, a user can restart the interview, and by clicking the gray button ‘Télécharger’, the user can download a single zip file containing this session’s videos to seek feedback from peers (f).

ipants). Of these, 12 were EU immigrants (or 26.1%) and 11 were non-EU immigrants (or 23.9%). The large majority of them was searching for jobs in the service sector. Among the recruited participants, nine job seekers reported having disabilities that had an impact on their job search: three participants reported having chronic health conditions (i.e. P16,

P22, P88), three participants reported having conditions affecting their mental health (i.e. P69, P81, P87) two participants reported physical conditions that restricted their employment options (i.e. P48, P83) and one participant reported having dyslexia (i.e. P60). Of these, participants P22, P69 and P88 did not complete the study. Five participants reported receiv-

TABLE 1. Attrition by gender of recruited participants.

Gender	Beginning of deployment	End of deployment	Total dropouts	Attrition %
	87	46		
Females	48	26	22	45.8
Males	35	20	15	42.9
Non-binary	1	0	1	100
Preferred not to answer	3	0	3	100
Total dropouts			41	
Attrition %			47.1	

TABLE 2. Demographic characteristics of participants who completed the study. Conditions: RevueCV (or RCV), InterviewApp (or IA) and Control (or Cont.).

		Age						Gender				Immigrant				Disabled	
		15–24		25–54		55–64		Male		Female		EU		non-EU		Moderate	
Cond.	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	
RCV	2	4.3	10	21.7	3	6.5	5	10.9	10	21.7	4	8.7	1	2.2	4	8.7	
IA	4	8.7	10	21.7	1	2.2	8	17.4	7	15.2	5	10.9	3	6.5	1	2.2	
Cont.	4	8.7	11	23.9	1	2.2	7	15.2	9	19.6	3	6.5	7	15.2	1	2.2	
Total	10	21.7	31	67.3	5	10.9	20	43.5	26	56.5	12	26.1	11	23.9	6	13.1	

ing employment at the end of the study (i.e. P37, P65, P66, P77, P83).⁷

4.4. Pre-treatment session

We conducted our protocol in French and conducted the majority of our protocol in a UX lab at the Swiss university.⁸ Some sessions were also held at the ORP and alternate locations. We experienced frequent no-shows and last-minute rescheduling because participants lacked private transportation. Since offering flexibility was crucial, we conducted both individual and group on-boarding sessions and began to on-board participants at locations that were convenient to them. This effort included locations that were 45–60 minutes away via public transportation. Our research assistants traveled to locations convenient to participants and conducted interviews in participants' homes and in public places such as cafes and restaurants. Due to the stigmatizing nature of unemployment, we selected locations that would allow participants to discuss this delicate matter with a reasonable level of privacy.

Our pre-treatment sessions lasted a total of 60–80 minutes each. The pre-treatment sessions were held during August

2019. During the session, we asked participants to complete a pre-treatment survey (details in the next subsection), provided a tutorial on their randomly assigned tool (if the participant was in an experimental group) and conducted a semi-structured interview.

4.4.1. Survey

We translated and adapted the survey from past literature on job search interventions (Hooft *et al.*, 2004, Ryn & Vinokur, 1992, Vinokur & Caplan, 1987). This survey consisted of TPB measures, questions about participants' job search experience and their demographic information. Six questions assessed self-efficacy, two questions assessed subjective norms and three questions assessed attitudes. Job seekers rated their confidence on completing the following six job-search-related tasks to assess their self-efficacy: 'making the best impression and getting their points across in interviews, contacting employers to consider them for the job, completing a good job application or resume, using friends or other contacts to discover promising job openings, using friends and other contacts to find out about employers that needed their skills, and making a good list of their job skills' (Dillahun & Hsiao, 2020, page 4). A 5-point Likert scale ranging from 'not confident at all' to 'extremely confident' was used for this construct. Per Ryn & Vinokur (1992), these questions formed a reliability coefficient of .87. However, due to confusion in translation between two similar English options, 'Using friends and other

⁷ The full demographic details of the participants who completed the study are available in the open science repository at <https://osf.io/n5a7d/>, last accessed November 2021.

⁸ The protocols used in our study are available in the open science repository at <https://osf.io/n5a7d/>, last accessed November 2021.

contacts to find out about employers that needed their skills' and 'Using friends or other contacts to discover promising job openings', only five of the six tasks in the deployed survey were included. The second question, 'Using friends and other contacts to find out about employers that needed their skills', was not listed.

Job seekers indicated how hard their significant others wanted them to try to get a job in the next month to assess the factor of subjective norms. The survey also included questions about how hard other important people to them, such as family and close friends, wanted them to try to get a job. A 7-point Likert scale ranging from 'not hard at all' to 'extremely hard' was used for this construct. Per Ryn & Vinokur (1992), these two questions formed a reliability coefficient of 0.80. Job seekers specified the extent to which it was beneficial or harmful, wise or foolish, useful or useless to try hard in the next month to get a job, to assess attitude. A 7-point Likert scale ranging from extremely beneficial (wise, useful) to extremely harmful (foolish, useless) was used for this construct. Per Ryn & Vinokur (1992), the 3-item index formed a reliability coefficient of 0.86.

Finally, the pre-treatment TPB scale assessed participants' intentions to try 11 different job-search activities in the next month: 'In the next one month, how much effort do you intend to spend on trying the following job search activities?' (Dillahun & Hsiao, 2020, page 4]. We used sample activities such as visiting job fairs, preparing and revising their resumes, and reading classifieds/help wanted advertisements as described in Hooft *et al.* (2004), Ryn & Vinokur (1992) and Dillahun & Hsiao (2020). A 5-point Likert scale ranging from 'no effort at all' to 'a great amount of effort' was used for this construct and per Hooft *et al.* (2004), and questions formed reliability coefficients of 0.92 (employed participants) and 0.94 (unemployed participants).

4.4.2. Tool tutorial and practice

We provided a 5-minute tutorial to treatment-group participants to sign them up and walk them through their assigned tool. We gave participants an additional 15–20 minutes to practice relevant tasks. We also asked RevueCV group participants to upload their digital resume and review the feedback to confirm that they could successfully retrieve their feedback. We created a sample recording with participants in the InterviewApp group. All participants had access to laptop or desktop computers with cameras.

4.4.3. Semi-structured interviews

We asked participants to describe their employment status and recent job search experience. To supplement our survey results, we asked the following questions: 'In your job search, which activities do you feel the most/least confident about?' (self-efficacy); 'Among the people you know, who has provided you with the most support in your job search in the past month?' (subjective norms); and 'What are your thoughts about the

job search in general?' (Dillahun & Hsiao, 2020,p.4]. Finally, we asked our participants about their feelings about their job search and outcomes (attitude) and their experience using digital tools in their job search. RevueCV participants provided their thoughts overall on the tool and shared their feedback and their past experience requesting resume feedback from others. InterviewApp participants also provided their thoughts overall about the tool, their practice videos and sharing feature and their past experience practicing job interviews and receiving feedback.

4.5. One-month deployment

We assigned tool-based tasks to each group. We tasked RevueCV group members to upload at least two iterations of their resume and to revise their CV according to our feedback twice. We recruited a French-speaking research assistant who specialized in labor economics and took HR training courses to assist our study. She reviewed all the CVs uploaded by the participants and provided detailed feedback. The average response time was ~3 days. We tasked InterviewApp participants to use the tool at least once a week to answer questions that were assigned of them weekly via email. Researchers from the original study shared questions for us to use for our InterviewApp. These included the default questions used in their Interview4 application (i.e. 'Please tell me about yourself' and 'If I contacted your previous manager, what would they say about you?') (Dillahun & Hsiao, 2020, page 5] and four questions drawn from job websites (e.g. 'What do you know about the company [you are applying to]?') (Peterson, n.d., Wayup.com, n.d.). We translated all questions to French and encouraged participants to use their assigned tool whenever they needed. Finally, we tasked our participants with maintaining a monthly diary to track their weekly job-search tasks.⁹ To increase response rate, we sent weekly emails with instructions based on their assigned interventions and provided a link to a Qualtrics survey to submit their responses. Participants could submit diary entries via SMS, email or in-person. No one used SMS and some submitted updates via email. Overall, adherence was low because the ORP mandated participants to complete diaries containing their job search efforts; therefore, this required study task was redundant.

