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DISCUSSION PAPER SERIES 115/26

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APRIL 2026

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Reference

JEL Codes: A12, D01, D91, J64, J68.

Keywords: Job search, motivation, experiment

Recommended Citation: Bart Cockx, Johan Egebark, Greet van Hoye, Emilie Videnord, Johan Vikström (2026): Motivating Job Seekers. A Field Experiment. RFBerlin Discussion Paper No. 115/26

Imprint

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Motivating Job Seekers. A Field Experiment*

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February 2026

Abstract: Reduced motivation among jobseekers over the unemployment spell may lead to declining job-finding rates. We report findings from a low-cost digital intervention with motivational emails aimed at enhancing and sustaining motivation and search effort among job seekers in Sweden. Using a randomized controlled trial that included 200,720 job seekers, we evaluate both carrot messages aimed at encouraging the pursuit of personal goals and intrinsic motivation and stick messages focusing on external pressure and constraints. A large share of job seekers opened the emails, and they triggered behavioral responses. Both types of messages backfired, reducing search effort and job-finding rates. The carrot messages reduced both the number of job applications and job finding, particularly among men. One likely explanation is that these messages signal to job seekers that the Public Employment Service was less controlling than initially perceived, prompting a reduction in effort. The stick messages backfired for job seekers who, at the onset of unemployment, reported that they were motivated by an inner drive rather than by constraints. These findings underscore the challenges of motivating job seekers to actively search for jobs and suggest that low-cost digital interventions, in isolation, are inadequate and may even be counterproductive.

JEL codes: A12, D01, D91, J64, J68.

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* We thank Elliott Syrén for his excellent research assistance. The paper benefited from comments from Anders Böhlmark, Mathias Ekström, Markus Eliasson, Caroline Hall, and Lukas Lehner, and of participants at research seminars of the Department of Economics of Marche Polytechnic University in Ancona, ROA Learning and Work Seminar of Maastricht University, IFAU, and the Swedish PES. The pre-analysis plan has been registered at the AEA RCT Registration as trial no. 5502. The research design obtained ethical approval from the Swedish Ethical Review Authority on 2020-04-04 (No. 2019-06401).

1 Introduction

Job-finding rates decline as unemployment duration increases. Two main explanations have been proposed: *selection effects*, whereby jobseekers with lower employment prospects remain unemployed longer, and *"true" duration dependence*, in which an individual's probability of finding a job decreases over time. While some recent papers identify selection effects as the primary driver (Ahn & Hamilton, 2020; Mueller & Spinnewijn, 2024), others highlight declining search effort during the unemployment spell (Kroft et al. 2016; Faberman & Kudlyak, 2019; Alvarez et al., 2024; Lalive et al., 2025). For instance, using search diaries from Swiss job seekers, Lalive et al. (2025) document that search effort declines as unemployment duration increases. One likely contributing factor is that job seekers lose motivation to continue searching.[1] Even if finding a new job is a central objective for most unemployed job seekers, searching for a job is often a painful process, marked by failed applications and lost social connections. This makes it challenging for job seekers to maintain the motivation to actively search for jobs over time (Krueger & Mueller, 2010, 2011; Faberman & Kudlyak, 2019; Marinescu & Skandalis, 2021; Della Vigna et al., 2022).

Thus, a central public policy question is how to effectively enhance and sustain motivation and search effort among job seekers. To examine this, we designed a low-cost intervention as part of a large-scale randomized controlled trial (RCT) involving approximately two-thirds of all entrants into the Swedish unemployment insurance (UI) scheme over a period of 20 months. The intervention consisted of six motivational emails sent to job seekers over a six-month period, examining the "carrots or sticks" dimension by comparing two different types of emails with a randomized control group. It examines whether job seekers more motivated to exert job-search effort if the emails focus on providing greater intrinsic motivation, autonomy and supporting them in the actions they choose to undertake (the "carrot")? Or does this leniency risk reducing their motivation and search effort, such that emails emphasizing constraints and the threat of sanctions if they do not search enough (the "stick") are more effective?

This connects to the ongoing debate about which type of policy is most effective – supportive policies or controlling policies that restrict behavior (e.g., van der Klaauw & van Ours, 2013; Arni et al., 2020). Many studies in economics point to the importance of 'sticks'

[1] Employers discriminating against the long-term unemployed is another contributing factor. For instance, several correspondence studies have examined differences in callback rates between short- and long-term unemployed individuals using fictitious résumés (e.g., Kroft et al., 2013; Eriksson & Rooth, 2014; Farber et al., 2016).

in the form of monitoring and sanctions (e.g., Black et al., 2003; van den Berg et al., 2004; Abbring et al., 2005; Mc Vicar, 2008, 2010; van der Klaauw and van Ours, 2013; Arni & Schiprowski, 2019; van den Berg & Van der Klaauw, 2019). However, some studies in economics find (more) favorable effects of 'carrots' (Woodbury & Spiegelman, 1987; O'Leary et al., 2005; Card & Hyslop, 2005; van den Berg & Van der Klaauw, 2006; Arni et al. 2020). In addition, Klepinger et al. (2002) and Ashenfelter et al. (2005) document, respectively, negative and insignificant effects of tighter search requirements on job finding.[2,3]

To shed new light on this debate and examine the best way to motivate job seekers to search for jobs, we randomized two-thirds of the 200,720 individuals who registered as unemployed job seekers in the Swedish UI between May 2020 and December 2021. Half of this group was randomly assigned to a control group that received no treatment, while the other half was assigned to one of two types of emails, emphasizing either carrots or sticks. These two treatment groups received up to six messages of the selected type during the first six months of unemployment. In accordance with our registered pre-analysis plan (AEA RCT Registration, trial no. 5502), we use register and survey data to evaluate the impact of these messages on outcomes capturing (i) changes in self-perceived motivation, (ii) behavioral changes (e.g., search effort and search quality), and (iii) labor market results (e.g., job finding and job quality). We also examine heterogeneous effects by initial motivation, gender, local unemployment rate, and labor market attachment.

To operationalize the "carrots and sticks" interventions, we rely on well-established Self-Determination Theory (SDT) from psychology about what motivates people to undertake actions (Deci & Ryan, 1985; 2000; 2008; 2012). This provides a coherent framework for understanding motivation, which we used to design the emails. Specifically, SDT distinguishes between two types of motivation: autonomous and controlled. Individuals are autonomously motivated when they self-endorse their actions, either (i) because they find them inherently interesting or enjoyable (intrinsic motivation), or (ii) because they find them meaningful, personally relevant, and contributing to goals that are important to them. Controlled motivation

[2] A substantial body of literature in psychology also questions that control and 'sticks' policies are the most effective way to sustain job seekers' motivation (da Motta Veiga & Gabriel, 2016; Deci et al., 2017; Koen et al., 2015; 2016; van der Vaart et al., 2020; Vansteenkiste et al., 2004; 2005).

[3] The behavioral economics literature has also recognized that extrinsic incentives may backfire (Fehr & Falk, 1999; Gneezy & Rustichini, 2000a, b). Casar & Meier (2018) review this literature and its relation to Self-Determination Theory, discussed below.

occurs when individuals experience pressure to behave in a certain way, which can come from external sources (e.g., demands, rewards, or punishments) or internal sources (e.g., guilt, shame, seeking approval, or moral obligation). Based on this theory, the "carrot" messages focused on boosting autonomous motivation and the "stick" messages on controlled motivation. To stimulate autonomous motivation, the messages were formulated to fulfill three basic psychological needs: autonomy, competence, and relatedness.[4] In contrast, the messages aimed at eliciting controlled motivation were designed to increase external pressure.

We initially document that a large share (72%) of job seekers opened our motivational emails. We also see that the emails triggered a notable first stage behavioral response of the treatment messages that is similar across all groups of job seekers. Job seekers respond to both messages by increasing their monthly mandatory activity reporting, which is a requirement to remain eligible for unemployment benefits. However, this increase in reporting did not translate into more effective job search. On the contrary, our findings show that using motivational strategies to impact job seeker's behavior is less straightforward than expected, since both message types may backfire by reducing search effort and job finding.

Male job seekers appear to interpret the soft tone in the carrot messages as a signal that the already controlling environment of the Swedish PES has become less strict, leading them to lower their effective job-search intensity. This constitutes a novel insight, suggesting that attempts to stimulate the pursuit of personal goals and intrinsic motivation can have unintended negative consequences in environments characterized by high levels of control and external pressure. In contrast, women do not exhibit any measurable change in search effort.

We also document a second, somewhat more established, crowding-out effect consistent with existing evidence *from other contexts* (Fehr & Falk, 1999; Gneezy & Rustichini, 2000a, b; Huffman & Boganno, 2018; Herz & Zihlmann, 2024): controlled messages reduce job finding among individuals who, at the onset of unemployment, reported that they were motivated by an inner drive rather than by constraints To our knowledge, this is the first study to provide evidence that increased control can undermine such motivation *in the job search process*.

We make three overall contributions to the literature. First, to our knowledge, no research has examined whether different types of motivation can be induced through low-cost

[4] The need for autonomy refers to volition and the need to self-organize and regulate one's own behavior. Competence involves the need to feel effective and capable in one's actions. Relatedness refers to the desire to feel connected to others.

interventions *in a job-search context*.[5] Second, we employ *a large-scale RCT,* which increases the external validity of our results (List, 2020). Third, our study contributes to the ongoing debate about the relative effectiveness of 'carrot or stick' policies by focusing on the role of motivation, *independent of external (monetary) incentives*.

Our study relates to several strands of literature. Recently, several papers have examined job seekers and the job search process from a behavioral economics perspective. Key examples include the impact of over-optimism (e.g., Spinnewijn, 2015; Mueller et al., 2021), locus of control (Caliendo et al., 2015), information and motivation (Altmann et al*.,* 2018), hyperbolic time preferences (e.g., DellaVigna & Paserman, 2005), reference dependent preferences (DellaVigna et al. 2017, 2022), and self-regulation (Berger et al., 2022).[6, 7] Similar to our study, these studies highlight the importance of behavioral phenomena in the job search process. Our contribution lies in the explicit focus on motivational strategies and the use of state-of-the-art psychological theory to induce behavioral change. The most closely related study is the RCT in Altmann et al. (2018). In their intervention treated job seekers received a brochure that informed about job-search strategies, consequences of unemployment, and motivated the job seekers to actively search for a job. They find some positive employment effects of this information brochure, but unlike our approach, they did not design their interventions based on a theory of motivation and cannot disentangle the roles of information and encouragement.

Our paper also relates to empirical papers based on standard job search theory, which links motivation to *extrinsic* monetary rewards and penalties – often termed 'carrots' and 'sticks'. The empirical literature in this tradition has mainly focused on 'sticks', and several studies have shown that enforcing job search effort through sanctions, monitoring and/or job-search requirements increases job finding but negatively affects job quality (e.g., Mc Vicar 2008, 2010; Manning, 2009; Petrongolo, 2009; van den Berg and Vikström 2014; Arni &

[5] Several studies aiming to influence health-related behavior have attempted to induce autonomous and controlled motivation through message framing based on SDT, with mixed success (e.g., Legate & Weinstein, 2021; Strien-Knippenberg et al., 2022; Morbée et al., 2023).

[6] Berger et al. (2022), study the role of self-regulation in job search, but, since self-regulation – the ability to set and commit to goals and to regulate effort, emotions, and attention to strive effectively for these goals – constitutes a different behavioral dimension than autonomous and controlled motivation, our paper makes a unique contribution.

[7] While self-regulation involves setting a goal directly related to the outcome of primary interest, i.e., finding a job, Bjorvatn et al. (2021) show that setting goals indirectly related to job finding, such as sleep, activity and substance use, can also enhance job finding.

Schiprowski, 2019).[8] Yet, monitoring always entails a threat of sanctions, leaving open the question of how control functions in their absence. Additionally, these studies are silent on the impact of autonomous motivation and only some of these studies are based RCTs.[9] While this literature mainly focuses on 'sticks' policies, some studies have compared 'carrots' and 'sticks' policies. Arni et al (2020) distinguish the effect of policy *regimes* from the *content* of labor market policies. They find that both supportive and restrictive policies increase the exit rate from unemployment, with supportive policies having a greater effect.[10] Behnke et al. (2010a, b) find that caseworkers who apply more pressure on unemployed job seekers have a greater impact on increasing employment rates and job stability for their clients compared to case workers who are more cooperative. Unlike these earlier studies, we present evidence from a large-scale RCT.

This paper also contributes to the growing literature on low-cost digital interventions aimed at changing job seekers' behavior through email or platform-based information and support (e.g., Altman et al., 2018, Barr & Turner, 2018; Belot et al., 2019; and for surveys Kircher, 2022; Haaland et al., 2023; Le Brabanchon et al., 2024). These studies have largely focused on optimizing informational content and besides Altman et al. (2018) none have examined motivation in greater depth. Notably, while this literature found modest positive effects for specific groups, achieving substantial impacts remains challenging (DellaVigna & Linos, 2022), especially when online interventions are not paired with in-person assistance (Gallego et al., 2023). Our study supports this conclusion.

Another related strand of literature is the psychological literature on SDT. Here, SDT has received extensive empirical support across various research domains,[11] but there is only little evidence within the context of job search (Vansteenkiste et al. 2004, 2005; Koen et al. 2015,

[8] In contrast, as mentioned in footnote 1, Klepinger et al. (2002) and Ashenfelter et al. (2005) do not find positive effects of tighter search requirements on job finding.

[9] Welters et al. (2014) and Gerards & Welters (2020, 2021, 2022) examine the effects of external pressure on job search and job finding in Australia. They find that involuntary part-time and casual labor contracts, liquidity constraints, benefit requirements and financial hardship negatively impact both the quality and quantity of these outcomes. However, none of these studies consider autonomous motivation and analyze controlled motivation in a non-experimental context, raising concerns about internal validity.

[10] This study also finds that supportive policies increase earnings after job seekers leave unemployment, while restrictive policies reduce them.

[11] See Deci & Ryan (2008), Moran et al. (2012), Cerasoli et al. (2014), Van den Broeck et al. (2016) and Deci et al. (2017).

2016; da Motta Veiga & Gabriel 2016; van der Vaart et al. 2020). These studies generally find that, compared to controlled motivation, autonomous job search motivation is positively related to job search behavior, job seeker well-being, and employment finding. However, there are some inconsistencies in the findings, few studies have examined actual employment outcomes, and the evidence is based on small non-experimental studies, raising concerns on both external and internal validity.

This article is organized as follows. The next section describes the RCT set-up, including the institutional context, randomization design, and intervention. Section 3 outlines the chosen outcome variables in the register and survey data, along with the moderators and the motivation measures. Section 4 briefly reviews the methods. Section 5 presents and discusses the results, covering main effects, and moderators. The final section provides the conclusion.