4.6. Post-treatment session

After the one-month deployment, we held post-treatment sessions consisting of a final survey and interview. While the post-treatment session survey and interview were identical to the pre-treatment session, we dove deeper into participant answers as an attempt to better understand their experiences during our

⁹ The templates of the diary used during the study in French, as well as those of the original study in English, are available in the open science repository at <https://osf.io/n5a7d/>, last accessed January 2021.

intervention. The only other exception was that we rephrased the questions assessing intention. We referenced participants' previous month's job search behaviors to account for the last month (i.e. 'In the past month, how much effort did you spend on the following job search activities?'). After participants completed their surveys, we conducted our semi-structured interviews to understand their job search and how the assigned tool, if applicable, supported them in the past month. Our post-treatment sessions lasted a total of 60–90 minutes. These sessions averaged longer than expected. One of the reasons is that many of our participants did not have French as their native language, so full understanding between researchers and participants often required reformulation of questions and instructions. Our study lasted from August 6, 2019, to December 3, 2019 (i.e. 119 days; about 4 months). Participants were paid a total of 60 CHF (~50 GBP). As we discuss later, this amount was considered insufficient by our participants.

4.7. Data overview

The large majority of our data stemmed from 86 pre-treatment interview sessions and 46 post-treatment sessions, which were audio-recorded and transcribed. The total length of these recordings was 37 hours and 17 minutes (pre-treatment session: mean=26:20, SD=23:49; post-treatment session: mean=24:41, SD=19:55). We were missing recordings for five participants (P22, P26, P53, P58, and P77) and had partial recordings for three participants (P9, P14 and P15). We supplemented the missing recordings with our detailed observations and notes. We transcribed all interviews and used an automated tool to generate initial translations in English and hired a native French speaker who was fluent in English to review the translations and address any incoherent text. We provide details of tool usage among each group in [D](#).

4.8. Data analysis

4.8.1. Quantitative analysis

Although we employed linear regression to analyse our data, we did not observe that the tools had significant effects on job seekers' self-efficacy, subjective norms and job attitudes. It is possible that our sample size was not large enough to earn statistical power. Thus, we focused on descriptive statistical analysis to understand whether and how job seekers' TPB factors changed based on their assigned tool. For readers who are interested in the regression analysis results, please refer to Appendix [E](#).

4.8.2. Qualitative analysis

We started with provisional coding ([Saldaña, 2015](#)), to begin with a 'start list' of codes based on what earlier investigations suggest would appear in our data. This list included the TPB factors—self-efficacy, subjective norms and attitude. We also

based our initial codes on prior work (i.e. [Dillahunst & Hsiao \(2020\)](#)): perceived benefits of the tool (e.g. receiving resume feedback); tool feedback, or tool concerns and improvements. Other categories, besides the TPB factors and those described in the US study ([Dillahunst and Hsiao, 2020](#)) included 'positive attitude', 'negative attitude' and 'changed attitude'. We held several meetings to ensure that the code books were well understood.

Once we had the provisional codes, we reviewed our transcripts line-by-line and highlighted the related quotes. It was later found that not all codes, however, applied (e.g. 'increased job search attitudes', 'technology support') and we did not find quotes that fit these codes. We added 'autonomy' and 'pressure from ORP' to reflect our findings. During the analysis, the team engaged in a weekly process of refinement and dialogue to reach agreement in emerging codes.

5. RESULTS

Overall, our most surprising finding, as suggested by our survey results, is that the interventions did not lead to substantial changes in the TPB values ([Table 3 to 6](#)), and in fact resulted in a slight decrease across self-efficacy and attitudes. On the surface, participants in the *RevueCV* and *InterviewApp* groups appreciated the support provided by these two tools, as revealed by feedback captured in the interview sessions. However, a deeper analysis of the qualitative results revealed that the extra support provided by the two tools was not as beneficial to participants as expected. While *RevueCV* provided participants with expert feedback on their CV, this was considered redundant given the support already offered by the ORP. Although *InterviewApp* provided limited support to participants' self-efficacy, it helped them to realize that their social circles could not provide beneficial feedback for their job applications, thus influencing their subjective norms.

In this section, we provide an overview of participants' survey results. We discuss participants' overall job search experience and contextualize some of our findings. We then describe how the tools influenced participants' TPB factors. We provide details of participants' tool usage in [D](#) and compare our results with those of [Dillahunst and Hsiao \(2020\)](#) to study whether (and how) different contextual conditions might influence the participants' engagement with the tools and their overall feedback. The details of this comparison are available in [F](#).

In addition to analysing our qualitative data for TPB factors, we found *autonomy* to be a key factor in Swiss job seekers' job search process. Autonomy refers to job seekers' ability to make independent decisions in their job search. Most job seekers described a lack of perceived autonomy in their job search experience. While our qualitative results do not suggest a direct influence on job seeker autonomy within the assigned tools, we describe how the tools, in addition to the ORP, might have played a role. In the following subsections, we describe

TABLE 3. All ratings are projected onto the span of 0 and 1. This table includes participants' mean TPB values (standard deviations), and $PercentageChange = (Mean_{post} - Mean_{pre})/Mean_{pre}$.

Group	Self-efficacy		
	Mean & SD (Pre)	Mean & SD (Post)	Percentage Change
RevueCV (N = 15)	.510 (.273)	.500 (.222)	-1.96%
InterviewApp (N = 15)	.633 (.230)	.633 (.281)	≈ 0%
Control (N = 16)	.625 (.183)	.609 (.224)	-4.09%

TABLE 4. All ratings are projected onto the span of 0 and 1. This table includes participants' mean TPB values (standard deviations), and $PercentageChange = (Mean_{post} - Mean_{pre})/Mean_{pre}$.

Group	Subjective Norms		
	Mean & SD (Pre)	Mean & SD (Post)	Percentage Change
RevueCV (N = 15)	.761 (.285)	.794 (.285)	4.34%
InterviewApp (N = 15)	.744 (.284)	.672 (.286)	-9.68%
Control (N = 16)	.646 (.313)	.714 (.265)	10.53%

TABLE 5. All ratings are projected onto the span of 0 and 1. This table includes participants' mean TPB values (standard deviations), and $PercentageChange = (Mean_{post} - Mean_{pre})/Mean_{pre}$.

Group	Attitudes		
	Mean & SD (Pre)	Mean & SD (Post)	Percentage Change
RevueCV (N = 15)	.837 (.169)	.781 (.227)	-6.69%
InterviewApp (N = 15)	.711 (.243)	.711 (.272)	≈ 0%
Control (N = 16)	.774 (.177)	.795 (.159)	2.71%

details of our findings and provide further interpretation of our results.

5.1. Survey results

5.1.1. *RevueCV*

Most participants stated in their interviews that *RevueCV* was beneficial in helping them revise their resumes; however, *RevueCV* was limited in influencing job seekers' TPB factors. Some *RevueCV* participants reported mixed feelings with

TABLE 6. All ratings are projected onto the span of 0 and 1. This table includes participants' mean TPB values (standard deviations), and $PercentageChange = (Mean_{post} - Mean_{pre})/Mean_{pre}$.

Group	Intention & Behavior		
	Mean & SD (Intention)	Mean & SD (Behavior)	Percentage Change
RevueCV (N = 15)	.686 (.157)	.676 (.152)	-1.46%
InterviewApp (N = 15)	.689 (.174)	.635 (.188)	-7.84%
Control (N = 16)	.594 (.181)	.553 (.144)	-6.90%

the tool. Three participants stated they would not have an immediate need for it after finishing our intervention because they felt their CV did not need frequent updates. In addition, six participants felt that the tool provided feedback that was somewhat redundant to what the ORP already provided. Here, participants were referring to mandatory training on how to prepare their job application.

While a few participants suggested that the tool supported their self-efficacy, we found a slight decrease (Percentage Change = -1.96%) in *RevueCV* participants' self-efficacy survey results. This slight decrease had the same negative trend of that of the control group, hence it could be explained by the natural decline in self-efficacy as time in the unemployment spell extends (Wanberg *et al.*, 2005). Our survey results showed that *RevueCV* participants had increased subjective norms (Percentage Change = 4.34%). Almost all participants consistently reported in their interviews that the feedback received through *RevueCV* encouraged them to revise and improve their CVs. However, as we discuss later, ORP-mandated courses regularly covered CV preparation training. Last, *RevueCV* participants had decreased attitudes (Percentage Change = -6.69%). The analysis of the interview data revealed that six participants in this group lowered their expectations toward the job search after the month-long study, which could explain the decline measured through the surveys.

5.1.2. *InterviewApp*

Overall, among the 15 *InterviewApp* participants who finished the study, 14 gave positive feedback on the tool. Although *InterviewApp* participants stated in their interviews that their self-efficacy improved after using the tool, there was not a detectable change in their group's self-efficacy (Percentage Change ≈ 0.0%). Given that the *RevueCV* group (Percentage Change = -1.96%) and control group had negative changes (Percentage Change = -4.09%), it is possible that *InterviewApp* helped the Swiss job seekers counter the natural decline in self-efficacy as time in the unemployment spell extended.

In terms of subjective norms, the survey showed a decrease (Percentage Change = -9.68%) and interview results help

unpack this finding. Only 4 out of 15 participants shared their mock interviews with peers and family during the study. Of these, only 3 received informational and emotional support, which might have been beneficial to their subjective norms. The remaining 11 participants did not share and 8 participants specifically mentioned not sharing because they felt uncomfortable with it. We will come back to this point later in Sec. 5.3.2. Finally, we did not find that InterviewApp had a salient influence on job seekers' attitudes in either our interview or survey data. In fact, there was not a detectable change in participants' job search attitudes (Percentage Change $\approx 0.0\%$) after the study. In the interviews, participants reported mixed feelings about how to best tackle their job search.

5.2. Participants' experience with the job search

Most participants' job search experience was the same as what we described in Sec. 3. To avoid repeating these details, we provide an overview of the high-level barriers participants experienced and provide additional details of their job search experience in C.

Participants cited contextual, personal and qualification barriers that impeded their search. One of the most frequently cited barriers to finding employment, as implied earlier, was the current market condition and the lack of available job opportunities (39 mentions). The next most frequently cited barriers were personal in nature. For instance, participants felt they experienced difficulties finding employment because of their limited network of contacts (18 mentions). The oldest participants mentioned age as being one of the reasons why they could not find a job (12 mentions). Other limitations to their job search, that were personal in nature, included health issues (4 mentions) and limited access to personal transportation (3 mentions). Several participants also referred to qualification barriers that slowed down their search: lack of experience (9 mentions), lack of skills (7 mentions), their education level (4 mentions) and their level of digital literacy (2 mentions).

A key variable in the study, and common among all participants, was the ORP. Several participants expressed their mistrust toward this authority (7 mentions) and stated that they received limited to no support from this office (17 mentions). More important, many participants described how the ORP regulations reduced—and dictated—the options to which they could apply (10 mentions), thus affecting the sense of *autonomy* of participants.

5.3. Intervention effects on the TBP constructs and autonomy

In the subsections that follow, we discuss how the tools influenced the three TPB factors, job search intention and the emerging theme—autonomy, among participants.

5.3.1. Self-efficacy

We noted a salient gap between the survey and interview findings of the study concerning the self-efficacy factor. While several participants in RevueCV and most participants in InterviewApp were positive about the two tools and how the tools helped them gain confidence, the survey responses revealed no positive changes. The analysis of the interviews helped to clarify this difference. While only 7 participants (of 15) in the RevueCV group reported effects on their self-efficacy in terms of confidence, control and awareness, 14 participants (of 15) in InterviewApp felt the tool helped them improve their self-presentation.

Of the 15 RevueCV participants, only one participant (P87) felt more confident about *himself* and another six (P65, P70, P72, P77, P81, P83) became more confident about their CVs. For example, P83 was a 39-year-old man with a disability. He was previously an automobile mechanic and decided to look for administrative roles because of his disability. With a degree of 'apprentissage' from a vocational school—similar to an associate's degree in other countries—he described the various barriers to securing a job because many positions required higher degrees. The RevueCV feedback helped him to keep his CV up-to-date.

*'I liked the feedback, it was clear. The feedback was great. Preparing a CV takes time. I feel more confident with my resume. The more we are up to date, the more we are a good candidate.'*¹⁰

Almost all InterviewApp participants reported positive feedback. InterviewApp participants felt reassured about their interview performance, were more confident after practicing to improve their interview skills and felt better prepared for questions.

Almost all InterviewApp participants (N=12) improved their awareness of self-presentation and interview skills (P24, P26, P30, P37, P41, P42, P43, P48, P50, P51, P53, P58) after using InterviewApp. Specifically, 8 of the 12 participants attributed their improved self-efficacy to awareness of their body language in interviews. P42, who was a woman in her 30s, was an immigrant from Portugal and had looked for jobs in both Portugal and Switzerland. The different social norms of body language between Switzerland and Portugal made it challenging for her to find a job. P42 said that using InterviewApp to practice interviews helped her become more aware of and manage her overly expressive body language.

'I had never asked someone to watch me during an interview. Neither my husband nor anyone. I did not think about it. But now I understand that it makes sense. I did not think I needed to fix anything before using InterviewApp.'

¹⁰ The interviews were conducted in French. The original quotes in French, together with the translated quotes, are available at <https://osf.io/n5a7d/>.

These findings suggest that InterviewApp helped to improve job seekers' self-efficacy by improving their confidence and awareness of their own image. These improvements led to improvements in their interview skills and subsequently their interview performance, or at least improvements in their perceived performance. InterviewApp participants, in general, felt more prepared for job interviews after using the tool, and many continued using it to prepare for upcoming interviews.

5.3.2. Subjective norms

There was no qualitative evidence suggesting that RevueCV had any effect on job seekers' normative beliefs, motivation to conform to social standards or social pressure to find a job. All participants using RevueCV received expert feedback on their CVs. However, none of the participants felt compelled to change their strategy regarding their job search based on their feedback. We looked for signs of social support outside and across the interventions in our interviews. We found that 9 participants in the RevueCV, 9 in the InterviewApp and 11 in the control group commented positively regarding their involvement with the study. Many described how being part of the study made them feel cared for. Some also described how the researchers took time to listen to their stories, asked questions and sometimes provided ideas. Likely these moments provided relational support beyond the goals of the research. For instance, P77, who was depressed about her job search and felt pressured by the ORP, stated:

'[RevueCV] The study motivated me, and I liked to have feedback on my CV.'

Filling out the diary was also something that several participants perceived as being beneficial and supportive. A few people in each group, namely 4 in RevueCV, 4 in InterviewApp and 5 in the control group, mentioned that completing the online diary each week made them reflect on their job search strategy and how to optimize their time. In summary, these findings might explain the increase of subjective norms as captured by the surveys, but it does not justify the decrease for the InterviewApp group. However, we found factors in the interview data that could help explain the different perceptions these participants had.

Despite its availability and our encouragement for participants to use it, we found that only four InterviewApp participants (P28, P30, P42 and P50) used the 'sharing' functionality feature. These participants received comments that were useful for their interviews from people who they shared the videos with. However, these participants did not follow our instructions to download and upload their videos to a secure online platform. Instead, they shared their videos directly by showing the videos on the application to their family and friends. For example, P30 was a 20-year-old male immigrant from Thailand. He was looking for a position as a store assistant

but was also open to different job opportunities. He said his parents watched and commented on his practice videos: *'I showed my videos to my parents. There are things I did not think before, they told me,'* referring to his posture and the tone of his voice.

The other 11 InterviewApp participants did not share their practice videos, for multiple reasons. However, one of the most often cited reasons was that they realized they did not know who to share the video with. These participants knew they could share their videos with friends and family. However, most felt that these contacts could not provide *relevant* feedback. Participants felt that their contacts would not know the details of their line of business and that their feedback would not be objective. For instance, P28, a male in his late 30s looking for a PR manager position, stated: *'I would have appreciated neutral [or more objective] feedback. The family will respect the sensitivities, a professional won't so the feedback is better.'* Another eight participants explicitly stated that receiving feedback from peers or volunteers was useless because they felt that this feedback would not be relevant. P51 described only wanting to rely on his own analysis of the interview. P58 stated that *'I have no relatives in my field so it's less relevant to have their opinion.'* This suggests that a lack of networks or appropriate connections was the reason he chose not to share. While P26 described confidence in his interview skills, he also indicated that his videos were private and considered potentially sharing them with the ORP:

'I did not share videos but I did tell my friends about it. I do not need [to share the videos] as I am confident enough and maybe because it's a bit private. Maybe I'll show it to the ORP.'

Another reason that was reported by participants to not share their videos was that they felt *uncomfortable* showing themselves answering job interview questions (N=8: P24, P28, P37, P39, P41, P43, P51, P53). Among the eight participants who did not feel comfortable sharing the videos, the discomfort was associated with participants' low self-efficacy and their introverted personalities. For example, P53 was a 26-year-old male immigrant from Costa Rica looking for a disc jockey (DJ) position. When asked why he did not share his practice videos, he described his videos as 'not good'. He did not even review his *own* videos.

'I did not share the videos with anyone. They were not good—I did not want to see it again. I didn't want anybody to see it.'

In addition to lacking confidence in her interview skills, P43 felt the stigma of being unemployed. She expressed that unemployment was a 'taboo subject' to her and did not want other people to know about her unemployment. Without sharing the videos to anyone, she said,

'I did not share the videos because for me it [unemployment] is a taboo subject. When you lose a job, it is not easy to say it and to have the opinion of others and ask for help. It's not something you want to tell.'

Last, one participant (P48) had technical issues when she tried to download the videos. The videos were broken so she was not able to share them with anyone. To summarize, while all participants perceived a sense of social support by taking part in the study (i.e. completing their diaries and interacting with researchers), InterviewApp participants reported several constraints when the study prompted them to rely on their social network. Our survey results might reflect shifts in their appreciation of perceived social support after these limitations surfaced.