2 The RCT Set-Up

We set-up a large-scale RCT in collaboration with the Swedish PES and a leading expert in applied psychology to obtain reliable causal evidence on the impacts of messages that aimed at stimulating autonomous and controlled motivation. This provides a unique opportunity to test the effectiveness of using short state-of-the art messages to activate job seekers. This section outlines the RCT set-up, including the specific institutional context, the experimental design, the details of the intervention, the content of the messages, and the expected impact of the intervention.

2.1 Institutional Context

In Sweden, unemployed job seekers aged 20 or older may receive either basic or income-related UI benefits. Eligibility for basic benefits requires registration at a PES office, active job search, availability to work, and a recent work history of at least six months within the past year.

The benefit level depends on UI fund membership. Non-members receive a flat-rate basic benefit of SEK 11,220 per month.[12] Voluntary members of a UI fund (with at least 12 months of documented membership) are entitled to income-related benefits: 80% of previous earnings for the first 200 days of unemployment and 70% for the remaining 100 days, subject to a cap (SEK 26,400 per month during the study period). Benefits are paid for up to 300 days

[12] The average conversion rate in 2020–2021 was 0.097 EUR/SEK. Thus, dividing SEK amounts by ten provides a reasonable approximation of their value in EUR.

(five days per week). After 300 days, those who remain unemployed transition to the Job and Development Program, which provides welfare benefits for an additional 450 days at 65% of prior earnings, subject to the same minimum and maximum levels as UI.[13]

Unemployed job seekers receiving UI benefits in Sweden are subject to monitoring and sanction rules designed to enforce job search effort. Sanctions may be imposed for (1) insufficient job search activity, (2) deliberate delay in re-employment, or (3) self-inflicted unemployment. Violations include missing scheduled meetings, failing to submit required reports, rejecting suitable job offers, or voluntarily leaving employment without valid reason.

To monitor compliance with active job search requirements, job seekers must submit monthly activity reports via a digital form accessible through electronic ID. They select reported activities from a predefined list, including applications for posted vacancies, spontaneous job applications, and job interviews. The report must be electronically signed before it is submitted to the PES. Caseworkers at the PES review the reports to assess whether job seekers have been sufficiently active. If not, they issue a formal notification to the relevant UI fund, which makes the final decision on whether to impose a benefit sanction.

The activity reporting was introduced in 2013, marking a shift to a significantly stricter job-search monitoring-regime. Lombardi (2019) finds that this reform increased job finding rates among men, while women were unaffected. In recent years, the PES has implemented several measures to further strengthen monitoring. First, it uses risk-based algorithms to automatically flag activity reports that are more likely to indicate noncompliance. Second, the reports are reviewed by specialized monitoring staff who focus exclusively on detecting violations and who, hence, do not provide job search support to job seekers. Third, the PES sets specific job search requirements for each job seeker, in the form of a required range for the number of job applications per month, which varies based on the job seeker's profile. All of this indicates that we introduce our intervention into an already rather controlling environment. This is also supported by country comparisons conducted by the OECD. In a comparison from 2022, Sweden ranks as the fifth strictest country out of 38 in terms of the strictness of job-search requirements and monitoring procedures (OECD, 2022). This ranking is based on how frequently job seekers are required to report their job-search activities and how detailed the information they must provide is.

[13] Non-UI-members can continue to receive the flat rate during this period.

2.2 The Time Period and Randomization Design

The intervention was applied in a field experiment involving two-thirds of all individuals registering as unemployed job seekers at the Swedish PES between May 20, 2020 and December 19, 2021.[14, 15, 16] For people with multiple unemployment spells, only the first entry of an individual is retained. Messages were sent to this population for up to six months after they entered unemployment, concluding the intervention in June 2022. Among this population, we selected those who are required to search for a job and document their efforts in the monthly activity reports described in Section 2.1., as the intervention is intended to boost the motivation of unemployed individuals who search for a job.

An important observation related to the COVID-19 crisis, documented by Hensvik *et al.* (2021) and Eliasen (2021), is that in Sweden, after an initial drop, job search effort and the job-finding rates remained at high levels, even surpassing those attained in 2019 in the second half of 2020. This contrasts with the situation in most European countries, where job search plummeted for an extended period. A key explanation is that Sweden did not enforce any sustained lockdowns. It suggests that external validity is less of a concern, as the experiment was conducted during a relatively normal period.

The random assignment of the research population into treatment and control conditions was carried out as follows. Based on their birthday (day of the year), individuals were randomly assigned to the control group with a 50% probability and to each of the treatment conditions

[14] Initially, the experiment started on January 20, 2020, but due to the COVID-19 pandemic, the Swedish PES suspended the requirement for job seekers to report their activities every month. Since the intervention was tied to this reporting, we had to interrupt the experiment until the reporting requirement was reinstated on May 20.

[15] Note that we could not consider the full inflow population. The PES had given the mandate to an internal team to test various nudging practices within the global intention to make the transition to digital service provision. This team decided to collaborate with two groups of researchers of which we were one. Each research group could use one-third of the population for their intervention, while the remaining third would be shared as control group.

[16] The timing of the end of the experiment was determined by two main factors: the knowledge that a very large sample size was required to detect statistically significant effects for the low-cost intervention described below, and the willingness of the PES to continue running the experiment. As reported in our pre-analysis plan, we aimed to detect effect sizes of the same order of magnitude as those reported in the study by Altmann *et al.* (2018), who also used a light-touch information intervention to enhance the job finding of unemployed job seekers. Based on extrapolations of historical inflows into unemployment, the power analysis suggested that we should continue our experiment for at least one and a half years, i.e., until the end of 2021, a target that we eventually realized.

with a 25% probability.[17] We excluded immigrants from nine countries in East Africa and the Middle East born on particular dates because missing birth certificates for some individuals originating from these countries may result in a manipulated, and thus, non-random birthday. Details can be found in Appendix 1.

Table 1: Summary Statistics and Differences in Background Characteristics by Group: Research Population

Variable	(1) Contr. Motiv.	(2) Auton. Motiv.	(3) Control group	(4) Diff. (2)–(1)	(5) Diff. (3)–(1)	(6) Diff. (3)–(2)
Age	34.766	34.784	34.740	0.018	-0.026	-0.044
Male	0.532	0.530	0.532	-0.002	-0.000	0.002
Have UI benefits	0.739	0.737	0.736	-0.002	-0.003	-0.000
Health disability	0.029	0.029	0.029	0.000	0.000	-0.000
Matchable	0.905	0.907	0.905	0.002	-0.000	-0.003
Education level						
High school	0.469	0.466	0.469	-0.003	0.000	0.003
College	0.346	0.348	0.346	0.002	-0.000	-0.002
Place of birth						
Nordic country	0.016	0.017	0.016	0.001	0.000	-0.001
Western Europe	0.041	0.041	0.041	-0.000	-0.000	0.000
Outside Western Europe	0.258	0.257	0.254	-0.002	-0.005*	-0.003
Unemployment days						
Year t-1	42.217	42.217	42.134	-0.000	-0.083	-0.083
Year t-2	39.225	39.356	39.071	0.131	-0.154	-0.285
Year t-3	38.515	38.619	37.397	0.105	-1.118**	-1.222**
Year t-4	36.941	37.767	37.218	0.825	0.277	-0.549
# of unemployment spells						
Year t-1	0.181	0.180	0.179	-0.001	-0.002	-0.000
Year t-2	0.286	0.290	0.287	0.003	0.001	-0.003
Year t-3	0.271	0.271	0.267	-0.000	-0.004	-0.004
Year t-4	0.253	0.255	0.252	0.002	-0.001	-0.003
# of programs last 4 years						
Labour market education	0.010	0.010	0.010	0.001	0.000	-0.000
Preparatory education	0.025	0.026	0.024	0.001	-0.001	-0.002
Labour market training	0.016	0.015	0.015	-0.000	-0.000	0.000
Subsidized employment	0.034	0.032	0.031	-0.002	-0.002**	-0.001
Observations	55 857	56 082	88 781	111 939	144 638	144 863

Notes: Significance Codes: ***: 0.01, **: 0.05, *: 0.1. The research population excludes some individuals born in nine East African and Middle Eastern countries as discussed in Appendix 1. As mentioned in the pre-analysis plan (version 3.0), half of the control group could not be used between May 20 and October 31, 2020, which involves 14,912 individuals. To account for this issue, we weighted the retained control individuals in that period by the inverse of their share in the counterfactual control group that would have been used in the absence of this issue; specifically, we weighted them by 1.977454. The reported number of observations are unweighted.

[17] As mentioned in the pre-analysis plan (version 3.0), we were unable to use half of the control group that was randomly assigned to another research team between May 20 and October 31, 2020. Consequently, we reweighted the control group to address this issue, as detailed in the note accompanying the balancing tables below. While this adjustment does not impact the validity of the random assignment, it does reduce statistical power.

Table 1 presents the balancing tests for the research population. The control variables, taken from the register data, are all measured at the time of registration at the PES prior to the intervention and correspond to those retained by Cheung *et al.* (2025). The table shows that, despite the exceptionally high precision due to the large sample of 200,720 individuals, the control variables are well balanced over the two treatment conditions and the control group.

2.3 The Intervention

To study how to activate job seekers, we contrast motivational messages framed as either "carrots" and "sticks". There is no strict definition of carrot and stick interventions, but it usually refers to interventions that provide support and encouragement respectively interventions focusing on monitoring and constraints. To operationalize these two types of interventions with an explicit focus on motivation, we rely on self-determination theory from psychology about what motivates people to undertake actions (Deci & Ryan, 1985; 2000; 2008; 2012). As mentioned in the introduction, SDT distinguishes between autonomous motivation, which occurs when individuals self-endorse their actions because they find them interesting and/or meaningful, and controlled motivation, which occurs when individuals experience pressure to behave in a certain way. This provides a coherent framework about motivation that can be used to design email messages. It has the same flavor as previous studies on "carrot and stick" policies, even if the definition of "carrot and stick" interventions vary in the literature. In the following, we use the terms autonomous and controlled motivation to refer to the carrot and stick interventions.

To this end, we crafted short emails, each approximately 120–160 words in length, with wording and tone tailored to stimulate the desired type of motivation. Each job seeker assigned to a treatment condition received a series of up to six monthly emails during the first six months of the unemployment spell,[18] all of the same type: either stimulating autonomous or controlled motivation. The messages were stopped if a job seeker found a job. We did not send any messages to the control group because it was challenging to design a message with the same content that would not foster motivation. However, we note that all job seekers in the study population – both treated and non-treated – received various other frequent messages from the PES, typically in the form of baseline email communications. Therefore, it is unlikely that the

[18] The exact timing at which the messages and surveys were sent can be found in Appendix 5 of the pre-analysis plan.

emails we sent produced a pure message effect. Caseworkers were unaware of the experiment and of the fact that some of their clients received these messages. They therefore could not have influenced how job seekers responded to the intervention.

For wording and tone, we used SDT as guideline. To stimulate autonomous motivation, we framed the messages to support the basic needs for autonomy, competence, and relatedness, which are key drivers of motivation according to this theory (Deci & Ryan, 2000; 2008). In contrast, to foster controlled motivation we framed the messages to enhance external pressure, thereby primarily undermining autonomy, and to a lesser extent the needs for competence and relatedness.

The need for *autonomy* relates to a sense of volition and the ability to self-direct and manage one's own actions. To stimulate autonomy, we used words such as "can", "may", "choose", and "feel free" in the autonomous messages versus words like "must", "required", "have to", and "obliged" in the controlled messages. Moreover, the autonomous messages explained why particular job search actions might be useful, whereas the controlled messages focused on job search obligations. *Competence* reflects the desire to feel capable and effective in one's activities. Here, the autonomous messages emphasized job search success and expressed belief in job seekers' ability to attain their job search goals. Conversely, the controlled messages emphasized avoiding job search failure and did not refer to job seekers' own goals. *Relatedness* concerns the aspiration to feel connected and involved with others. To this end, the autonomous messages expressed support and understanding, and used a more personal tone (e.g., "we"). On the contrary, the controlled messages focused on sanctions and were more formal and impersonal in tone (e.g., "the PES").

Since we are not aware of any other research that used the wording and tone of messages to trigger different types of motivation in a job search context, we carefully implemented several quality checks to ensure that our goal was attained. The wording was extensively discussed in multiple rounds between team members, PES caseworkers, and Swedish labor market experts. Additionally, we refined the messages based on a pilot conducted in June 2019.[19]

[19] In this pilot, we tested the twelve emails (six autonomous, six controlled) on 2,923 unemployed Swedish job seekers, randomizing between the autonomous and controlled conditions. To get a tractable pilot, each job seeker only received one email, which was tailored to their unemployment duration (one to six months) at the moment of the pilot. Results from a follow-up survey about these pilot emails were used to further improve the emails before running the full-scale intervention.

A potential challenge in using emails is how to capture the attention of jobseekers. To enhance relevance, each email included job search tips, such as the importance of having a clear and up-to-date CV when applying. To avoid confounding by other factors than the type of motivation, the content and job search tips of the messages as well as and their length (120-160 words) were, each month, kept as similar as possible across the two message types. The subject line of the corresponding emails was also each month identical for both types of messages. That is, besides the focus on either autonomous or controlled motivation the two types of messages were as similar as possible.

To further enhance engagement, job seekers were personally addressed by their first names, a common practice in Sweden. In addition, all emails were sent from the Swedish PES, as this was expected to increase recipients' attention. To further ensure that the emails were read, the messages were sent a few days before the mandatory monthly activity report deadline and always referenced the upcoming deadline. We stressed this deadline in the controlled condition only. In the autonomous condition we explained why the activity reporting is useful. Note that the PES commonly communicates its baseline services information about the activity reporting by email, again making it unlikely that our emails to the treatment group would produce a pure message effect. Aggregate data show that these actions to attract attention were successful, as around 70% of the job seekers opened the emails.

2.4 Examples of the Content of the Messages

Here we provide two examples of the messages. All other messages are reported in Appendix 2. The Swedish versions of the messages are included in the pre-analysis plan that can be downloaded from the AEA RCT registry website.

Email 1 autonomous [163 words English; 155 Swedish]:
Hi [#name]
The activity reporting opens on the first of [#month]. Thank you for submitting your report.

Your report gives us a better understanding of how your job search is going. It helps us understand your specific situation, so that we can give you the right support on the way to a job or education.
We understand that it is important for you to achieve your personal goals and to find a job or education that suits you. Arbetsförmedlingen believes in your ability and wants to support you in finding the job or the education that you are looking for.

There are several ways to find a fitting and interesting job. Depending on the type of job you are looking for, you can choose to apply for jobs via job listings, by contacting firms directly or by using your own network.
If you have not visited Platsbanken before, you have the opportunity to search for jobs via this link:

To Platsbanken

Best regards,

Arbetsförmedlingen

Email 1 controlled [155 words English; 156 Swedish]:
Hi [#name]

The activity reporting opens on the first of [#month] . Remember to submit your activity report on time.

Arbetsförmedlingen monitors your report to check whether you are active enough in your job search. Being active is a requirement for increasing your chances of quickly finding employment or education. You are expected to accept suitable job offers, so that the time that you remain unemployed is kept as short as possible.
If you have unemployment benefits or receive activity support, the benefit rules require that you are actively seeking and applying for suitable jobs or education. Search for jobs through job listings, using your network and contacting companies directly.
You are obliged to have knowledge of and follow the rules that apply to all job seekers. If you receive benefits and break the rules, you risk a warning or suspension from your benefits.
Visit Platsbanken to look for job openings:

To Platsbanken

Best regards,

Arbetsförmedlingen

2.5 The Expected Impact of the Intervention

Theories from economics and psychology lead to different hypotheses about the impacts of our emails, contributing to why it is relevant to compare the two types of motivation. According to

psychology's SDT, triggering of autonomous job search motivation is expected to consistently increase job search effort and, consequently, job finding compared to both controlled motivation and no intervention (i.e., the control condition). This is because the psychological literature suggests that the role of intrinsic (or autonomous) motivation depends on the nature of the task. "*Tasks that are straightforward, highly repetitive, and perhaps even less inherently enjoyable, should be closely linked to extrinsic incentives. (…) tasks that require a great deal of absorption, personal investment, complexity, and overall quality should be less linked to incentives, and much more closely linked to intrinsic motivation"* (Cerasoli et al. 2014, p. 998-999). While job search may not be *inherently* enjoyable, finding a job is a crucial and meaningful goal for most individuals. Additionally, since job search can be viewed as a complex activity requiring sustained effort over time as well as substantial focus and personal dedication, it is likely that self-regulation and, consequently, autonomous motivation play a key role (Van Hooft et al. 2013). SDT thus predicts that stimulating autonomous motivation should have more favorable effects than controlled motivation (Deci & Ryan 2008; Deci et al. 2017).

SDT does not provide a clear prediction on the relative effectiveness of controlled motivation versus no intervention. In contrast, job search theory (JST) posits that if autonomous messages are perceived as *supportive* or *welfare-enhancing* and controlled messages are *welfare-reducing,* controlled motivation will be more effective than both autonomous motivation and no intervention.[20]

[20] In standard economic job search theory (JST) (Ehrenberg and Oaxaca 1976; Mortensen 1977; for a survey, Le Barbanchon et al. 2024), intrinsic (or autonomous) and controlled motivation are considered to matter only indirectly, through their effects on welfare. Consequently, standard economic theory makes predictions that are opposite to those of SDT regarding the relative effectiveness of autonomous and controlled motivation. According to JST, monitoring job search activities incentivizes job finding because individuals seek to avoid the risk of sanctions for non-compliance. In contrast, relaxing control by supporting job seekers' basic needs (autonomy, competence, and relatedness) enhances their welfare, reduces the fear of sanctions, and thus may decrease their motivation to search intensively.

3 Data

We collected information on the labor market outcomes using PES register data and three different surveys.[21] All three surveys were kept short to encourage higher response rates and to comply with the PES guidelines. An *initial survey* was used to measure initial job search motivation. It was conducted within the first month of unemployment, about a week before the first message was sent. The time lag between this survey and the first message aims to avoid a priming effect. An *intermediate survey* was sent between 3 and 4 months after entry into unemployment, asking about job-search behavior (effort and quality) and motivation. By this time, most respondents in the treated group have already received three of the six intended messages.[22] Finally, all job seekers who found a job were sent an *exit survey* 2 to 7 weeks after leaving unemployment, with questions focusing on perceived job quality, including job satisfaction, job fit, and intention to stay.

Appendix 3 presents the balancing tables for the samples that responded to the surveys. While some imbalances are observed, they do not raise concerns about selective survey response, as the findings remain robust when adjusting for background characteristics.

3.1 Outcome Variables

Table 2 lists the primary (in bold) and secondary outcome variables, as pre-specified in the pre-analysis plan. We distinguish between three different outcomes: (i) 'first stage' outcomes; (ii) job search and job finding outcomes; (iii) measures of job search quality and quality of the first job after unemployment.

The first set of outcomes aims at measuring whether our intervention triggered a first stage behavioral response and whether this response was in line with our intentions. The main purpose here is to measure whether the intervention had any significant bite. First, we measure the proportion of job seekers who opened the emails and click rates for URLs included in the emails. For privacy reasons, we only have this information on the aggregate level and only for

[21] The surveys were sent to all job seekers with two exceptions. First, due to practical reasons, survey collection began on August 24, 2020, excluding the first two cohorts from the initial survey. Second, only half of the control group was eligible to receive the surveys.

[22] For individuals who exited unemployment before the intermediate survey was sent, the intermediate and exit surveys were merged into a single survey. This was decided in consultation with the PES to avoid these individuals receiving two separate surveys within a short time period.

two cohorts, those who entered unemployment in months 14 and 16 after the start of the experiment. Second, since our messages were sent each month close to the deadline for job seekers to submit their activity reports, we consider the average monthly share who complied (in months 1–3, 4–6, and 1–6) as *individual* response indicators. We also used the intermediate survey data to check whether our messages triggered any observable change to *controlled and autonomous motivation* (see Appendix 4 for details), keeping in mind that the power of the survey analyses is lower due to non-responses.

Table 2: Overview of Primary **(in bold)** and Secondary Outcomes

Outcome category	Register data	Survey data
(i) 'First stage'	- Aggregate email open and URL click rate (selected cohorts)[1] - Monthly share submitting activity reports (months 1-3, 4-6, 1-6).	Motivation in intermediate survey after 3-4 months:[2] - Controlled; - Autonomous.
(ii) a. Job search	a. **Average number of job applications per month** (months 2-4, 5-7, **2-7**).	a. Number of hours searched last week.
b. Job finding	b. **Leaving unemployment within 7 months** (4 and 12 months); - Days unemployed within one year of the unemployment onset.	
(iii) a. Job search quality	a. Average number of spontaneous applications per month (months 2-4, 5-7, 2-7). - Average number of job interviews per month (months 2-4, 5-7, 2-7).	a. Validated measure of job search quality.[3]
b. Job quality	b. Employment (as measured by non-unemployment) lasts more than 6 months (3/12 months).	b. Measure of job quality:[4] job satisfaction, perceived fit and stay intention, and the average of these items.

Notes: [1] In contrast to all other outcomes, this information is not available at the individual level and is pertains only to cohorts 12 and 16, who entered unemployment between April 20-May 19, 2021, and August 20-September 19, 2021, respectively.
[2] Appendix 4 describes the construction of the validated measures of motivation. The initial search motivation used as moderator (Section 5.2.2) is measured in the initial survey using the same items.
[3] Appendix 5 describes how this measures slightly modifies the validated measure of Turban et al. (2009).
[4] Appendix 6 describes the construction of this measure in more detail.

For job search and job finding, our two primary outcomes are (i) the average number of job applications[23] per month during months 2 to 7 of unemployment, and (ii) exit from

[23] Job applications include submissions to posted vacancies, excluding spontaneous applications, which are analyzed as a separate outcome category.

unemployment within 7 months.[24] We restrict the number of primary outcomes as to avoid the issue of multiple testing and select them from the administrative data to maximize statistical power. We chose these two outcomes as primary measures, because ultimately, we are interested in whether our motivational emails increase search effort and boost job finding. As secondary outcomes, we consider job search and job finding outcomes measured in other periods, and complement the exit from unemployment indicators by measuring days in unemployment.

The final set of outcomes concerns job-search quality and job quality. *Job search quality* may be relevant as the autonomous treatment could enhance how job seekers search for jobs without affecting the total number of applications submitted. We measure job-search quality in several ways. First, we use data from the monthly activity reports to measure the *average number of spontaneous applications per month* and the *average number of job interviews to which job seekers are invited per month*, as this may reflect both the quality of job search and broader changes in job-finding success. Second, based on survey data we construct a validated psychological measure of job-search quality (Turban et al., 2009). Appendix 5 explains the construction of this measure.

The main measure of *job quality* is an indicator that measures whether the duration of the first job – proxied by the time not in unemployment – exceeds 6 months. For sensitivity, we also consider job duration thresholds of 3 and 12 months. Additionally, we use data from the exit survey, in which job seekers are asked about: (i) job satisfaction, (ii) perceived job fit, and (iii) their intention to stay.[25]

3.2 Moderators

Even though the theories provide no clear predictions about moderators of the intervention, we examine the moderating effects of initial job-search motivation, gender, labor market attachment, and the local unemployment rate. The first two moderators are motivated by previous findings. Herz & Zihlman (2024) reported in their working paper (now published) that monitoring could particularly reduce the performance of intrinsically motivated workers

[24] This outcome, which is also used in other research (see e.g. Cheung et al. 2025), is readily available in the administrative data from the Swedish PES.

[25] We analyze these three scales separately and also use a composite measure, calculated as the average of the three. See Appendix 6 for more details.

in complex tasks. Lombardi (2019) found that males react more strongly to increased monitoring of job search activities. In addition, we explore whether the impact of our intervention is stronger for individuals who are strongly attached to the labor market and live in areas with low local unemployment rates, as search effort is likely to be more effective for these groups.[26]

4 Methods

We estimate the causal effect of the treatment in a straightforward way by regressing the outcomes of interest (Y_i) on treatment indicators and, possibly, control variables ($\boldsymbol{X}_i$). We define the treatment indicators as follows: $T_i^c = 1$ if individual *i* belongs to the random group that receives messages aimed at triggering controlled motivation and $T_i^c = 0$ otherwise; $T_i^a = 1$ in case individual *i* belongs to the random group that receive messages aimed at triggering autonomous motivation and $T_i^a = 0$ otherwise. The regression model is specified as:

$$Y_i = \alpha + \beta_c T_i^c + \beta_a T_i^a + \boldsymbol{X}_i \boldsymbol{\gamma} + u_i \quad (1)$$

where β_c and β_a are the parameters of interest, capturing the effect of the autonomous respectively the controlled messages versus no intervention. We can also test for differences between the two treatments by comparing β_c and β_a. While Section 5 reports the results without control variables, our sensitivity analysis presented in Appendix 7 demonstrates that including covariates $\boldsymbol{X}_i$ in the regressions has no impact on our main findings. As recommended by Duflo (2018), we select the control variables in these robustness checks using a double machine learning LASSO method (Belloni *et al.,* 2014; Urminsky *et al.,* 2016; Cilliers *et al.,* 2024). We use conventional standard errors, as using Huber-White robust errors has no measurable impact on the results.

One potential concern is dynamic selection as some of our outcome variables, such as job-search intensity, are measured conditional on being unemployed. Thus, if the treatment affects the likelihood of exiting unemployment, it alters the composition of treated individuals in (un)employment relative to the untreated, and this may create selection problems. However, our results are robust to the adjusting for control variables (Appendix 7), suggesting that

[26] In the pre-analysis plan, we also announced that we would consider occupational exposure to Corona as potential moderator. However, this turned out to be less relevant ex post, and we therefore did not include it in the analysis.

dynamic selection is less of a problem. Moreover, the interesting impacts of our light-touch email intervention are only moderately sized, so the resulting compositional changes are marginal. As a result, any dynamic selection bias should be less of a concern.

For the moderating analysis, we run the regressions separately for binary moderators. For non-binary moderators, we estimate an interacted version of Equation (1), which includes the moderator of interest (e.g., initial motivation) both without interaction and in interaction with the two treatment indicators.[27]

5 Results & Discussion

5.1 Main Effects

In this section, we report the effects of receiving the two types of messages relative to the control group for the following outcomes: (i) the 'first stage' outcomes, measured by aggregate email open and URL click rates, the share submitting activity reports, and survey scales of controlled and autonomous motivation (Table 3); (ii) the job search and job finding outcomes measured in the register data (Table 4); (iii) the job search quality and job quality indicators measured in the register data and surveys (Tables A8.1–A8.2). In the final subsection, we provide an interpretation of the findings.

Note that the number of observations differ largely depending on the data source: outcomes measured from survey data are based on a much smaller number of observations than those from register data, and therefore, may be measured much less precisely.

5.1.1 'First stage': Open Rates, and Impact on Activity Reporting and Motivation

As mentioned in Section 3.1, we possess aggregate-level data on the email open rate and click-through rates for two inflow cohorts. Overall, the open rate is 72%: 11,102 of the 15,436 messages sent to these cohorts were opened. This suggests that the majority of the job seekers has seen the messages. This open rate is higher than those reported in other studies, which

[27] Since the estimates with and without controls are nearly identical, we do not include the controls in the moderating analysis presented in Section 3.3.

typically range from 30% to 50%.[28] It is comparable to the rate observed for a personally addressed letter (Altmann et al., 2018).

The open rate of the first email cannot be influenced by its content and is therefore balanced across the two conditions: 74.9% in the controlled and 75.0% in the autonomous condition, with a p-value of 0.949. However, once the first message has been opened, the treatments may lead to different subsequent open rates. Indeed, we observe an open rate of 72.1% for individuals in the controlled condition, compared to 70.0% in the autonomous condition (p-value < 1%). Similarly, conditional on opening, 10.9% of individuals in the controlled condition click on the URLs in the emails as to seek more information on the PES website, compared to only 8.9% in the autonomous condition.[29] This shows that the messages triggered different behavioral reactions.

In principle, the treatment effect reflects the combined effect of receiving motivational messages *and* accessing the tips provided on the webpages linked via the embedded URL's. However, given the low conditional click-through rates, it is unlikely that the tips are the primary driver of the effects reported below. Moreover, the directions of the observed treatment effects do not align with the expected impact of such tips.

A key observation from Table 3 is that both treatments significantly impact activity reporting, with p-values less than 1%. The fraction of submitted reports during the first six months increased by 1.1 percentage points (pp) for emails triggering controlled motivation and by 0.8 pp for those reinforcing autonomous motivation.[30] These changes correspond to proportional increases relative to the baseline by 2.5% and 1.7%, respectively. Although the effect sizes are small, as might be expected from an email intervention, they nonetheless demonstrate a clear behavioral response.