5.3.3. Attitudes

Our interview results show where participants felt helpless after speaking with recruiters and that their job search efforts were useless. P60, a male on his late 30s, reported being socially isolated, having dyslexia and feeling that being dyslexic made his job search more complicated. Although recruiters are not able to explicitly suggest bias in the hiring process, participants inferred based on misplaced recruiter comments that they might experience hiring difficulties due to factors beyond their control.

'Recruiters often rely on diplomas, but recruiters, when I explain my disability, they are a little reluctant. I would like to continue doing what I did before, but because of my problems I cannot do it and it was hard to accept that.'

Other participants experienced health-related problems. For instance, P89, an HR professional who was quite familiar with all of the Swiss job market quirks and ORP procedures, reported burnout as the main reason he could not find a job. He could not work for several periods at a time, which created 'holes', or gaps in his CV that he could not explain to recruiters.

'There is always a question that we have not planned in an interview. I'm blocked when I am asked why I left my old job as it was because of my burnout. I do not know how to lie, so what should I say?'

Other participants reported feelings of helplessness because of their age, something they could not change despite their best intentions. For instance, P70, a male in his 50s who was previously a stock manager coming from Mozambique reported concern with the jobs proposed to him. Particularly, he felt that the offers he received in Switzerland were not aligned with his previous salary conditions.

'I had some interviews, since the beginning of the study, and after I changed my CV. But because of my age the possibilities are reduced. People are trying to pay as little

as possible! I had a job offer paid 25CHF gross per hour, which I refused because I have my dignity.'

In summary, our interview data did not suggest that either of the two tools influenced participants' attitudes. It is also possible that feedback received during interviews can lead to sudden noticeable changes in the TPB constructs, particularly for job seekers who could face discrimination due to their age, health, or other personal conditions.

5.3.4. Intention and behavior

Our interview data show that most participants felt demotivated toward the job search, an activity they had been dealing with for several months when the study started. Several participants described the feeling of running in circles and that their efforts were not paying off. Many participants reported applying to several open positions and receiving few to no responses from hiring companies. Other participants reported feeling helpless after their interactions with recruiters, as described in the previous section. P66, a female participant in her 40s, described how the lack of feedback from companies and the lack of freedom to choose her own training eroded her initial impulse to find a job.

'When I registered for unemployment, I was very confident. I thought I would find something in less than a month. But after the first, second appointment, I did not find the support I expected. I wanted to know what was wrong with my application. Also, I wanted to take IT and language classes, but the ORP did not finance them.'

Several participants took courses during or prior to the study to write their CV and the cover letter and to obtain interview training (nine in RevueCV and eight in InterviewApp). However, some of these participants reported these courses were not what they wanted to increase their chances to get a job. As we discuss next, participants' decrease in Intention and Behavior measures could be attributed to many of the above factors.

5.3.5. Autonomy

Beyond the TPB factors, we found two factors contributing to our job seekers' *autonomy*: the ORP and our tools. Autonomy refers to job seekers' ability to make independent decisions in their job search. Our interviews revealed the constraints that the ORP placed on participants' freedom to decide their course of finding employment. To maintain access to their unemployment benefits, job seekers were given a quota of applications to submit every month. The exact number varied by factors such as age, health, education and market conditions, among others, and many participants faced difficulties matching this quota. They did not want to apply to just *any* offers that matched their profile. Instead, they wanted to be selective about where they submitted applications. They wanted to have the option of choosing their employment conditions and responsibilities,

which created tension between their intrinsic need to find a job and the extrinsic requirement to match ORP directives. This led many participants to submit ‘bogus applications’—i.e. they applied to open positions to meet ORP requirements but did not wish to receive offers for these positions. P86, a new mother in her early 40s, described how the ORP’s unemployment program pushed her to pursue office jobs that she did not want. She was tired of working in an office and was looking for part-time positions that required manual labor. However, the case worker thought she was overqualified for those positions and nudged her toward administrative assistant positions.

‘I have been looking for work since July 9th.¹¹ I am looking for a part-time job because I have a baby. But it’s not easy to find something part-time. And the ORP forces me to make 12 offers a month and I do not even find 12 part-time positions. I’m applying for jobs at 80% hoping it does not work...’¹²

Furthermore, we learned that the ORP was not only constraining the *number* of applications but also the *types* of applications job seekers submitted. In fact, the case workers strongly encouraged job seekers to apply to positions that were extremely close to their past positions; they thought this would maximize their chances of finding employment. In some extreme cases, case workers scheduled interviews on job seekers’ behalf, and would not consider job applications toward the monthly quota that they disagreed with. This increased job seeker frustration and resentment, especially those who desired career changes. P77, a very dynamic and active female participant in her 30s, had a retail sales background but wished to look more broadly. She received no support from the ORP.

‘I have to send 14 applications a month. I’m looking in sales, but I can also look in HR. If I look outside those areas, I have to do it myself, it doesn’t count for ORP.’

Job seekers were also required to attend training programs arranged by their ORP case workers. Some participants intended to pivot their career and wished to do so by acquiring new skills with training courses. If ORP case workers judged the training to be too far removed from their background, they also experienced refusal of support. P70, an immigrant in his 30s who was a mechanic, was interested in working in software development and intended to take a machine learning course. However, the ORP refused to pay for the course.

As we analysed the restrictions to the autonomy participants experienced during their unemployment spell, the connection with their regulatory processes became evident. Most

participants described situations where the lack of autonomy translated into a difficulty to self-regulate. Many applications were submitted to comply with the ORP’s regulations and not because they truly desired those jobs; lack of responses—or negative feedback—from companies was taken as judgmental and disapproving on them as individuals. Keeping track of tasks became more difficult and prone to procrastination. For instance, P53, a male participant in his 20s who relocated from South America, described the difficulties he had in keeping track of his job search activities and also the tasks that he had to complete for the study.

‘It did not give me anything [filling the diary]. I did it because I had to do it for you [the researcher], but I was late with it. I forgot all the time what I had done [the job-related tasks he did during the week]. To be honest, it was boring to remember to do it. I saw your emails and I be like, oh I forgot it again.’

Aside from the ORP and job-seeking context, we also found that RevueCV and InterviewApp impacted participants’ autonomy, but in different ways, and distinct from those of the ORP. Both tools allowed participants to self-reflect and seek feedback that could support their job-seeking tasks. However, these tools allowed these practices with different degrees of agency: RevueCV feedback was inherently automatic and required, and feedback via InterviewApp was self-initiated and optional. This asymmetry led participants in the two groups to comment differently based on their perception of control (i.e. less control to choose who their resumes went to for review versus control over who they sent their mock interviews to).

Seven participants in the RevueCV group felt that the feedback they received was unnecessary and nine participants reported not having an immediate need for the tool. These participants did not take advantage of the comments on their CVs primarily because they did not ask for them. P85, a female participant in her 50s who worked previously as an administrator for a law firm, described how RevueCV did not provide much support. We underline possessive pronouns to emphasize how the feedback felt extraneous to her.

‘It was not always easy to understand what you wanted. Your way of doing the CV does not suit me, to be frank. I still changed 2-3 things but I kept my style. RevueCV did not bring me much. My CV has been a little rectified, but that’s it.’

On the contrary, most participants in the InterviewApp group felt positive about the app: 11 participants commented that the app allowed them to self-reflect on how they behaved during interviews and helped them to gain confidence. InterviewApp’s support for this group was better received because it did not overlap with activities typically prescribed by the ORP. Participants were also freer to train for interviews and to seek additional feedback if they wished to do so. P50, a female

¹¹ This date refers to the year 2019. At the time of the interview, this participant had been looking for work for 4 months.

¹² The percentage refers to the regular working hours. In Switzerland, an 80% job corresponds to working 4 days a week.

participant in her 40s who worked in the fashion industry and left because of burnout, described how InterviewApp helped her be more in control of her non-verbal behavior during an interview.

'I learned about myself and how I speak during an interview. I discovered that I do not look at the other person in the eyes. If the tool remains free I will continue to use it. I have a visual memory, so I like this kind of training.'

Only four InterviewApp participants sought feedback from peers and family members for the reasons we discussed previously in Sec. 5.3.2. These participants found the feedback they received to be useful and supportive. In summary, we observed that providing context and tools that allow autonomous initiative is necessary to support job seekers' motivation, growth and well-being.

6. DISCUSSION

Our work contributes qualitative insights to our job seeker interventions outside of a US context. While we made use of Ajzen's TPB, a theory that has been used to predict job search behavior and is well supported in past research (Caska, 1998, Ryn & Vinokur, 1992), our study results suggest a deeper investigation of this theory. Given the changing nature of job search behavior and potentially outdated TPB questionnaires and framework, prior work suggests the future use of alternative frameworks to analyse contemporary job-search strategies (Dillahun & Hsiao, 2020). We contribute SDT as an alternative framework.

Per Fig. 4, our work uncovered additional limitations of the TPB, namely that the current theory does not consider reasons why job seekers might fail to act on their job search intentions. This limitation, referred to as the gap between behavior and intention, has also been identified in different streams of research (Baumeister et al., 2007, Inzlicht et al., 2014, Ryan & Deci, 2000, Van Hooft et al., 2012). These research streams argued that theory and research on *self-regulation* could be useful to build a more comprehensive understanding of job search behavior, which we further explore in our discussion. Because the ORP's external regulations impacted job seekers' self-regulatory behavior, we leverage SDT (Deci & Ryan, 1985), to better conceptualize our results.

SDT is a broad theoretical framework used to study human motivation and development and can help explain this intention-behavior gap (Hooft, 2018b). Within the SDT, the concept of *autonomy* is key to understand the quality of behavioral regulation (Ryan & Deci, 2006). Our qualitative results clearly suggest autonomy, or the lack thereof, as the key factor contributing to our results, which show a surprising decrease in intention to behavior across *all* groups, including our control group. Autonomy is vital among job seekers who are under-represented because they are often forced to find jobs to meet

their basic needs and do not have time to focus on matters beyond this (Hui et al., 2018). Thus, we frame our findings and contributions around autonomy and self-regulation (see Fig. 4). Our results suggest that participants held less autonomy given the nature of the ORP's restrictions and the distrust participants held for the institution. Our tools also afforded two distinct levels of autonomy. Borrowing from SDT (Ryan & Deci, 2000), we discuss design recommendations for future employment tools. We also discuss our results in the context of past HCI and vocational literature, which has primarily been focused on US settings (Harris-Bowlsbey, 2013).

6.1. Self-determination theory and self-regulation

SDT is a broad theoretical framework used to study human motivation and development. The three supporting conditions include autonomy, competence and relatedness. Competence and relatedness hold some similarity with the TPB constructs of self-efficacy and subjective norms, respectively. Thus, we focus on autonomy because, as pointed out in the literature review, it has been recognized as a construct that can help explain any dissonance between intention and behavior (Hooft, 2018b) and does not have an equivalent TPB construct. SDT postulates that people have not only different amounts of motivation toward a certain activity but also—and more important—different *types* of motivation, specifically different orientations with underlying attitudes and goals that give rise to action (Deci & Ryan, 1985).

The most basic distinction is between *intrinsic* and *extrinsic* motivation (see Table 7). The former refers to doing something because a person finds it inherently interesting or enjoyable (e.g. reading a book), whereas the latter refers to doing something because it can lead to a separate outcome (e.g. preparing for an exam). Furthermore, SDT proposes that there are several types of extrinsic motivation that differ in the degree of internalization (i.e. the degree to which the behavioral regulation is autonomous versus controlled). Each of these motivation types corresponds to a different regulatory style. These styles range from heteronomy (or controlled regulation), to autonomy or *true* self-regulation (Ryan & Deci, 2000). Self-regulation is defined as 'an internal process that enables individuals to maintain their goal-directed activities and guide their goal attainment over time and across changing situations' (Hooft, 2018b, page 7). Self-regulation is needed when an activity, such as job search, has short-term costs (e.g. it is unpleasant, boring or otherwise aversive) and long-term benefits (e.g. finding a job in a reasonable number of months).

The most autonomous form of regulation (occurring on the far right side of Table 7), namely the regulation by the self, is unconflicted and based on interest in the behavior (Ryan & Deci, 2006, page 1563]. People are inherently satisfied at this level.

The most heteronomous forms of motivation are those that are externally regulated and lead to compliance (occurring on

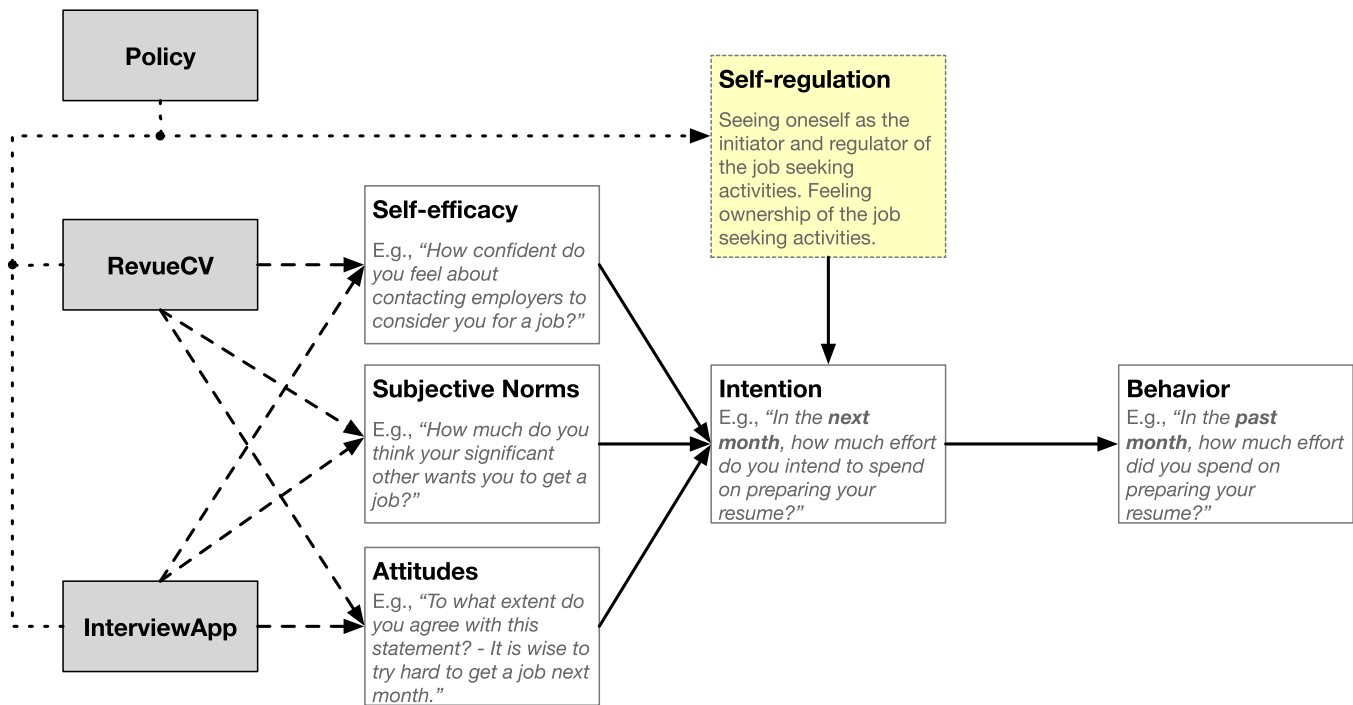


FIG. 4. The TPB model used in this study (adapted from the original study and Hooft, 2018b). Updated to show how self-regulation moderated the gap between job seekers' intention and behavior.

TABLE 7. Various levels of human motivation postulated by SDT (adapted from Ryan & Deci (2000)). Ideally the goal is to move job seekers from an external regulatory state to a self-regulation state.

Motivation	EXTRINSIC MOTIVATION				INTRINSIC MOTIVATION
Regulatory style	External regulation	Introjected regulation	Identified regulation	Integrated regulation	Self-regulation
Regulatory processes	Compliance Reactance	Approval from others	Self-endorsement of goals	Congruence	Inherent satisfaction
Perceived locus of causality	External	Somewhat external	Somewhat internal	Internal	Internal

the far left side of the continuum). For example, the ORP's regulations threatened job seekers' self-regulatory behaviors because their job search goals were in conflict with ORP's regulations. For instance, P70 wanted to take a machine learning course but the ORP would not support him because the area was considered too distant from his background. Job seekers were also unmotivated to search for jobs that did not align with their pay expectations, especially when the government was providing a significant payout already. In fact, some job seekers were unmotivated to interview well for certain jobs—

they became more selective about the interviews that they chose to perform their best, especially given the financial support provided by the government. Financially, they did not want to land a lower-paying position than their previous job. Each of these examples are examples of *compliance reactance*, because the job seekers applied to jobs anyway, even if unwillingly so. If job seekers, however, were to more willingly apply to jobs despite ORP regulations because they saw inherent benefits to the economy, for example, this would be seen as a form of *inherent satisfaction*. However, this was not found in our

results. A second form of heteronomous regulation is labeled *introjected regulation*. This occurs when external controls have been partially assimilated but not fully accepted as one's own. An example of this might be a person who applies to jobs because they do not want to be singled out by their family members as not supporting the household but does not find any enjoyment in the job, thereby seeking *approval from others*. A more autonomous form of regulation is labeled *identified regulation* and reflects personal valuing of a behavioral goal. Such behaviors are somewhat internal and one might still work to protect their ego, for instance by studying medicine to become a successful surgeon. Finally, *integrated regulation* occurs when the target actions are synthesized with all of one's values, and it is a purely autonomous form of regulation. For instance, this would occur when a person only searches for work in public service because the act aligns with his personal belief system, even if it is not fully enjoyable. As stated earlier, our participants had little job autonomy given the ORP restrictions. The ORP enforced very strict policies on our participants, thus affecting their basic psychological needs of autonomy. In fact, none of our participants reported changing career paths even though some wanted to do so (e.g. P86 described in Sec. 5.3.5).