The effects on reporting are more pronounced in the beginning of the intervention than later on. The intervention's impact on the first activity reporting is about two to three times larger than for reports 4–6. However, it is difficult to assign a structural interpretation to this

[28] In Darling et al. (2017) email open rates range between 33% and 48%, in Hopkins & Dorian (2024) between 30% and 35%, and in Schimpf et al. (2025) between 48% and 49%.

[29] We include the clicks in the first message in these statistics, as individuals' clicking behavior may have been influenced by its content. The p-value for the difference in the conditional click rates is also below 1%.

[30] These are intention-to-treat (ITT) effects. Although we cannot merge the email open data with individual responses, we can infer from the aggregate open rate that the local average treatment effects (LATE) are approximately 1.39 times larger than the reported ITT: based on an open rate of 72%, 1.39=1/0.72. Throughout the paper, we report only the ITT estimates.

time dependence, as it may reflect dynamic selection: those who respond more strongly early may also exit unemployment more quickly.

Table 3: Effects on the Monthly Share Submitting Activity Reports and on Survey Scales of Motivation

	Monthly share submitting activity reports				Motivation: intermediate survey	
	1st report	Reports (1–6)	Reports (1–3)	Reports (4–6)	Controlled motivation	Autonomous motivation
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment						
Controlled $\hat{\beta}_c$	0.0231***	0.0113***	0.0151***	0.0075***	0.0283	0.0058
	(0.003)	(0.002)	(0.002)	(0.002)	(0.025)	(0.015)
Autonomous $\hat{\beta}_a$	0.0204***	0.0076***	0.0091***	0.0060**	0.0112	-0.0056
	(0.003)	(0.002)	(0.002)	(0.002)	(0.025)	(0.016)
Observations	200 720	200 720	200 720	200 720	16 093	16 093
Mean control gr.	0.589	0.456	0.534	0.377	3.187	4.190
Auto. vs Contr.	-0.0027	-0.0037	-0.0060**	-0.0014	-0.0171	-0.0114
$= \hat{\beta}_a - \hat{\beta}_c$	(0.003)	(0.002)	(0.002)	(0.003)	(0.025)	(0.016)
Observations	111 939	111 939	111 939	111 939	10 726	10 726
Mean controlled tr.	0.612	0.467	0.550	0.385	3.215	4.195

Notes: Regressions estimates for the analyses sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–4 report show effects on the monthly share of submitted activity reports over various intervals. Columns 5–6 on motivational scales, based on survey data described in detail in Appendix 4. Effects relative to the mean of the control group and relative to the controlled treatment. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively.

While the effect is larger in the controlled than in the autonomous condition, the difference is statistically significant only during the first three months, possibly due to similar dynamic selection. Given the emphasis on compliance with formal requirements in the controlled condition, a stronger effect on reporting was to be expected.

The right panel of Table 3 reveals that the impacts of the intervention on the two motivational scales measured from the intermediate survey are statistically not different from zero. These imprecise estimates may be attributed to the reduced statistical power of the survey data, given the low response rate of approximately 9.5%, or the difficulty of measuring these different motivational concepts. However, since – as shown below – the messages did influence job search behavior and outcomes, albeit in the opposite direction than anticipated, this suggests that the absence of measured motivational are due to a measurement problem rather than a lack of impact.

5.1.2 Effects on Job Search and Job Finding

Table 4 reports the effects of the intervention on indicators of job-search effort and job finding. It includes the effects on the two primary outcomes (marked as bold): the number of job applications between months 2 and 7 (column 2), and the job finding rate within the first 7 months (column 4). We conclude that the controlled treatment does not affect any of these outcomes. The zero impact of the controlled treatment is confirmed by the statistically insignificant (and small) estimates for the secondary outcomes as well (columns 1, 3 and 5–6).

Table 4: Effects on Number of Job Applications and Job Finding

	Job applications		Job finding			
	Report 2–4	**Report 2–7**	4 months	**7 months**	12 months	Days unemployed 12 months
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment						
Controlled $\hat{\beta}_c$	-0.0081	**0.0083**	0.0005	**0.0009**	-0.0013	0.1170
	(0.055)	(0.049)	(0.003)	(0.003)	(0.002)	(0.684)
Autonomous $\hat{\beta}_a$	-0.1283**	**-0.0938***	-0.0030	**-0.0003**	-0.0043**	0.5368
	(0.055)	(0.049)	(0.003)	(0.003)	(0.002)	(0.683)
Observations	125 357	131 518	200 720	200 720	200 720	200 720
Mean control gr.	8.734	8.286	0.462	0.631	0.817	184.2
Auto. vs Contr.	-0.1202**	**-0.1021***	-0.0034	**-0.0012**	-0.0030	0.4198
$= \hat{\beta}_a - \hat{\beta}_c$	(0.059)	(0.053)	(0.003)	(0.003)	(0.002)	(0.749)
Observations	70 363	73 796	111 939	111 939	111 939	111 939
Mean controlled tr.	8.726	8.294	0.462	0.632	0.815	184.3

Notes: Regressions estimates for the analyses sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–2 show the effects on the average number of job applications per month in months 2-4 and 2-7; Columns 3–5 on job finding within 4, 7, and 12 months; and Column 6 on the number of days unemployed within one year of unemployment onset. . Effects relative to the mean of the control group and relative to the controlled treatment. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively. Primary outcomes are in bold.

The autonomous treatment impacts the number of job applications: they decrease by 0.09 (p-value < 10%), which corresponds to a proportional decrease of 1.1% relative to baseline. This is reinforced by a more statistically significant (p-value < 5%) decrease by 0.13 (1.5% relative to baseline) in the corresponding short-run outcome measuring the number of job applications between months 2 and 4.[31] Because of the zero effects of the controlled treatment, the negative effects of the autonomous treatment relative to the control group are also reflected in significant differences between the two treatments (line Auto. vs Contr. $= \hat{\beta}_a - \hat{\beta}_c$).

[31] To save space, we omit the effects on job applications between months 5 and 7. These effects have the same sign as those between months 2 and 4 but they are not significantly different from zero. Results are available upon request.

For job finding we see no significant effect on the primary outcome (job finding within 7 months) in column 4. However, we observe a slight decline in the job finding rate relative to the control group within the first 4 and 12 months, with the latter being significant at the 5% level: –0.4 pp –0.5% relative to baseline). Below, we show that these effects are driven by behavioral changes among men, for whom we find significant effects for the job-finding outcomes.

5.1.3 Effects on Job Search Quality and Job Quality

We find no systematic effects on job-search quality nor job quality for either of the two treatments (Tables A8.1 and A8.2 in Appendix 8). Relative to the control group, only the controlled treatment condition has a statistically significant effect on one of the seven measures of job-search quality and one of the seven measures of job quality. Specifically, it has a positive effect on the intermediate survey measure of job-search quality and a negative effect on the exit survey measure of job satisfaction. Relative to the autonomous treatment, only the former effect remains significant at the 10% level. However, since the messages designed to induce controlled motivation had no significant impact on any of the primary outcomes or other quality indicators, these effects are likely due to sampling noise and should not be interpreted substantively.

5.1.4 Discussion

How can we interpret these findings? A first observation is that a high share (72%) opened the emails. This is important, as a high open rate is a necessary condition for the intervention to generate behavioral responses.

Second, messages stimulating *controlled* motivation had no impact on job search effort or on job finding. These zero effects are precise and cannot, therefore, be attributed to low statistical power. Nevertheless, we do observe a highly significant increase in activity reporting, confirming that the controlled messages did have a meaningful behavioral impact. One possible interpretation is that these messages may have primarily acted as a reminder and increased the incentive to comply with the reporting requirements rather than encouraging genuine changes to search effort. This would explain why we find no impact on the reported number of job applications or on job finding, despite observing a positive effect on activity reporting. The zero effect on formal applications also implies that there seem to be no shift

from informal applications to formal applications as previously observed in the literature (van den Berg & van der Klaauw, 2006).

Table 5: Moderating Effects of Gender on the Monthly Share Submitting Activity Reports

	Monthly share submitting activity reports			
	1st report	Reports (1–6)	Reports (1–3)	Reports (4–6)
	(1)	(2)	(3)	(4)
Treatment				
Controlled x Male	0.0264***	0.0098***	0.0143***	0.0052
	(0.004)	(0.003)	(0.003)	(0.003)
Autonomous x Male	0.0253***	0.0101***	0.0116***	0.0086***
	(0.004)	(0.003)	(0.003)	(0.003)
Controlled x Female	0.0193***	0.0131***	0.0161***	0.0101***
	(0.004)	(0.003)	(0.003)	(0.004)
Autonomous x Female	0.0145***	0.0045	0.0060*	0.0030
	(0.004)	(0.003)	(0.003)	(0.003)
Observations	200 720	200 720	200 720	200 720
Mean control group (male)	0,504	0,405	0,472	0,338
Mean control group (female)	0.589	0.453	0.535	0.372

Notes: Regression estimates of treatment effects for the analysis sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–4 show effects on the monthly share submitting activity reports over various time periods. Effects in deviation from the mean shares of activity reporting by females and males in the control group reported in the two last lines. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively.

Third, the significant decrease in job search effort and moderately negative effect on job finding of the *autonomous* motivation emails were unexpected. However, the description of the institutional context and the comparison with other countries in Section 2.1.3 showed that the institutional environment was highly controlling at the baseline, and this may explain this apparent contradiction. In such a controlling environment, messages promoting autonomy might lead job seekers to believe they can reciprocate by reducing effort without risking sanctions (Rabin 1993; Falk & Fischbacher 2006; Dohmen et al. 2009). Note, however, that the interpretation of this reciprocity is subtle, as these theories also predict that job seekers should respond positively to the kindness that messages promoting autonomy aim to convey. The fact that they react in the opposite direction suggests that they do not perceive these messages as kind, but rather as an opportunity to retaliate against the overall pressure by reducing effort without risking sanctions.[32] This response demonstrates that autonomous motivation cannot be stimulated in isolation from the broader context and may even backfire.

[32] The absence of retaliation in response to the controlling messages reinforces the interpretation that men did not reduce effort because they perceived the system as so controlling that any reduction would lead to immediate sanctions. In contrast, the autonomous messages alleviate this pressure.

It also aligns with recent evidence from van den Berg *et al.* (2024) in the context of German social assistance, which shows that higher negative reciprocity under a stricter regime particularly reduces the search effort of *male* welfare recipients.

5.2 Moderators[33]

We now discuss the moderating impact of gender, initial motivation, labor market attachment and unemployment rate in the local labor market.

5.2.1 Gender

In the main analysis, we reported some negative effects of the autonomous messages on job-search effort and job finding. Here, we demonstrate that these effects are driven by significant effects among men.

Table 5 shows that the controlled treatment significantly increased activity reporting for both men and women. Notably, the response to the controlled treatment is equally strong irrespective of gender – suggesting that the increased ambition to comply with the reporting requirements is general. In contrast, we find that the autonomous treatment consistently has a stronger effect on activity reporting for men than for women throughout the unemployment spell. For the first report, the effect on reporting is significantly higher for men than for women, with a difference of +1.1 pp (p-value < 5%). This finding already suggests a stronger behavioral response of autonomous messages among men than among women.

Table 6 shows that the negative effect of messages stimulating autonomous motivation primarily reduces the number of job applications per month among men. The negative effect for men appears in all the three different time intervals that we consider, and it is significant (10%-level) during months 5 to 7 and during months 2 to 7 of unemployment. We also find negative effects on job finding among men. For them the job-finding rate within the first 4 months decreases by 0.8 pp (a 1.8% decline relative to baseline), and the number of days in unemployment within the first year increases by 1.6 days (a 0.8% increase relative to baseline).

[33] We only report the moderating effects on the activity reporting shares, the job search and job finding indicators. The moderating effects on other outcomes are available from the authors upon request.

Table 6: Moderating Effects of Gender on Job Search and Job Finding

	Job applications			Job finding			
	Report 2–4	Report 5–7	**Report 2–7**	4 months	**7 months**	12 months	Days unemployed 12 months
	(1)	(2)	**(3)**	(4)	**(5)**	(6)	(7)
Treatment							
Controlled x Male	0.0090	-0.0430	**0.0099**	0.0001	**0.0033**	-0.0015	-0.0773
	(0.076)	(0.079)	(0.068)	(0.004)	(0.004)	(0.003)	(0.938)
Autonomous x Male	-0.1243	-0.1378*	**-0.1157***	-0.0081**	**-0.0023**	-0.0038	1.5674*
	(0.076)	(0.079)	(0.069)	(0.004)	(0.004)	(0.003)	(0.938)
Controlled x Female	-0.0261	0.0402	**0.0067**	0.0009	**-0.0019**	-0.0010	0.3367
	(0.078)	(0.081)	(0.070)	(0.004)	(0.004)	(0.003)	(1.000)
Autonomous x Female	-0.1326*	-0.0052	**-0.0708**	0.0028	**0.0019**	-0.0049	-0.6109
	(0.078)	(0.082)	(0.070)	(0.004)	(0.004)	(0.003)	(0.997)
Observations	125 357	85 769	131 518	200 720	200 720	200 720	200 720
Mean contr. gr (male)	8,168	7,402	7,748	0,460	0,631	0,829	185,982
Mean contr. gr (female)	8.202	7.166	7.761	0.465	0.637	0.825	182.3

Notes: Regression estimates of treatment effects for the analysis sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–3 show effects on the average number of job applications per month in months 2–4, 5-7, and 2–7; Columns 4-6 on job finding within 4, 7 and 12 months; and Column 7 on the number of days unemployed within one year of unemployment onset. Effects in deviation from the means in the control group for males and females reported in the two last lines. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively. Primary outcomes are in bold.

These striking gender differences are interesting in light of the previous evidence. The literature on the effectiveness of active labor market policies consistently finds larger impacts for women (Bergemann & van den Berg 2008; Card et al. 2018), but this has been attributed to selection effects related to fertility decisions (Lechner & Wiehler, 2011; Vooren et al., 2019). However, our findings align with those of Lombardi (2019), who found that, within the same institutional environment, only men responded to tighter monitoring and threats of sanctions by finding jobs faster. Reducing strictness by sending messages aimed at fostering more autonomy should then result in the opposite behavior. Moreover, van den Berg et al. (2024) also report stronger negative reciprocity effects among men in stricter welfare regimes. This suggests that males are more prone to retaliatory behavior.

5.2.2 Initial Motivation

Within the behavioral economics literature much attention has been given to the prediction that extrinsic incentives (i.e., controlled motivation) may backfire by crowding out intrinsic motivation (Fehr & Falk 1999; Gneezy & Rustichini 2000a, b; Huffman & Boganno 2018). While not all forms of extrinsic motivation constitute controlled motivation in SDT (Ryan &

Deci 2000),[34] this crowding-out effect aligns with SDT's prediction that controlled motivation can undermine autonomous motivation.