The source of the regulation of the autonomous behavior is referred to as *perceived locus of causality*, or PLOC (DeCharms, 1968) (see second row of Table 7). An *internal* perceived locus of causality means that one sees oneself as the source of initiation and regulation of behavior, while an *external* perceived locus of causality means to be controlled, experiencing a sense of pressure and compulsion (Ryan & Deci, 2017, page 226). The theory posits that people have natural tendencies toward self-determined action (i.e. intrinsically motivated behavior). However, in order for this to happen, people need to satisfy their basic need for *autonomy* (Ryan & Deci, 2017). Autonomy refers to 'feeling willingness and volition with respect to one's behavior' (Ryan & Deci, 2017, page 86). The more internal the PLOC, the more likely that people will experience autonomy in carrying out the behavior. The more a person's need for autonomy is satisfied, the more intrinsically motivated a person can be toward the target activity. When goals are intrinsically motivating, individuals naturally and effortlessly self-regulate the activities to reach those goals. In contrast, when goals are suggested by others or are not internally driven and personally meaningful, as we saw with the ORP, regulation becomes more difficult. As we discuss next, factoring autonomy into policy and design could help job seekers reach intrinsic motivation, inherent satisfaction and an internal perceived locus of causality.

6.2. Factoring autonomy into policy and design

The SDT framework is particularly useful in the job search context because it can help evaluate institutional interventions and technological support provided to job seekers. Regulations that are over-prescriptive might harm the job seekers' auton-

omy, thus inhibiting their motivation to find a job. Similarly, interventions that are built on extrinsic motivators (e.g. money, peer pressure) can fail to support behavior (i.e. searching for a job) over time (Deci & Ryan, 1985). Conversely, when individuals reach intrinsic levels of motivation, they develop self-determined action toward the target behavior (i.e. searching for a job). When this state is reached, interventions are no longer needed, and behavior becomes persistent through time. SDT can also explain changes in TPB constructs. For instance, it can help explain why intention moved by subjective norms might not translate into job search behavior. Specifically, Sheeran et al. found that intentions that are based on autonomous motivation are enacted more than intentions that are pressured by relevant others, family or friends (Sheeran et al., 1999). While the support that the Swiss government provides is well appreciated, policies that subsidize job seekers' temporary employment, if needed, might be better received, and could allow job seekers to minimize employment gaps, maintain their skill set and stay connected to the workforce. Such job seekers should have the option to continue searching for employment but should not be dissuaded to accept an interview or position for fear of receiving lower income.

Going forward, designing employment tools to support self-regulation training may be a valuable next step. Such tools could follow the 'mental contrasting with implementation intentions' (MCII) (Oettingen et al., 2001) self-regulation strategy, which improves goal setting, goal commitment and goal striving. In terms of goal setting, past research has asked job seekers to imagine their goal and describe how they feel after achieving it; describe potential obstacles to achieving their goal and how to overcome the barriers; and finally, to think of an 'if-then rule' that would allow job seekers to plan if a critical situation occurred. Other forms of self-regulation strategies include setting Specific (S), Measurable (M), Appropriate (A) and Realistic (R) goals within a specific time frame (T) (Doran, 1981) (i.e. SMART goals). This suggests that providing Swiss job seekers with access to self-regulation and resilience training might aid in their awareness and control over the externally imposed barriers and constraints they experienced with the ORP. Given that job seekers had already reported having too many activities to complete for the ORP and frustration when their efforts did not count for the ORP, it's important to make this training officially part of the basic set of courses job seekers must take.

In addition to the ORP, RevueCV, InterviewApp and the study participation, although supportive, might have posed further constraints and led to detectable change in the TPB constructs. The two tools afforded two distinct levels of autonomy, which might have impacted participants' ability to self-regulate. The RevueCV application afforded less autonomy than InterviewApp because the workflow automatically provided job seekers with resume feedback from an external reviewer. On the other hand, InterviewApp provided job seekers with the option to self-reflect on their interviews as well

as share their interviews with others for feedback. Given that job seekers in this context held less autonomy, logically the tool providing the least amount of autonomy might have led to poorer results. SDT posits that supporting the basic need of autonomy could help a person flourish because it could lead to self-determined action and self-improvement. InterviewApp afforded self-initiated feedback whereas RevueCV afforded autonomic feedback (and left job seekers with no other option). Future iterations of similar tools should consider giving job seekers the options to (i) self-reflect through machine-generated feedback, (ii) seek expert feedback or (iii) decide who to request feedback from themselves. This would provide choice and support the users' need for autonomy. Going forward, researchers should investigate the most desirable and effective frequencies of seeking and receiving feedback in longitudinal deployment. Also, given these three options, understanding how they might support job seekers' regulatory processes is an open question to explore in the future.

6.3. Factoring autonomy into future studies

To the best of our knowledge, autonomy has only arisen implicitly in past work aiming to support job seekers in achieving their dream jobs (Dillahunty & Lu, 2019) or in connecting crowd workers to mentors who could help them to achieve their goals (Suzuki *et al.*, 2016). Autonomy is vital among job seekers who experience marginalization because they are often forced to find jobs to meet their basic needs and do not have time to focus on matters beyond this (Hui *et al.*, 2018).

However, at the core of the TPB is *job search intentions*, which represents the key determinant of job search behavior (Van Hooft, 2016). Although a person's intentions or motivations to maintain the job search and stay engaged are important, they are likely insufficient (Van Hooft, 2016). Some job tasks are complex, tedious and often lead to rejection. Such tasks require self-regulation, especially to recoup after failure. The aforementioned conflicts, however, are moderators of job search intention-behavior (Van Hooft, 2016) and might have led to a decrease in our job seeker's intentions.

In hindsight, taking a country's employment policies and comparing them to an individual's job search intentions could have been informative to our work. This would have allowed us to reflect on how a location's employment policies impact an individual's goals. With this information, we might have (i) chosen to leverage SDT as opposed to the TPB or (ii) modified our intervention. A recent randomized controlled trial showed that offering self-regulation training improved job search effort, particularly for job seekers with an internal locus of control (Berger *et al.*, 2019). Those with an external locus of control benefited, but not as much as those with higher levels of internal loci of control. In a 30-minute-long training, participants in the treatment group were taught a technique that consisted of four steps: (i) listing their goals, (ii) foreseeing barriers to achieve them, (iii) listing strategies to overcome the barriers

and (iv) describing how they would react to critical situations. Setting personal goals triggered an internal commitment. From an SDT perspective, it nurtured the participants' basic need for autonomy. Moving forward, research should focus on how to design more effective self-regulation interventions, particularly for jobseekers with an external locus of control, and ensure that such efforts are tested in collaboration with organizations such as the ORP in Switzerland.

7. CONCLUSION

In summary, we conducted a 4-month deployment of two employment tools among 46 Swiss job seekers. The majority of our job seekers was immigrants who were racial and ethnic minorities. Immigrant groups, especially those from non-European countries, tend to experience labor market disadvantages such as discrimination and fewer social networks (Auer *et al.*, 2017) in similar ways to racial and ethnic groups in other countries like the US. This might lead these groups to lower self-awareness, self-efficacy and self-regulation and reliance on institutions like the ORP. However, the results of our work provide suggestions for those who must rely on restrictive institutions like the ORP who have much less autonomy in their job search than US job seekers. Thus, the response to our question, *Are technologies envisioned in past HCI work applicable in non-US contexts?*, is no—at least not in the Swiss context.

We contribute policy and design implications to support job seeker self-regulation and autonomy and propose guidelines for selecting appropriate theoretical frameworks and interventions given a country's employment regulation and policy. In short, policy-makers should avoid posing burdens on job seekers at the policy level and designers should avoid developing tools that pose burdens on job seekers. Interventions that provide self-regulation training could help to ensure that job seekers in heteronomous (i.e. autonomy-constrained) environments can still achieve their goals. Such interventions could train job seekers to be more resilient in such environments and provide individual-level coping strategies, which are more likely to support a sense of ownership over the job search activities.