Consistent with this, Herz & Zihlmann (2024) found in a stylized field experiment with Amazon Mechanical Turk workers that introducing greater control can reduce performance driven primarily by intrinsic ("non-pecuniary") motivation. This negative effect was observed only for challenging tasks, not for simple ones, supporting the psychological research suggesting that intrinsic motivation is more crucial for complex tasks than for simple ones (Cerasoli et al. 2014). Given that job search is generally considered a complex task (Van Hooft et al. 2013), reinforcing controlled motivation could reduce job-search effort and hinder job finding of individuals who were initially (i.e., at the start of unemployment) autonomously motivated.

Table 7: Moderating Effects of Initial Autonomous Motivation on Job Search and Job Finding

	Job applications			Job finding			
	Report 2–4	Report 5–7	**Report 2–7**	4 months	**7 months**	12 months	Days unemployed 12 months
	(1)	(2)	**(3)**	(4)	**(5)**	(6)	(7)
Treatment							
Controlled x Initial auton. motivation	0.0042	-0.2531	**-0.0742**	-0.0165	**-0.0190***	-0.0113	4.2825*
	(0.201)	(0.194)	(0.180)	(0.010)	(0.010)	(0.008)	(2.566)
Observations	14 855	10 201	15 297	19 806	19 806	19 806	19 806
Mean control group	9.501	7.752	8.870	0.428	0.614	0.806	188.6

Notes: Regression estimates of treatment effects for the analysis sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–3 show effects on the average number of job applications per month in months 2–4, 5-7, and 2–7; Columns 4-6 on job finding within 4, 7 and 12 months; and Column 7 on the number of days unemployed within one year of unemployment onset. Effects in deviation from the controlled treatment with initial motivation set to zero. The complete table including the interaction effect between the autonomous treatment and initial autonomous motivation is reported in Table A9.2 in Appendix 9. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively. Primary outcomes are in bold.

We find some evidence in line with these expectations. Table 7 shows that the interaction effects between the controlled messages and initial autonomous motivation are negative for the number of job applications between months 2 and 7, and 5 and 7, though not statistically significant. They are also negative for job finding rates measured after 4, 7, and 12 months,

[34] When people identify with the desired outcomes and internalize the regulation of their behavior, it becomes self-determined, and external incentives can even enhance autonomous motivation (Cerasoli et al. 2014).

with statistical significance at the 10% level after 7 months. Conversely, the effect is positive (p-value < 0.10) for the number of days in unemployment during the first year.

While this evidence is not significant across all outcomes, the fact that the effects on the other job finding outcomes share the same sign and that these findings align with prior research in different contexts, points in the direction of negative effects of the controlled treatment for initially autonomously motivated job seekers.[35] This is another interesting way in which our messages appear to have backfired.

By contrast, as expected, no significant effects are found for the interaction between controlled messages and initial controlled motivation, nor between messages stimulating autonomous motivation and either type of initial motivation.

5.2.3 Other moderators

In Section 3.2, we hypothesized that motivational effects would be more pronounced for job seekers with strong labor market attachment or residing in areas with low local unemployment rates, but we no find systematic evidence of such moderating effects (Tables A9.5-A9.8 in Appendix 9). Residing in a municipality with unemployment rate below the median significantly *reduces* the share submitting activity reports in all months by about 1 pp (p-value < 5%) in the autonomous treatment condition, but has no significant impact in the controlled treatment. However, we do not observe any statistically significant moderating effect of the local unemployment rate on other outcomes, except for a small increase in the 4-months job-finding rate for the autonomous treatment in low-unemployment municipalities. This is the only result that is significant and directionally consistent with the hypothesis. Strong labor market attachment does not moderate any outcome for either treatment, except for a reduction in the share submitting the first activity report by 1.5 pp (p-value < 1%) in the controlled treatment.

[35] The full estimation results for the interaction effects of initial autonomous and controlled motivation with the two treatments on the activity reporting shares, the job search and job finding indicators are presented in Table A.9.1-9.4 in Appendix 9. There are no additional significant effects to report.

6 Conclusion

One of the greatest challenges in job search is maintaining motivation, as repeated failure can lead to significant frustration. To address this challenge, this research presents a low-cost digital intervention with motivational emails aimed at enhancing and sustaining motivation and search effort among job seekers. Unique in its approach, the intervention evaluates a "carrot" and a "stick" approach to stimulate motivation, by sending short, theory based email messages to unemployed job seekers. Specifically, the carrot and stick emails were operationalized using Self-Determination Theory (SDT) in psychology (Deci & Ryan 1985; 2000; 2008; 2012), focusing on what is referred to as autonomous and controlled motivation – the two main drivers of motivation according to SDT. The intervention was implemented on an unprecedented scale in a randomized controlled trial (RCT) involving approximately 200,000 individuals entering unemployment in Sweden.

Most of the job seekers opened the motivational emails and it increased compliance with job-search reporting requirements, likely in part because they served as reminders to submit activity reports. Interestingly, we find evidence of two crowding-out effects. First, the stick messages that attempted to stimulate controlled motivation backfire for job seekers who were motivated by an inner drive rather than by constraints at the onset unemployment. Similar findings have been reported in both economics and psychology for complex tasks (Herz & Zihlmann, 2024; Cerasoli et al., 2014). In contrast, for other job seekers, enhancing controlled motivation had no behavioral effects, possibly due to the already highly controlling environment in which unemployed individuals operate.

We also document a novel crowding out effect of the carrot messages that attempted to stimulate autonomous motivation. The messages backfired and did not improve job search outcomes; in fact, they led to a slight decline in job applications and job finding, particularly among men. One possible explanation is that these messages signal to job seekers that the PES is less controlling than initially perceived, prompting a reduction in effort. This interpretation aligns with theories of reciprocal behavior, which suggest that individuals respond to excessive control or sanctions by reducing effort as a form of retaliation (Rabin 1993; Falk & Fischbacher 2006; Dohmen et al. 2009). However, this interpretation of this reciprocity is subtle, as these theories also predict that job seekers should positively react to the kindness that the messages promoting autonomy aim to convey. The fact that they react in the opposite direction suggests that they do not perceive these messages as kind, but rather as an opportunity to retaliate against the overall pressure by reducing effort without risking any sanctions. Such a retaliation is also

consistent with the findings of van den Berg *et al.* (2024) who show that, in the context of German social assistance, *male* welfare recipients in particular exhibit more negative reciprocity by reducing search effort in response to stricter regimes.

These findings demonstrate that enhancing motivation among job seekers through a low-cost intervention is challenging and may even be counterproductive. Our results highlight that the context in which such interventions are implemented plays a key role in shaping their effects. Inducing autonomous motivation appears to require a more broadly supportive environment. If the context is overly controlling, as in the Swedish PES, the intervention lacks credibility and may backfire. Whether light-touch measures can effectively stimulate autonomous motivation in a supportive setting, or whether this requires in-person guidance from a counselor, remains an open question for future research.

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Online Appendix

Appendix 1: Trimming and Selection Criteria on the Research Population

As mentioned in the main text, for some migrants originating from particular countries from East Africa and the Middle East the exact birth dates are unknown due to lacking birth certificates. For these individuals, the officially registered day of birth may not be random in a year, as it is either assigned by an administrator or chosen by the individuals themselves. Typically, the registered birthdays in these instances fall on the first day of the month, a round number, or a religious holiday. As a result, the assignment based on day of birth is not truly random for individuals originating from such countries. Ignoring this issue leads to an unbalanced distribution of the research population across treatment conditions.

To address this issue, we implemented the following procedure. We hypothesized that the problem primarily affects migrants from specific countries where birth date registration is uncommon. We calculated the standard deviation of the frequency observed on each day of birth by country of origin within our research population. The rationale is that countries where specific birth days are commonly chosen would show a significantly higher standard deviation compared to countries where this is much less common.

When ranking countries by this standard deviation, we identified two notable discontinuities at the top of the distribution. For nine countries from East Africa and the Middle East, the standard deviations exceeded this second discontinuity. We decided not to exclude all individuals but rather to exclude all six-day blocks[36] in which the standardized difference in the share of births within the year between individuals born in any of these nine countries and those born in Sweden exceeded 0.2 on any given day within the block. We chose 0.2 as the threshold, as Rosenbaum and Rubin (1985) consider this the point above which a standardized difference indicates significant imbalance. Even though higher thresholds (0.3 or 0.4) resulted in balanced samples across treatment conditions, we opted for a conservative approach by selecting the analysis sample based on the 0.2 threshold. This exclusion affected 36,570 individuals, or approximately 15% of the research population. This restored the balancing property. In a sensitivity analysis, we used the 0.3 threshold and found that the results were very robust.

[36] To implement the randomization, the calendar year was divided into a sequence of six-day blocks. The treatment condition was determined by the specific day within the block on which an individual's birthday fell.

Further details of this trimming procedure can be obtained from the authors upon simple request.

Appendix 2: The Messages Aimed to Trigger Motivation

- *Email 1 autonomous [163 words English; 155 Swedish]:*

Hi [#name]

The activity reporting opens on the first of [#month]. Thank you for submitting your report.

Your report gives us a better understanding of how your job search is going. It helps us understand your specific situation, so that we can give you the right support on the way to a job or education.

We understand that it is important for you to achieve your personal goals and to find a job or education that suits you. Arbetsförmedlingen believes in your ability and wants to support you in finding the job or the education that you are looking for.

There are several ways to find a fitting and interesting job. Depending on the type of job you are looking for, you can choose to apply for jobs via job listings, by contacting firms directly or by using your own network.

If you have not visited Platsbanken before, you have the opportunity to search for jobs via this link:

To Platsbanken

Best regards,

Arbetsförmedlingen

- *Email 1 controlled [155 words English; 156 Swedish]:*

Hi [#name]

The activity reporting opens on the first of [#month] . Remember to submit your activity report on time.

Arbetsförmedlingen monitors your report to check whether you are active enough in your job search. Being active is a requirement for increasing your chances of quickly finding employment or education. You are expected to accept suitable job offers, so that the time that you remain unemployed is kept as short as possible.

If you have unemployment benefits or receive activity support, the benefit rules require that you are actively seeking and applying for suitable jobs or education. Search for jobs through job listings, using your network and contacting companies directly.

You are obliged to have knowledge of and follow the rules that apply to all job seekers. If you receive benefits and break the rules, you risk a warning or suspension from your benefits.
Visit Platsbanken to look for job openings:

To Platsbanken

Best regards,

Arbetsförmedlingen

- *Email 2 autonomous [129 words English; 128 Swedish]:*

Hi [#name]

Thank you for letting us know how your job search is going through your activity reports. The next submission period opens on [month].

Arbetsförmedlingen understands that it is important for you to find a job that fits and feels right for you. We believe in your ability to accomplish your goals. If you want support and inspiration in your job search, you may find tips on our website. If you have questions about your job search or other questions, do not hesitate to mention these in your contact with us.

Having an interesting CV may be key to getting the job you are looking for. Our website might help you to write a CV that suits the jobs you are interested in:

Write cv

Best regards,

Arbetsförmedlingen

- *Email 2 controlled [129 words English; 123 Swedish]:*[37]

Hi [#name]

Starting from the first of [#month] you can submit your activity report. Your report is essential as it allows us to monitor your job search. Remember that each report is screened by Arbetsförmedlingen. Therefore, do not provide incorrect information.

According to the rules, you are obliged to actively search for jobs or education. You are expected to continue to be active, because it is important that you find a job as soon as possible. If you fail to meet the requirements for active job search, you may receive a warning or suspension from the unemployment insurance or activity support benefits.

Having a clear CV is crucial for your chances of getting a job. Our website describes how you write a good CV:

Write a cv

Best regards,

Arbetsförmedlingen

[37] Note that this translation differs slightly from the one provided in the pre-analysis plan, as it seemed to make the message less controlled than in the Swedish version.

- *Email 3 autonomous [152 words English; 147 Swedish]:*

Hi [#name]

Writing your activity report helps you reflect on everything that you have done so far on the way to a job or education. The activity reporting opens on the first of [month]

We understand that you already have done a lot to try to achieve your goals. Reflecting on what you have done so far can help you understand what you are doing well and how you can develop.

For instance, being invited to a job interview means that your job application was convincing. If you have not been invited for an interview, it is important not to take it personally. A missed invitation is a natural part of job search. Remember that you always have a new chance if you apply for other jobs!

There are many good ways to prepare yourself for a job interview. Feel free to read our tips at:

Before an interview

Best regards,

Arbetsförmedlingen

- *Email 3 controlled [147 words English; 142 Swedish]:*

Hi [#name]

Arbetsförmedlingen monitors your job search and it is therefore important that you continue submitting your activity reports. The activity reporting opens on the first of [month].

The rules demand that you actively search for suitable jobs or education. You are expected to continually evaluate how you can improve your job search. For instance, it is important to get a sense of why some job applications were unsuccessful and figure out what you may need to change to increase your chances of getting a job.

Writing an informative CV and a thought through application letter may be key for the chance of getting a job interview. You must therefore spend time on going through your application documents. To receive a job-offer, you should also prepare yourself thoroughly before all job interviews. Our website describes how you prepare for an interview:

Before an interview

Best regards,

Arbetsförmedlingen

- *Email 4 autonomous [143 words English; 131 Swedish]:*

Hi [#name]

The activity reporting opens on the first of [#month]. Your reports help us understand how your job search is going.

We at Arbetsförmedlingen want to encourage you to continue working towards your personal goals. There are many things that you can do to avoid the stress that sometimes arises when trying to find a job. For example, it may help to preserve the structure of everyday life, engage in activities that provide you with meaning, or seek support from people around you.
We realize that you might experience some obstacles that hinder your job search during the current crisis. You are welcome to talk about it when you have contact with us at Arbetsförmedlingen. We want to help you find solutions and discover new opportunities.
Our website may perhaps inspire you in your job search:
Find the job

Best regards,

Arbetsförmedlingen

- *Email 4 controlled [126 words English; 123 Swedish]:*

Hi [#name]

The activity reporting opens on the first of [#month]. Each month, Arbetsförmedlingen monitors your activity report. Do not give false or misleading information.
To receive unemployment insurance benefits or activity support, you need to meet certain requirements. For instance, you must be actively searching for jobs and be prepared to take an offered job, even under the current crisis.
As a job seeker, it is important that you maintain a structured time schedule, engage in meaningful activities, and spend time with people close to you. If there are obstacles that hinder your job search, it is important that you report them in your contact with Arbetsförmedlingen.
Read the guidelines at the PES website on how you may proceed:
Find the job

Best regards,

Arbetsförmedlingen

- *Email 5 autonomous [149 words English; 133 Swedish]:*

Hi [#name]

The activity reporting opens on the first of [month]. Your reports help us understand how your job search is going.

Arbetsförmedlingen wants to support you in your job search. We believe in your capacity to accomplish your goals. At the same time, we realize that searching for jobs can be frustrating during these times. Maybe you can find interesting jobs within occupations you have not considered yet.
Talking to friends, family or other persons about any setbacks you may experience may be a good way to boost your confidence and help you to progress.
Many employers often directly ask people they know when they are recruiting. Discussing with others may therefore help you when searching for a job. Your own network is bigger than you can imagine, and it may be worth a lot! More inspiration can be found here:

Use your own network

Best regards,
Arbetsförmedlingen

- *Email 5 controlled [140 words English; 134 Swedish]:*

Hi [#name]

The activity reporting opens on the first of [month]. Remember to submit your activity report on time.

It is important that you avoid ending up as long-term unemployed. Some employers hesitate to employ people who have been unemployed for a longer time. Being unemployed for a long time may therefore decrease your chances of finding a job. Therefore, it is important that you continue searching for jobs or suitable education.
Remember that you are expected to actively search for jobs. You may also have to broaden your job search and try new occupations. Sometimes this is the only way to get a job.
To find a job, you should also use your network (family, friends, others). This is often crucial, as several jobs are never advertised by employers. Read more here:
Use your own network

Best regards,
Arbetsförmedlingen

- *Email 6 autonomous [135 words English; 124 Swedish]:*

Hi [#name]

The activity reporting opens on the first of [#month]. Your previous reports have helped us gain an understanding of how your job search has gone the last six months.

We want to encourage you to keep on developing your job search. Reflecting on your goals and activities to reach them can help you take the next step in your job search.

Perhaps you may try other ways of finding job openings. Many job seekers are helped by contacting potential employers directly or by turning to temporary employment agencies. If it fits your situation, you may also consider further expanding your job search to other occupations and locations. It may open new opportunities.

You may also choose to revise your application letters. You may find inspiration on our website:

Write application letters

Best regards,

Arbetsförmedlingen

- *Email 6 controlled [132 words English; 129 Swedish]:*

Hi [#name]

The activity reporting opens on the first of [#month].

You have now been registered at Arbetsförmedlingen for about six months. During this period, Arbetsförmedlingen has checked your reports and monitored how it is going for you. Actively searching for a job is a requirement for receiving unemployment insurance benefits or activity support.

It is important that you reflect on how you can improve the way you search for jobs. You may have to go through job advertisements, contact potential employers directly or turn to temporary employment agencies. You may also have to expand your job search further, both in terms of occupations and where in the country you can find jobs.

Spend time on revising your application letters. You find more information on our website:

Write application letters

Best regards,

Arbetsförmedlingen

Appendix 3: Balancing Tables for the Surveys

Table A3.1 presents the balancing test for the sample of respondents to the initial survey. This sample is much smaller (19,806 individuals) than the full research population because (i) less than half of the control group was eligible for this survey, and (ii) the response rate to this survey was relatively low, i.e., 12.9%. The table reveals that this sample is somewhat less balanced across the treatment conditions, with some imbalances, notably in the unemployment history. However, these imbalances stem from the high correlation among these variables and do not indicate selective non-response, as confirmed by the robustness analysis, which includes the conditioning variables retained in the LASSO regressions (see Appendix 7). Note that the constructed measures for initial controlled and autonomous motivation are generally well balanced. There is a slight imbalance for initial controlled motivation between the controlled treatment condition and the control group (p-value < 10%). However, as our main interest is in initial autonomous motivation as moderator (see Sections 3.2 and 5.2.2), this is not problematic. The balancing tables for the intermediate and exit survey are reported in Tables A3.2 and A3.3. While they show some imbalances, they are not a cause for concern, as findings remain robust after including conditioning variables

Table A3.1: Summary Statistics and Differences in Background Characteristics by Group: Initial Survey-Sample

Variable	(1) Contr. Motiv.	(2) Auton. Motiv.	(3) Control group	(4) Diff. (2)–(1)	(5) Diff. (3)–(1)	(6) Diff. (3)–(2)
Age	39.800	39.587	39.226	-0.213	-0.574**	-0.361
Male	0.488	0.491	0.481	0.003	-0.007	-0.010
Unemployment benefits	0.796	0.792	0.790	-0.005	-0.006	-0.002
Health disability	0.026	0.024	0.022	-0.002	-0.004	-0.002
Matchable	0.938	0.935	0.937	-0.003	-0.001	0.002
Education level						
High school	0.412	0.408	0.409	-0.004	-0.003	0.001
College	0.440	0.444	0.451	0.004	0.011	0.007
Place of birth						
Nordic country	0.019	0.023	0.021	0.004	0.002	-0.001
Western Europe	0.051	0.050	0.050	-0.001	-0.001	0.000
Outside Western Europe	0.275	0.281	0.274	0.006	-0.001	-0.008
Unemployment days						
Year t-1	40.538	38.927	39.722	-1.611**	-0.816	0.795
Year t-2	36.702	35.223	34.209	-1.479	-2.492	-1.013
Year t-3	32.840	32.889	30.494	0.049	-2.346	-2.395*
Year t-4	33.479	33.788	30.181	0.309	-3.298**	-3.607**
# of unemployment spells						
Year t-1	0.159	0.150	0.156	-0.010	-0.004	0.006
Year t-2	0.252	0.257	0.244	0.004	-0.009	-0.013
Year t-3	0.236	0.236	0.221	0.000	-0.014*	-0.015*
Year t-4	0.223	0.221	0.208	-0.003	-0.015*	-0.013
# of programs last 4 years						
Labour market education	0.008	0.010	0.008	0.001	-0.001	-0.002
Preparatory education	0.021	0.026	0.018	0.005	-0.002	-0.007**
Labour market training	0.012	0.015	0.012	0.003	0.001	-0.002
Subsidized employment	0.035	0.028	0.028	-0.007*	-0.007*	0.000
Initial motivation						
Autonomous	4.203	4.216	4.215	0.013	0.012	-0.001
Controlled	3.144	3.127	3.100	-0.017	-0.044*	-0.026
Observations	6 478	6 660	6 680	13 138	13 146	13 328

Notes: Significance Codes: ***: 0.01, **: 0.05, *: 0.1. The research population excludes some individuals born in nine East African and Middle Eastern countries as discussed in Appendix 1. In this table, only the respondents to the initial survey are retained. As mentioned in the pre-analysis plan (version 3.0), half of the control group could not be used between May 20 and October 31, 2020, which involves 14,912 individuals. To account for this issue, we weighted the retained control individuals in that period by the inverse of their share in the counterfactual control group that would have been used in the absence of this issue; specifically we weighted them by 1.977454. The reported number of observations are unweighted.

Table A3.2: Summary Statistics and Differences in Background Characteristics by Group: Intermediate Survey-Sample

Variable	(1) Contr. Motiv.	(2) Auton. Motiv.	(3) Control group	(4) Diff. (2)–(1)	(5) Diff. (3)–(1)	(6) Diff. (3)–(2)
Age	39.683	39.483	39.258	-0.200	-0.425	-0.224
Male	0.509	0.511	0.513	0.002	0.004	0.002
Unemployment benefits	0.837	0.832	0.845	-0.006	0.007	0.013*
Health disability	0.028	0.031	0.031	0.003	0.003	0.000
Matchable	0.945	0.942	0.938	-0.003	-0.006	-0.004
Education level						
High school	0.417	0.403	0.410	-0.014	-0.007	0.007
College	0.414	0.432	0.432	0.019*	0.018*	-0.000
Place of birth						
Nordic country	0.021	0.021	0.020	0.001	-0.001	-0.002
Western Europe	0.049	0.042	0.049	-0.007*	-0.000	0.007*
Outside Western Europe	0.279	0.286	0.273	0.007	-0.006	-0.013
Unemployment days						
Year t-1	43.194	43.675	43.010	0.481	-0.185	-0.666
Year t-2	42.396	39.858	39.250	-2.538	-3.146*	-0.608
Year t-3	43.320	40.263	37.707	-3.057*	-5.614***	-2.557
Year t-4	40.960	41.890	39.649	0.930	-1.311	-2.241
# of unemployment spells						
Year t-1	0.183	0.175	0.170	-0.008	-0.013*	-0.005
Year t-2	0.300	0.287	0.272	-0.013	-0.028***	-0.014
Year t-3	0.293	0.277	0.263	-0.016	-0.030***	-0.014
Year t-4	0.281	0.265	0.265	-0.015	-0.016	-0.001
# of programs last 4 years						
Labour market education	0.009	0.009	0.013	-0.000	0.003	0.003
Preparatory education	0.022	0.030	0.020	0.007*	-0.002	-0.010***
Labour market training	0.015	0.016	0.017	0.001	0.001	0.001
Subsidized employment	0.044	0.035	0.043	-0.009*	-0.001	0.007
Observations	5 411	5 315	5 367	10 726	10 778	10 682

Notes: Significance Codes: ***: 0.01, **: 0.05, *: 0.1. The research population excludes some individuals born in nine East African and Middle Eastern countries as discussed in Appendix 1. In this table, only the respondents to the initial survey are retained. As mentioned in the pre-analysis plan (version 3.0), half of the control group could not be used between May 20 and October 31, 2020, which involves 14,912 individuals. To account for this issue, we weighted the retained control individuals in that period by the inverse of their share in the counterfactual control group that would have been used in the absence of this issue; specifically we weighted them by 1.977454. The reported number of observations are unweighted.

Table A3.3: Summary Statistics and Differences in Background Characteristics by Group: Exit Survey-Sample

Variable	(1) Contr. Motiv.	(2) Auton. Motiv.	(3) Control group	(4) Diff. (2)–(1)	(5) Diff. (3)–(1)	(6) Diff. (3)–(2)
Age	36.643	36.475	36.438	-0.169	-0.206	-0.037
Male	0.459	0.477	0.474	0.018	0.015	-0.003
Unemployment benefits	0.888	0.884	0.892	-0.004	0.004	0.008
Health disability	0.005	0.005	0.007	0.000	0.002	0.002
Matchable	0.987	0.982	0.985	-0.005*	-0.003	0.002
Education level						
High school	0.440	0.459	0.458	0.019	0.018	-0.001
College	0.495	0.475	0.483	-0.019	-0.012	0.007
Place of birth						
Nordic country	0.019	0.018	0.019	-0.001	-0.000	0.001
Western Europe	0.045	0.042	0.043	-0.003	-0.002	0.001
Outside Western Europe	0.170	0.171	0.163	0.001	-0.007	-0.008
Unemployment days						
Year t-1	40.096	40.811	39.218	0.715	-0.878	-1.593
Year t-2	28.745	31.655	26.253	2.910	-2.492	-5.402***
Year t-3	27.364	28.498	24.916	1.134	-2.448	-3.582**
Year t-4	26.506	28.359	25.372	1.853	-1.134	-2.987*
# of unemployment spells						
Year t-1	0.170	0.169	0.154	-0.001	-0.016*	-0.015
Year t-2	0.252	0.274	0.238	0.022*	-0.014	-0.037***
Year t-3	0.233	0.237	0.216	0.005	-0.017	-0.021*
Year t-4	0.230	0.226	0.205	-0.004	-0.025**	-0.020*
# of programs last 4 years						
Labour market education	0.010	0.010	0.012	0.000	0.003	0.003
Preparatory education	0.015	0.018	0.012	0.003	-0.002	-0.006
Labour market training	0.010	0.010	0.011	0.000	0.001	0.001
Subsidized employment	0.030	0.029	0.020	-0.000	-0.010**	-0.010**
Observations	3 567	3 542	3 405	7 109	6 972	6 947

Notes: Significance Codes: ***: 0.01, **: 0.05, *: 0.1. The research population excludes some individuals born in nine East African and Middle Eastern countries as discussed in Appendix 1. In this table, only the respondents to the initial survey are retained. As mentioned in the pre-analysis plan (version 3.0), half of the control group could not be used between May 20 and October 31, 2020, which involves 14,912 individuals. To account for this issue, we weighted the retained control individuals in that period by the inverse of their share in the counterfactual control group that would have been used in the absence of this issue; specifically we weighted them by 1.977454. The reported number of observations are unweighted.

Appendix 4: Procedure for the Construction of the Motivation Scales

Our measure of controlled and autonomous motivation is based on Da Motta Veiga & Gabriel (2016) who adapted Moran et al.'s (2012) theory-based motivation scales to a job search context. Similar to da Motta Veiga and Gabriel's (2016) revisions, we adapted some of the wording to our particular research context (i.e., unemployed job seekers in Sweden versus U.S. job seeking students), in close consultation with experts at the PES. The adjustment and the predetermined procedure to select the items for the measures of initial and intermediate job motivation is the same and described in Section 3.4 (p. 20) and Appendix 2 (p. 38) of the pre-analysis plan. Here we provide a summary of the results of this procedure. Detailed output can be obtained from the authors upon request.

Participants were asked to indicate how strongly they agree with ten statements about why they are searching for a job on a 5-point scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Initially, we intended to measure controlled job search motivation with 6 items and autonomous job search motivation with 4 items. However, based on the reliability and factor analyses described below, in the final measure only two items were retained for controlled job search motivation (c-d), and three items for autonomous job search motivation (g-i).

Controlled job search motivation
a. Because other people want me to find a job
b. Because I need to start getting paid
c. Because I would feel guilty if I did not search for a job
d. Because I would feel ashamed if I did not find a job
e. Because Arbetsförmedlingen demands it
f. Because I am afraid of having my benefits cut if I do not search for a job
Autonomous job search motivation
g. Because my job search is important to me
h. Because finding a job is important to me
i. Because it is interesting to search for fitting jobs
j. Because job seeking is fun

A4.1 Results of the procedure for the initial survey:

In the initial survey, the total number of observations (*N*) is 20,658. After conducting a listwise deletion due to missing values, the valid sample size is reduced to 16,665 for controlled job search motivation, with the six items yielding a Cronbach's alpha (α) of 0.681. For the four autonomous job search motivation items, α is 0.710 based on a valid sample size of 18,455.