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A Appendix

This Appendix contains the following content: 1) Material adaptation process from the US study to Swiss study; 2) Participants' job search experience; 3) Participants' RevueCV and InterviewApp usage; 4) Comparisons of Swiss and US job seekers based on the original study (Dillahunst & Hsiao, 2020). While this information is not central to our research questions, we include these contents as a part of the Appendix to assist interested readers in their understanding of the complete study and background.

B Study Material Adaptation

The original study was quite complex given the length of the study (approx. 8 months), the tools that were deployed (e.g. one in-house developed tool and one commercial tool), and the study population (e.g. low-income, limited education, limited digital literacy) (Dillahunst & Hsiao, 2020). To setup the current study, we had to adapt the tools and study material to French, assess and localize an open-source project, and adjust study compensation to the Swiss context. Therefore, we use this section to detail what was necessary for a successful adaptation.

First, the Swiss team reached out to the US team for their documentation, which included their study and interview protocols, recruitment flyers and posters, surveys, and participant instruction. The US team also documented their study (Dillahunst & Hsiao, 2020), which we discussed. Next, we adapted documents and tools to French. A bi-lingual native French speaker, who holds a master's degree in Information Systems and is familiar with HCI interventions, translated all documents and tools from English to French. The original study employed two digital job-seeking tools: Review-Me and Interview4. Review-Me is an open-source application that allows job seekers to upload their resumes and receive feedback from volunteers.¹³ Interview4 was a tool that allowed job seekers to record mock interviews, self-reflect on their performance, and optionally send their videos to friends and family, or provide self-feedback. While Review-Me automatically provided external feedback to participants, Interview4 did not and required participants to share their interview recording with family and friends for feedback.

We adapted Review-Me to the Swiss context by translating its text from English to French. We first renamed the application to RevueCV to better communicate its intent to local

participants. We then replaced job article links with similar francophone articles adapted to the Swiss job market. The Swiss team met with the researchers maintaining Review-Me to understand how to properly deploy RevueCV to Swiss servers to ensure a similar user experience. For example, there were difficulties with the different character encoding when translating literal strings to French. The Swiss team tested the translation with native speakers to ensure that the translation was accurate and that the same user interface (UI) elements existed.¹⁴ The original Review-Me deployment leveraged Amazon Mechanical Turk (AMT)¹⁵, and local research assistants when needed, to provide resume feedback. AMT demographic surveys consistently show that workers from the US and India dominate the platform (Paolacci *et al.*, 2010, Ross *et al.*, 2010). Given that these countries represent English-speaking populations, requesting their feedback on US job seeker résumés was justifiable. However, few native French speakers make up AMT workers (Pavlick *et al.*, 2014), and likely are knowledgeable of the Swiss unemployment system. Therefore, after much investigation, we recruited a French-speaking research assistant who specialized in labour economics and took HR training courses to assist with our study. She reviewed all the CVs uploaded by the participants and provided detailed feedback. The average response time was ~3 days.

Because Interview4 was discontinued in July 2019, the Swiss team obtained guidance from the US team to select an application with comparable functionality. The US team shared different artefacts to clarify the relevant functionalities of Interview4 to be replaced in the Swiss context. The Swiss team held a product review in an online meeting with the US team to ensure that the main features were present in the alternative tool, InterviewApp (DEDAL S.A.S., 2020). The key difference between the tools was that there was no built-in “sharing” feature in the InterviewApp where participants could share their videos. However, there was a download feature and the Swiss team instructed participants on how to download the video on their machine, and upload it to a secure cloud repository so that it could be easily shared if they wished to do so. With this addition, the two tools were relatively identical in terms of feature set. InterviewApp has a multilingual interface, which made it simple to deploy to francophone participants.

C Participants' Job Search Experience

Immigrants (23 participants) and the participants over fifty years of age (11 participants) were quite pessimistic about whether they would have found a job in the weeks following the interviews. On the other hand, participants below thirty years

¹⁴ The fork of RevueCV is available at <https://github.com/petlab-unil/resume-me>, last accessed January 2020.

¹⁵ Amazon Mechanical Turk is a crowdsourcing website where “(crowd)workers” perform on-demand tasks for a small fee.

¹³ The code is available at <https://github.com/UMICTResearch/resume-me>, last accessed January 2020.

of age (19) were typically more confident in their ability to find a job. While the majority of our participants were looking for a new job, 10 participants were switching careers. The large majority of participants identified job positions through the Internet using job search websites such as *JobUp* and *Indeed* (20 mentions). Fewer participants also reported using social networking sites, such as *LinkedIn* (9 mentions) and *Facebook* (2 mentions). Finally, a few participants reported using public forums such as *Anibis* to search for open positions (4 mentions). Some participants also had access to the national platform called *Job Room* (SECO, 2020) which allowed them to see job offers a few days before they are posted to other platforms (4 mentions). About 10 participants reported using offline methods to find open positions (i.e., searching for newspaper advertisements, spontaneous phone applications and site visits to potential hiring companies). In addition to the methods above, participants relied on their previous colleagues (13 mentions), friends (30 mentions) and family (27 mentions) to find open positions and apply. Family and friends also provided also emotional support, making them feel they were cared for. Finally, the oldest participants reported using placement agencies such as *Adecco*, or *ManPower* to find temporary placements (14 mentions).

The most commonly used strategy to find jobs was to submit job applications to as many open positions as they could find and qualified for. A minority of participants followed a more reasoned approach, narrowing down their search to a fewer selected openings and applying only to those (8 mentions). Most participants did not keep a journal of their searches, only two did. Most of the participants applied with CVs that did not contain an explicit mention of their skills. Some of them listed their skills in their cover letter (10 mentions). While 17 participants mentioned taking mandatory training suggested by the ORP, only seven took courses to increase their chances of getting a new job without being prompted. About three quarters of participants were not aware of online resources that could help them with their job search (e.g. networking, interview training, cover letter preparation, etc.). We believe this to be due to limited knowledge of such sites or low IT literacy.

D Job Seeker Tool Usage

D.1. REVUECV USAGE

On average, each RevueCV participant uploaded 3 CVs, including the one they uploaded in the pre-treatment session. Participants reported that they spent 46.2 minutes (SD = 4.7 minutes) on RevueCV every week on average, which included uploading CVs, reading review comments, reading articles about resume preparation, and exploring the tool. We provide an overview of our RevueCV results.

D.2. INTERVIEWAPP USAGE

For context, the total length of InterviewApp participants' interview video clips was around 528 minutes, with an average length of 86.9 seconds per clip. On average, each InterviewApp participant recorded 23.3 interview video clips, including the five clips they recorded in the pre-treatment sessions. All participants took 20 interview clips or more when participating in the study. Job seekers spent 50.7 minutes (SD = 63.8 minutes) on InterviewApp every week on average.

E Regression Analysis Results

In this section, we report our linear regression results. For each of self-efficacy, subjective norms, and job search attitudes, we used the difference between the post-treatment value and pre-treatment value as the outcome in the regression models. We put groups (dummy variable) and the pre-treatment values as predictors in the regression models. Table E8 presents the regression results predicting self-efficacy, subjective norms, and attitudes. Table E9 presents the linear regression model predicting how much of the job search intention converted to actual job search behavior. As we discussed earlier, we did not find that the two tools had significant effects on the three factors, which perhaps resulted from our small sample size.

F Comparisons of Swiss and US Job Seekers

In this section, we compare the results of two studies (Switzerland versus US). We compare participant background information and technology access, tool usage across the study and feedback, participant attrition and, survey results. For context, all US participants had been actively seeking employment for the last 6 months and the majority of our participants had been searching 3-6 months before the study (28 participants less than 3 months, 40 between 3 and 6 months, and 17 more than 6 months). Both studies achieved even distribution across participant activity interests.

F.1. PARTICIPANT DEMOGRAPHICS AND TECHNOLOGY ACCESS

In this subsection we compare participant demographic information across the two studies based on the number of participants who completed their pre-treatment surveys (Swiss: $N = 86$ vs. US: $N = 55$). While the original study achieved perfect gender balance, we recruited slightly more women (Swiss: 57% vs. US: 49%). Swiss participants were slightly younger (Swiss: 35.79 ± 12.45 vs. US: 45.44 ± 11.26) and had higher median household incomes than US participants (84'000 CHF vs. 14,444 USD).¹⁶ The average number of household members were relatively the same (Swiss: 2.5 versus US:

¹⁶ The exchange rate CHF/USD during the study was 1.03, namely 1 CHF = 1.03 USD.