The α's cannot be further improved by deleting any item. Whereas these reliability estimates reflect satisfactory internal consistency of the items, we also conducted a confirmatory factor analysis (CFA) to check whether our expected two-factor model fitted the data. In this model, each item is specified to load only on the motivation factor it was intended to measure (controlled or autonomous), and not on the other one. Initial CFA results suggested that a two-factor model with these 10 items loaded on their respective factor showed a very poor fit: $\chi 2(34) = 17751.509$, $p < .001$, $CFI = 0.578$, $SRMR = 0.118$. The acceptable fit indices are *CFI* close to 0.95 or higher, and *SRMR* close to 0.08 or lower (Hu & Bentler, 1998). Consequently, items with lowest factor loadings were successively removed from this two-factor model until the desired thresholds are reached. The final two-factor model with acceptable fit emerged with factor 1 (i.e., controlled job search motivation) with 2 items: (c-d) and factor 2 (i.e., autonomous job search motivation) with 3 items (g-i): $\chi 2(4) = 415.180$, $p < .001$, $CFI = 0.979$, $SRMR = 0.023$. This final two-factor model with 5 items fitted the data significantly better than the original two-factor model with all items included, $\Delta\chi 2(30) = 17336$, $p < .001$. Cronbach's alpha for the final controlled job search motivation (2 items) is 0.717 and for final autonomous job search motivation (3 items) 0.667.

A4.2 Results of the procedure for the intermediate survey

The intermediate survey has total sample size (*N*) of 16,630. After deleting missing values on all variables, the valid sample size is reduced to 13,886 for controlled job search motivation, yielding a Cronbach's alpha (α) of 0.657. For autonomous job search motivation, the α is 0.680 based on valid sample size of 15,040. The α's cannot be further improved by deleting any item in these variables. However, similar to the initial survey CFA results, the two-factor model with these 10 items being loaded on their intended factor showed a poor fit: $\chi 2(34) = 11351.279$, $p < .001$, $CFI = 0.619$, $SRMR = 0.128$. Therefore, the final two-factor model suggested in the initial survey results was also tested here with factor 1 (i.e., controlled job search motivation) with 2 items (c-d) and factor 2 (i.e., autonomous job search motivation) with 3 items (g-i).[38] This model fitted the data really well, $\chi 2(4) = 193.284$, $p < .001$, $CFI =$

[38] We used the final two-factor model (controlled job search motivation with c and d and autonomous job search motivation with g, h, and i) from the initial survey results to test the fit of our intermediate survey data. This approach was chosen because in the intermediate survey data, the final solution emerging after successively removing one item at a time with the lowest factor loading, ultimately resulted in the occurrence of a Heywood case. Specifically, a Heywood case arose in our analysis when factor 1 i.e., controlled job search motivation is left at the end of this successive deletion process with only the 2 PES items i.e., e and f. In this case, the variance

0.987, *SRMR* = 0.018, and significantly better than the original one with all 10 items, $\Delta\chi 2(30) = 11158$, $p < .001$. Cronbach's alpha for the final controlled job search motivation (2 items) is 0.684 and for final autonomous job search motivation (3 items) 0.658.

of e becomes negative. A Heywood case in (confirmatory) factor analysis occurs when a solution produces improper or inadmissible results such as negative variance estimates or variance estimates exceeding one (Farooq, 2022). This can occur due to several reasons such as model misspecification, small sample sizes, multicollinearity, poorly measured variables, missing data, or the presence of outliers in the dataset among other reasons. Fixing the negative variance to zero or a specific value is the most widely used solution to fix Heywood cases. However, there needs to be strong theoretical reasons behind that (Kline, 2016). In view of this, we opted to go with the solution suggested by the initial survey, rather than the model with a Heywood case as suggested by the intermediate survey data, as it is advised to avoid interpreting/reporting a model with a Heywood case. Also note that the Heywood case also appears in the initial survey results if we measure factor 1 i.e., controlled job search motivation with only the 2 PES items.

Appendix 5: Procedure for the Construction of the Job Search Quality Scale

To assess the quality of people's job search process we used a measure of metacognitive activities during job search developed by Turban et al.(2009). This involves self-regulation of job search activities such as setting goals, developing plans, and monitoring and analyzing progress toward goal accomplishment. In close consultation with the PES, this measure was slightly modified to take into account the specific local context, the intended target group, and the PES guidelines. The adjustment and the predetermined procedure to select the items is described in Section 3.4 (p. 21) and Appendix 3 (p. 44) of the pre-analysis plan. Here we provide a summary of the results of this procedure. Detailed output can be obtained from the authors upon request.

Participants were asked to indicate how strongly they agree with five statements (see below items a to e) about how they approached their job search or up till they obtained a job, on a scale from 1 (*Completely disagree*) to 5 (*Completely agree*). The Cronbach's alpha (α) for job search quality is 0.820 based on a valid sample size of 14,784, suggesting good internal consistency of the scale items.

Job search quality
a. I set personal goals to guide my job search activities
b. I plan when and how I search for jobs
c. I reflect on what progress I have made in my job search
d. I think about how I may improve my job search
e. I think about how best to present myself in my job applications

Appendix 6: Procedure for the Construction of the Job Quality Scale

Job quality is measured using both three separate scales (job satisfaction, perceived fit, and stay intention) and a composite score which is just the mean of the three mentioned scales. Participants were asked to indicate how strongly they agree with a number of statements about the job they obtained. All items were rated on a 5-point scale ranging from 1 (*Completely disagree*) to 5 (*Completely agree*). Job satisfaction was assessed with the one-item scale proposed by Cammann et al. (1983): "I am satisfied with my job". The satisfaction and fit measures are based on Wanberg et al. (2002), and the stay intention measure is based on Colarelli (1984). The reader can find this description in Section 3.4 (p. 22) and in Appendix 4 (p. 51) of the pre-analysis plan.

Appendix 7: Sensitivity of Main Findings when Conditioning Variables Based on LASSO Regressions are Included

Here we report a sensitivity analysis for our main findings in which the conditioning variables are selected according the double machine learning LASSO method of Belloni et al. (2014). As described in Section 3.5 of the pre-analysis plan (p.23), we include quadratic terms of non-binary variables and first-order interaction terms in the set of potential variables. We only report the estimates of the main treatment effects in the tables below. Full estimation results can be obtained from the authors upon request.

Table A7.1: Effects on the Probability to Report and on Survey Scales of Motivation Based on LASSO Regressions (Table 3 in the main text without conditioning variables)

	Monthly share submitting activity reports				Motivation: intermediate survey	
	1st report	Reports (1–6)	Reports (1–3)	Reports (4–6)	Controlled motivation	Autonomous motivation
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment						
Controlled $\hat{\beta}_c$	0.0221***	0.0103***	0.0142***	0.0065***	0.0238	0.0025
	(0.002)	(0.002)	(0.002)	(0.002)	(0.025)	(0.015)
Autonomous $\hat{\beta}_a$	0.0189***	0.0063***	0.0078***	0.0049**	0.0082	-0.0069
	(0.002)	(0.002)	(0.002)	(0.002)	(0.025)	(0.015)
Observations	200 720	200 720	200 720	200 720	16 093	16 093
Mean control gr.	0.589	0.456	0.534	0.377	3.187	4.190

Notes: Regressions estimates for the analyses sample described in Section 2.2, using the model in Equation (1) with background characteristics using the LASSO procedure as described above. Columns 1–4 report show effects on the monthly share of submitted activity reports over various intervals. Columns 5–6 on motivational scales, based on survey data described in detail in Appendix 4. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively.

Table A7.2: Effects on Number of Job Applications and Job Finding Based on LASSO Regressions (Table 4 in the main text without conditioning variables)

	Job applications		Job finding			
	Report 2–4	**Report 2–7**	4 months	**7 months**	12 months	Days unemployed 12 months
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment						
Controlled $\hat{\beta}_c$	-0.0064	**0.0067**	0.0007	**0.0014**	-0.0010	-0.0895
	(0.054)	(0.048)	(0.003)	(0.002)	(0.002)	(0.640)
Autonomous $\hat{\beta}_a$	-0.1248**	**-0.0959****	-0.0025	**0.0003**	-0.0040**	0.4187
	(0.054)	(0.048)	(0.003)	(0.002)	(0.002)	(0.639)
Observations	125 357	131 518	200 720	200 720	200 720	200 720
Mean control gr.	8.734	8.286	0.462	0.631	0817	184.2

Notes: Regressions estimates for the analyses sample described in Section 2.2, using the model in Equation (1) with background characteristics using the LASSO procedure as described above. Columns 1–2 show the effects on the average number of job applications per month in months 2-4 and 2-7; Columns 3–5 on job finding within 4, 7, and 12 months; and Column 6 on the number of days unemployed within one year of unemployment onset. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively. Primary outcomes are in bold.

Table A7.3: Effects on Job Search Quality Based on LASSO Regressions (Table A8.1 in Appendix 8 without conditioning variables)

	Average # of spontaneous job applications			Job search quality (survey)	Average # of interviews		
	Report 2-4	Report 5-7	Report 2–7		Report 2-4	Report 5-7	Report 2-7
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment							
Controlled $\hat{\beta}_c$	-0.0030	0.0008	-0.0016	0.0301**	-0.0081	0.0047	-0.0027
	(0.011)	(0.011)	(0.009)	(0.014)	(0.007)	(0.006)	(0.006)
Autonomous $\hat{\beta}_a$	0.0105	0.0058	0.0111	0.0024	-0.0098	0.0015	-0.0043
	(0.011)	(0.011)	(0.009)	(0.014)	(0.007)	(0.006)	(0.006)
Observations	125 357	85 769	131 518	14 784	125 357	85 769	131 518
Mean control gr.	0.619	0.533	0.582	4.093	0.525	0.372	0.506

Notes: Regressions estimates for the analyses sample described in Section 2.2, using the model in Equation (1) with background characteristics using the LASSO procedure as described above. Columns 1–3 show the effects on the average number of spontaneous job applications per month during months 2-4, 5-7, and 2-7, as reported in the activity reports; Column 4 on job search quality as measured in the intermediate and exit surveys using the measure described in Appendix 5; and Columns 5-7 on the average number of interviews during months 2-4, 5-7, and 2-7, as reported in the activity reports. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively.

Table A8.2: Effects on Job Quality Based on LASSO Regressions (Table A8.2 in Appendix 8 without condition variables)

	Non-unemployment duration			Survey based job quality measures			
	> 3 months	> 6 months	> 12 months	Job satisfaction	Perceived fit	Stay intention	Composite score
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment							
Controlled $\hat{\beta}_c$	0.0000	-0.0012	-0.0010	-0.0482**	-0.0278	-0.0093	-0.0284
	(0.003)	(0.002)	(0.001)	(0.023)	(0.024)	(0.029)	(0.022)
Autonomous $\hat{\beta}_a$	0.0009	0.0023	0.0004	-0.0184	-0.0104	0.0164	-0.0042
	(0.003)	(0.002)	(0.001)	(0.023)	(0.024)	(0.029)	(0.022)
Observations	127 148	127 148	127 148	10 514	10 514	10 514	10 514
Mean control gr.	0.251	0.154	0.0434	4.382	4.092	4.053	4.175

Notes: Regressions estimates for the analyses sample described in Section 2.2, using the model in Equation (1) with background characteristics using the LASSO procedure as described above. Columns 1–3 show the effects on employment duration as measured by the first period of non-unemployment exceeding 3, 6, and 12 months (where only exits occurring within the first 7 months of unemployment are considered); Column 4-7 on the exit survey based measures job quality the construction of which is reported in Appendix 6: on job satisfaction, perceived fit, job stay intention, and on a composite score that is the average of the preceding three measures. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively.

Appendix 8: Findings of the Effects on Job Search Quality and Job Quality

Table A8.1: Effects on Job Search Quality

	Average # of spontaneous job applications			Job search quality (survey)	Average # of interviews		
	Report 2-4	Report 5-7	Report 2–7		Report 2-4	Report 5-7	Report 2-7
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment							
Controlled $\hat{\beta}_c$	-0.0032	0.0014	-0.0014	0.0291**	-0.0089	0.0038	-0.0032
	(0.011)	(0.012)	(0.009)	(0.014)	(0.007)	(0.007)	(0.007)
Autonomous $\hat{\beta}_a$	0.0101	0.0053	0.0111	0.0038	-0.0092	0.0015	-0.0033
	(0.011)	(0.012)	(0.009)	(0.014)	(0.007)	(0.007)	(0.007)
Observations	125 357	85 769	131 518	14 784	125 357	85 769	131 518
Mean control gr.	0.619	0.533	0.582	4.093	0.525	0.372	0.506
Auto. vs Contr.							
	0.0133	0.0039	0.0125	-0.0253*	-0.0003	-0.0023	-0.0000
$= \hat{\beta}_a - \hat{\beta}_c$	(0.012)	(0.013)	(0.010)	(0.014)	(0.008)	(0.007)	(0.007)
Observations	70 363	48 537	73 796	9 850	70 363	48 537	73 796
Mean controlled tr.	0.616	0.534	0.580	4.122	0.517	0.375	0.503

Notes: Regressions estimates for the analyses sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–3 show the effects on the average number of spontaneous job applications per month during months 2-4, 5-7, and 2-7, as reported in the activity reports; Column 4 on job search quality as measured in the intermediate and exit surveys using the measure described in Appendix 5; and Columns 5-7 on the average number of interviews during months 2-4, 5-7, and 2-7, as reported in the activity reports. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively.

Table A8.2: Effects on Job Quality

	Non-unemployment duration			Survey based job quality measures			
	> 3 months	> 6 months	> 12 months	Job satisfaction	Perceived fit	Stay intention	Composite score
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment							
Controlled $\hat{\beta}_c$	0.0004	-0.0011	-0.0010	-0.0482**	-0.0278	-0.0093	-0.0284
	(0.003)	(0.002)	(0.001)	(0.023)	(0.024)	(0.029)	(0.022)
Autonomous $\hat{\beta}_a$	0.0011	0.0025	0.0004	-0.0184	-0.0104	0.0164	-0.0042
	(0.003)	(0.002)	(0.001)	(0.023)	(0.024)	(0.029)	(0.022)
Observations	127 148	127 148	127 148	10 514	10 514	10 514	10 514
Mean control gr.	0.251	0.154	0.0434	4.382	4.092	4.053	4.175
Auto. vs Contr.	0.0007	0.0036	0.0014	0.0297	0.0174	0.0257	0.0243
$= \hat{\beta}_a - \hat{\beta}_c$	(0.003)	(0.003)	(0.002)	(0.024)	(0.025)	(0.029)	(0.022)
Observations	70 635	70 635	70 635	7 109	7 109	7 109	7 109
Mean controlled tr.	0.251	0.153	0.0424	4.333	4.064	4.044	4.147

Notes: Regressions estimates for the analyses sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–3 show the effects on employment duration as measured by the first period of non-unemployment exceeding 3, 6, and 12 months (where only exits occurring within the first 7 months of unemployment are considered); Column 4-7 on the exit survey based measures job quality the construction of which is reported in Appendix 6: on job satisfaction, perceived fit, job stay intention, and on a composite score that is the average of the preceding three measures. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively.

Appendix 9: Interaction Effects of Initial Motivation (Tables A9.1-A9.4) and of Other Moderators (Tables A9.5-A9.)

Table A9.1: Moderating Effects of Initial Autonomous Motivation on the Monthly Share Submitting Activity Reports

	Monthly share submitting activity reports			
	1st report	Reports (1–6)	Reports (1–3)	Reports (4–6)
	(1)	(2)	(3)	(4)
Treatment				
Controlled tr.	-0.0712*	-0.0222	0.0158	-0.0601
	(0.037)	(0.033)	(0.033)	(0.040)
Autonomous tr.	-0.0566	-0.0214	0.0110	-0.0538
	(0.037)	(0.033)	(0.033)	(0.040)
Initial autonomous	0.0001	0.0028	0.0110**	-0.0053
	(0.006)	(0.005)	(0.005)	(0.006)
Controlled tr. x initial autonomous	0.0250***	0.0104	0.0031	0.0177*
	(0.009)	(0.008)	(0.008)	(0.009)
Autonomous tr. x initial autonomous	0.0218**	0.0090	0.0027	0.0152
	(0.009)	(0.008)	(0.008)	(0.009)
Observations	19 806	19 806	19 806	19 806
Mean control group	0.756	0.566	0.670	0.461

Notes: Regression estimates of treatment effects for the analysis sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–4 show effects on the monthly share submitting activity reports over various time periods. Interaction effects of controlled and autonomous treatment with initial autonomous motivation. The mean of the monthly share submitting activity reports in the control group reported in the last line. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively.

Table A9.2: Moderating Effects of Initial Autonomous Motivation on Job Search and Job Finding

	Job applications			Job finding			
	Report 2–4	Report 5–7	**Report 2–7**	4 months	**7 months**	12 months	Days unemployed 12 months
	(1)	(2)	**(3)**	(4)	**(5)**	(6)	(7)
Treatment							
Controlled tr.	-0.7146	0.5992	-0.2850	0.0619	0.0764*	0.0529	-16.5245
	(0.866)	(0.831)	(0.774)	(0.044)	(0.043)	(0.035)	(11.007)
Autonomous tr.	0.2382	0.7374	0.4270	0.0174	0.0429	0.0082	-6.3988
	(0.869)	(0.832)	(0.777)	(0.044)	(0.043)	(0.035)	(11.039)
Initial autonomous	0.8354***	0.8216***	0.7881***	0.0105	0.0155**	0.0105*	-3.0812*
	(0.137)	(0.129)	(0.122)	(0.007)	(0.007)	(0.005)	(1.712)
Controlled tr. x initial autonomous	0.0042	-0.2531	**-0.0742**	-0.0165	**-0.0190***	-0.0113	4.2825*
	(0.201)	(0.194)	(0.180)	(0.010)	(0.010)	(0.008)	(2.566)
Autonomous tr. x initial autonomous	-0.2072	-0.2887	**-0.2315**	-0.0066	**-0.0107**	-0.0022	2.0303
	(0.202)	(0.194)	(0.180)	(0.010)	(0.010)	(0.008)	(2.570)
Observations	14 855	10 201	15 297	19 806	19 806	19 806	19 806
Mean control group	9.501	7.752	8.870	0.428	0.614	0.806	188.6

Notes: Regression estimates of treatment effects for the analysis sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–3 show effects on the average number of job applications per month in months 2–4, 5-7, and 2–7; Columns 4-6 on job finding within 4, 7 and 12 months; and Column 7 on the number of days unemployed within one year of unemployment onset. Interaction effects of controlled and autonomous treatment with initial autonomous motivation. The mean of the monthly share submitting activity reports in the control group reported in the last line. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively. Primary outcomes are in bold.

Table A9.3: Moderating Effects of Initial Controlled Motivation on the Monthly Share Submitting Activity Reports

	Monthly share submitting activity reports			
	1st report	Reports (1–6)	Reports (1–3)	Reports (4–6)
	(1)	(2)	(3)	(4)
Treatment				
Controlled tr.	0.0189	0.0214	0.0313*	0.0115
	(0.018)	(0.016)	(0.016)	(0.020)
Autonomous tr.	0.0485***	0.0154	0.0363**	-0.0055
	(0.018)	(0.016)	(0.016)	(0.019)
Initial controlled	0.0105***	0.0022	0.0075**	-0.0030
	(0.004)	(0.003)	(0.003)	(0.004)
Controlled tr. x initial controlled	0.0047	0.0000	-0.0010	0.0010
	(0.005)	(0.005)	(0.005)	(0.006)
Autonomous tr. x initial controlled	-0.0043	0.0003	-0.0045	0.0051
	(0.005)	(0.005)	(0.005)	(0.006)
Observations	19 806	19 806	19 806	19 806
Mean control group	0.756	0.566	0.670	0.461

Notes: Regression estimates of treatment effects for the analysis sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–4 show effects on the monthly share submitting activity reports over various time periods. Interaction effects of controlled and autonomous treatment with initial controlled motivation. The mean of the monthly share submitting activity reports in the control group reported in the last line. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively.

Table A9.4: Moderating Effects of Initial Controlled Motivation on Job Search and Job Finding

	Job applications			Job finding			
	Report 2–4	Report 5–7	**Report 2–7**	4 months	**7 months**	12 months	Days unemployed 12 months
	(1)	(2)	**(3)**	(4)	**(5)**	(6)	(7)
Treatment							
Controlled tr.	-0.4965	-0.1930	-0.3038	0.0015	0.0127	-0.0128	0.6445
	(0.419)	(0.406)	(0.375)	(0.022)	(0.021)	(0.017)	(5.431)
Autonomous tr.	-0.3417	0.0703	-0.1875	0.0011	0.0270	0.0086	-2.8892
	(0.416)	(0.403)	(0.373)	(0.021)	(0.021)	(0.017)	(5.367)
Initial controlled	0.4049***	0.3112***	0.3936***	0.0044	0.0071*	0.0026	-1.6980
	(0.082)	(0.080)	(0.073)	(0.004)	(0.004)	(0.003)	(1.053)
Controlled tr. x initial controlled	-0.0721	-0.0871	**-0.1001**	-0.0029	**-0.0053**	0.0057	0.2990
	(0.123)	(0.120)	(0.110)	(0.006)	(0.006)	(0.005)	(1.598)
Autonomous tr. x initial controlled	-0.0977	-0.1719	**-0.1180**	-0.0038	**-0.0094**	-0.0030	1.6281
	(0.122)	(0.119)	(0.110)	(0.006)	(0.006)	(0.005)	(1.583)
Observations	14 855	10 201	15 297	19 806	19 806	19 806	19 806
Mean control group	9.501	7.752	8.870	0.428	0.614	0.806	188.6

Notes: Regression estimates of treatment effects for the analysis sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–3 show effects on the average number of job applications per month in months 2–4, 5-7, and 2–7; Columns 4-6 on job finding within 4, 7 and 12 months; and Column 7 on the number of days unemployed within one year of unemployment onset. Interaction effects of controlled and autonomous treatment with initial controlled motivation. The mean of the monthly share submitting activity reports in the control group reported in the last line. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively. Primary outcomes are in bold.

Table A9.5: Moderating Effects of the Local Unemployment Rate on the Monthly Share Submitting Activity Reports

	Monthly share submitting activity reports			
	1st report	Reports (1–6)	Reports (1–3)	Reports (4–6)
	(1)	(2)	(3)	(4)
Treatment				
Controlled tr.	0.0230***	0.0102***	0.0136***	0.0067
	(0.005)	(0.004)	(0.004)	(0.004)
Autonomous tr.	0.0125***	0.0002	0.0012	-0.0008
	(0.005)	(0.004)	(0.004)	(0.004)
High local unemployment rate	-0.0032	0.0134***	0.0049*	0.0220***
	(0.003)	(0.003)	(0.003)	(0.003)
Controlled tr. x high local unemployment rate	-0.0000	0.0016	0.0022	0.0010
	(0.006)	(0.005)	(0.005)	(0.005)
Autonomous tr. x high local unemployment rate	0.0113**	0.0105**	0.0113**	0.0097*
	(0.006)	(0.005)	(0.005)	(0.005)
Observations	200 548	200 548	200 548	200 548
Mean control group	0.589	0.453	0.535	0.372

Notes: Regression estimates of treatment effects for the analysis sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–4 show effects on the monthly share submitting activity reports over various time periods. High local unemployment rate is defined as above the median. Interaction effects of controlled and autonomous treatment with indicator of high local unemployment rate. The mean of the monthly share submitting activity reports in the control group reported in the last line. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively.

Table A9.6: Moderating Effects of the Local Unemployment Rate on Job Search and Job Finding

	Job applications			Job finding			
	Report 2–4	Report 5–7	**Report 2–7**	4 months	**7 months**	12 months	Days unemployed 12 months
	(1)	(2)	**(3)**	(4)	**(5)**	(6)	(7)
Treatment							
Controlled tr.	-0.0409	-0.0644	-0.0490	0.0057	0.0045	-0.0029	-0.9650
	(0.098)	(0.104)	(0.088)	(0.005)	(0.005)	(0.004)	(1.219)
Autonomous tr.	-0.0971	-0.0885	-0.0730	0.0040	0.0035	-0.0041	-0.2119
	(0.099)	(0.104)	(0.089)	(0.005)	(0.005)	(0.004)	(1.223)
High local unemployment rate	0.5901***	0.5654***	0.5449***	-0.0344***	-0.0409***	-0.0303***	12.6925***
	(0.069)	(0.072)	(0.062)	(0.003)	(0.003)	(0.003)	(0.854)
Controlled tr. x high local unemployment rate	0.0448	0.0894	**0.0824**	-0.0077	**-0.0055**	0.0022	1.6491
	(0.118)	(0.124)	(0.106)	(0.006)	(0.006)	(0.005)	(1.473)
Autonomous tr. x high local unemployment rate	-0.0507	0.0192	**-0.0337**	-0.0099*	**-0.0052**	-0.0001	1.0155
	(0.119)	(0.125)	(0.107)	(0.006)	(0.006)	(0.005)	(1.474)
Observations	125 255	85 705	131 410	200 548	200 548	200 548	200 548
Mean control group	8.202	7.166	7.761	0.465	0.637	0.825	182.3

Notes: Regression estimates of treatment effects for the analysis sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–3 show effects on the average number of job applications per month in months 2–4, 5-7, and 2–7; Columns 4-6 on job finding within 4, 7 and 12 months; and Column 7 on the number of days unemployed within one year of unemployment onset. High local unemployment rate is defined as above the median. Interaction effects of controlled and autonomous treatment with indicator of high local unemployment rate. The mean of the monthly share submitting activity reports in the control group reported in the last line. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively. Primary outcomes are in bold.

Table A9.7: Moderating Effects of the Labor Market Attachment on the Monthly Share Submitting Activity Reports

	Monthly share submitting activity reports			
	1st report	Reports (1–6)	Reports (1–3)	Reports (4–6)
	(1)	(2)	(3)	(4)
Treatment				
Controlled tr.	0.0302***	0.0128***	0.0185***	0.0070**
	(0.004)	(0.003)	(0.003)	(0.003)
Autonomous tr.	0.0195***	0.0069**	0.0090***	0.0049
	(0.004)	(0.003)	(0.003)	(0.003)
Strong attachment	0.0648***	0.0533***	0.0596***	0.0471***
	(0.003)	(0.002)	(0.003)	(0.003)
Controlled tr. x strong attachment	-0.0150***	-0.0033	-0.0072	0.0006
	(0.005)	(0.004)	(0.004)	(0.005)
Autonomous tr. x strong attachment	0.0018	0.0012	0.0003	0.0022
	(0.005)	(0.004)	(0.004)	(0.005)
Observations	200 720	200 720	200 720	200 720
Mean control group	0.589	0.453	0.535	0.372

Notes: Regression estimates of treatment effects for the analysis sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–4 show effects on the monthly share submitting activity reports over various time periods. Strong labor market attachment is defined as having experienced less than the median number of days in unemployment during the last four years prior to registration. Interaction effects of controlled and autonomous treatment with indicator of strong labor market attachment. The mean of the monthly share submitting activity reports in the control group reported in the last line. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively.

Table A9.8: Moderating Effects of the Labor Market Attachment on Job Search and Job Finding

	Job applications			Job finding			
	Report 2–4	Report 5–7	**Report 2–7**	4 months	**7 months**	12 months	Days unemployed 12 months
	(1)	(2)	**(3)**	(4)	**(5)**	(6)	(7)
Treatment							
Controlled tr.	-0.0649	-0.0049	-0.0348	0.0010	0.0003	-0.0009	-0.1947
	(0.078)	(0.083)	(0.070)	(0.004)	(0.004)	(0.003)	(0.957)
Autonomous tr.	-0.1373*	-0.0753	-0.0956	-0.0028	0.0027	-0.0016	-0.1660
	(0.078)	(0.083)	(0.070)	(0.004)	(0.004)	(0.003)	(0.954)
Strong attachment				-	-	-	
	0.3262***	0.2846***	0.2653***	0.0706***	0.0538***	0.0338***	22.2693***
	(0.064)	(0.066)	(0.057)	(0.003)	(0.003)	(0.002)	(0.790)
Controlled tr. x strong attachment	0.1102	0.0035	0.0836	-0.0005	0.0016	-0.0007	0.4876
	(0.109)	(0.114)	(0.098)	(0.005)	(0.005)	(0.004)	(1.363)
Autonomous tr. x strong attachment	0.0173	0.0047	0.0030	-0.0002	-0.0061	-0.0055	1.4177
	(0.109)	(0.114)	(0.098)	(0.005)	(0.005)	(0.004)	(1.361)
Observations	125 357	85 769	131 518	200 720	200 720	200 720	200 720
Mean control group	8.202	7.166	7.761	0.465	0.637	0.825	182.3

Notes: Regression estimates of treatment effects for the analysis sample described in Section 2.2, using the model in Equation (1) without background characteristics. Columns 1–3 show effects on the average number of job applications per month in months 2–4, 5-7, and 2–7; Columns 4-6 on job finding within 4, 7 and 12 months; and Column 7 on the number of days unemployed within one year of unemployment onset. Strong labor market attachment is defined as having experienced less than the median number of days in unemployment during the last four years prior to registration. Interaction effects of controlled and autonomous treatment with indicator of strong labor market attachment. The mean of the monthly share submitting activity reports in the control group reported in the last line. Standard errors in parentheses. ***: 0.01, **: 0.05, *: 0.1 denote significance levels at the 1%, 5%, and 10%, respectively. Primary outcomes are in bold.

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