TABLE E8. Results of linear regression predicting changes of self-efficacy, subjective norms, and attitudes. The three factors' pre-treatment values had significant negative correlations to the three factors' changes. However, compared to the control group, the interventions (i.e., RevueCV and InterviewApp) did not have significant effects on the three factors' change. The data were normalized, i.e., projected to the span of 0 and 1.

	Self-efficacy Change		Subjective Norm Change		Attitude Change	
	β	95% CI	β	95% CI	β	95% CI
(Intercept)	0.304**	[0.091, 0.516]	0.365***	[0.170, 0.560]	0.193	[-0.018, 0.405]
RevueCV	-0.053	[-0.215, 0.110]	0.019	[-0.151, 0.189]	-0.062	[-0.182, 0.057]
InterviewApp	0.020	[-0.138, 0.178]	-0.095	[-0.264, 0.075]	-0.035	[-0.154, 0.084]
Pre-treatment Value	-0.511***	[-0.802, -0.220]	-0.460***	[-0.702, -0.218]	-0.223	[-0.475, 0.029]
Adjusted R^2	0.176		0.248		0.042	

*** $p < .001$; ** $p < .01$; * $p < .05$

TABLE E9. Results of linear regression predicting how much job search intention was converted to job search behavior. The intention, however, had significant negative correlations to the actual behavior. Compared to the control group, the interventions (i.e., RevueCV and InterviewApp) did not have significant effects on the behavior. The job seekers' self-efficacy, subjective norms, and attitudes did not have significant effects on the behavior either. The values were normalized and projected to the span of 0 and 1.

	Intention to Behavior	
	β	95% CI
(Intercept)	0.146*	[0.003, 0.289]
RevueCV	0.056	[-0.034, 0.146]
InterviewApp	0.032	[-0.059, 0.122]
Self-efficacy Change	-0.030	[-0.182, 0.121]
Subjective Norm Change	0.113	[-0.030, 0.256]
Attitude Change	-0.114	[-0.338, 0.110]
Pre-treatment Value	-0.325**	[-0.541, -0.108]
Adjusted R^2	0.168	

*** $p < .001$; ** $p < .01$; * $p < .05$

2.37). A majority of participants across both studies held less than a college degree: (Swiss: 73% vs. US: 60%). During the interviews, we learned that more than half of Swiss participants were immigrants (N=47), while this information did not surface in the US study, likely because there were few immigrants.

Swiss participants had more convenient Internet access than their US counterparts. In terms of technology access, all Swiss participants owned smartphones, had home Internet access, and in many cases, owned laptops at home. This allowed them to use InterviewApp within the comfort of their own homes. Over half (N=28) of the 50 US participants, who reported this information, did not have at-home computer access (i.e.,

desktops or laptops). Thirteen (N=13) did not own any Internet-enabled devices and relied on public computers. Among the 21 Interview4 participants, 18 did not have access to a webcam-equipped computer and the US research team compensated for this by providing webcams for these job seekers.

In terms of job-related events that happened during the longitudinal study, in Switzerland a higher percentage of participants were offered employment compared to the original study (Swiss: N=5; 10.9% vs. US: N=1; 4.4%). We found that fewer of our participants maintained their status during the study compared to US participants (Swiss: N=40; 87.0% vs. US: N=21; 91.3%), although a higher percentage of US participants were employed at the point of pre-treatment session (Swiss: N=1; 2.2% vs. US: N=6; 26.1%). Both studies had the same number of participants changed status from unemployed to student and self-employed (Swiss: N=1; 2.2% vs. US: N=1; 4.4%).

F.2. TOOL USAGE AND FEEDBACK

Overall, Swiss job seekers were more engaged in using the assigned tools and spent more time using them. Swiss job seekers generated more content on average. RevueCV participants uploaded more CVs on average than Review-Me participants (Swiss: 3 vs. US: 2.67). InterviewApp participants' recorded more interview videos (Swiss: 23.3 versus US: 14.88 clips), which were longer in length than Interview4 participants (86.9 versus US 41.23 seconds per clip). However, given that the interviews occurred in different languages, these time differences are not an equal comparison.

Participants reported the time they spent on the tools in the diary. RevueCV participants spent 46.7 minutes per week on average, while US job seekers spent only an average of 5.5 minutes on Review-Me per week. InterviewApp participants spent 50.7 minutes per week, while US job seekers spent about 36.8 minutes per week using Interview4.

TABLE F3. A comparison of USA's and Switzerland's mean of pre-treatment TPB values ($M_{pre} = \sum_{n=1}^N v_{n,pre}/N$; $\Delta_{pre} = M_{pre,CH} - M_{pre,US}$). The values were normalized, i.e., projected to the span of 0 and 1. The *Adjusted p val.* columns show the p values adjusted using the Benjamini-Hochberg correction (Benjamini & Hochberg, 1995).

Comparison of Pre-treatment TPB Values

	CH Mean (SD) N=46	US Mean (SD) N=23	Δ_{pre}	p val.	Adjusted p val.
Self-efficacy	.590 (.233)	.687 (.211)	-.096	.099	.397
Subjective Norms	.716 (.293)	.714 (.263)	.002	.980	.992
Attitudes	.774 (.201)	.848 (.227)	-.074	.174	.404
Intention	.655 (.174)	.655 (.223)	$\approx .000$	.992	.992

TABLE F4. A comparison of USA's and Switzerland's mean of changes in TPB values ($M_{change} = \sum_{n=1}^N |v_{n,post} - v_{n,pre}|/N$; $\Delta_{change} = M_{change,CH} - M_{change,US}$). Same as Table F3, the values were normalized.

Comparison of Changes in TPB Values

	CH Mean (SD) N=46	US Mean (SD) N=23	Δ_{change}	p val.	Adjusted p val.
Self-efficacy	.178 (.159)	.138 (.157)	.041	.320	.511
Subjective Norms	.185 (.191)	.160 (.236)	.025	.632	.843
Attitudes	.117 (.117)	.225 (.244)	-.108	.016	.125
Intention & Behavior	.106 (.083)	.138 (.125)	-.032	.202	.404

A simple analysis of the comments left by RevueCV and Review-Me suggests that the expert reviewer who was hired in the Swiss study provided more feedback as measured by average word count (Swiss: 91.11 ± 83 versus US: 34.18 ± 40). We recognized that a simple comparison of word count between two different languages might not be equivalent. To provide a better comparison, we translated the French feedback in English using the *Google Translate API*¹⁷. This additional analysis showed that despite the different languages, the Swiss average feedback was 2.34 times of the US average feedback (CH-translated: 79.89 ± 75 versus US: 34.18 ± 40).

F3. PARTICIPANT ATTRITION

Swiss participants were more likely to stay in the study once enrolled than US participants. The Swiss study had an attrition rate of 46.51%, which is about 36% lower than the US study's attrition rate (82.44%). We attribute the lower attrition rate to our participants' close relation to the ORP. Researchers from the original study faced difficulties maintaining contact because of unreliable modes of contact (i.e., disconnected phones, changing phone numbers). In contrast, Swiss participants kept their phone numbers the same and had regular access

to their email. They also had an obligation to stay connected with the ORP.

F4. SURVEY RESULTS

We conducted two comparative analyses of Swiss and US datasets—the pre-treatment TPB values and the changes in TPB values (Table F3 & F4). Although *none* of the comparisons had statistically significant differences, the results suggest two preliminary findings for us to expand our discussion.

First, the Swiss participants had lower starting values of self-efficacy and attitudes. We compared the pre-treatment values of the two studies to discover differences in two groups' TPB values in their natural job search setting. Table F3 presents the comparison of the two groups' starting TPB factors. The differences of self-efficacy ($\Delta_{pre} = -.096$) and attitudes ($\Delta_{pre} = -.074$) were detectable. On the other hand, differences of subjective norms ($\Delta_{pre} = .002$) and intention ($\Delta_{pre} \approx .000$) were negligible. These results suggest that a systematic difference might exist between the two countries' job seeker populations in regard to the TPB constructs. However, this finding must be verified in future research.

Second, we compared the two groups' changes in TPB values. This comparison allows us to discover whether the study participation was associated with different extents of change in TPB values. Table F4 presents the results. The changes

¹⁷ See <https://cloud.google.com/translate/docs>, last accessed May 2020.

were calculated as absolute values of differences between post-treatment and pre-treatment scores. Swiss job seekers had larger changes in self-efficacy ($\Delta_{change} = .041$) and subjective norms ($\Delta_{change} = .025$) than US job seekers. On the contrary, Swiss job seekers had smaller changes in attitudes ($\Delta_{change} = -.108$) and intention-behavior ($\Delta_{change} = -.032$) than US

job seekers. The results suggest that CH job seekers' attitudes were more likely to remain unchanged, and they were more likely to stick with job search tasks that they intended to do. Swiss job seekers' self-efficacy and perceived subjective norms, however, were more likely to be influenced than US job seekers.