Stimulating controlled or autonomous motivation of job seekers. What works best?

Pre-Analysis Plan

Update 1
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General Information

Name/title of the project: Stimulating controlled or autonomous motivation of job seekers. What works best?

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- **Conflicts of Interest:**

Johan Hartvig Egebark and Emilie Videnord are employees of Swedish Public Employment Service (SPES). Since the SPES is directly interested in the findings there is potentially a conflict of interest. However, the authors firmly declare not to have felt any pressure that could impact the research findings. For the other authors there is no conflict of interest.

- **Pre-Registration information:**

AEA RCT Registry
Registry number: AEARCTR-0005502,
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- **Updates**

- *Update of the research plan announced at the initial registration implemented on 08/04/2021 (date at which the first version of the Pre-Analysis Plan was written)*

April 8, 2021: Due to the COVID-19 crisis the intervention temporarily halted and the intervention was shifted such that a new start date was set to May 20, 2020. This pre-analysis plan is written, after the (new) start date of the intervention, but well before its end date, and before the researchers had access to the data. At the occasion of this update the title of this research has been changed from "Can automatic feedback improve the motivation and labor market outcomes of Swedish job seekers?" to "Stimulating controlled or autonomous motivation of job seekers. What works best?". This change was implemented because it reveals better the research question than the original title does.

- *Update of the Pre-Analysis plan on 07/09/2022 (after collection of the data, but before the start of the analysis)*

September 20, 2022: Some minor modifications of the research plan were implemented before the analysis started. These modifications are indicated in italics. An overview is listed below:

1. *June 1, 2022: Due to administrative reasons and other ongoing activities at the SPES we are unable to use half of the control group for the period May 20, 2000 to October 31, 2020. It excludes a randomized part of the control group, affecting the power of our analyses and not the validity of the randomization.*[1]

2. *In the previous (first) version of the pre-analysis plan we wrote in Section 2.2 (bullet "research population") that the end date of the experiment to be the end of 2021 and that the last message would be sent until 6 months later, i.e. until the end of June 2022. We mentioned at that moment, however, that we could not be fully sure about the exact end date as this would "depend on the discretion of the PES". Eventually, this plan was implemented. The final end date was set to December 19, 2021, and the last message was sent in June 2022.*
3. *A concern is that part of the effects that we measure could be partly "pure" message effects, irrespectively of their content: the unemployed could react simply because they receive a message. This concern is particularly relevant in case we would find that the effects of our two interventions are equal because we could then not exclude the hypothesis that the effects that we measure are just "pure" message effects and that the content of the messages does not matter. In Section 3.5 (last bullet point) we therefore propose two strategies that aim at measuring the importance of these "pure" message effects.*
4. *In Section 3.6 we mentioned that we would study moderating effects (effect heterogeneity) of the industry exposure to Corona. However, we did not clearly define the measure that we would use for this exposure. A difficulty is that for the construction of an measure of industry exposure we would have to rely on data from Statistics Sweden. These data are not readily available. We therefore propose to replace this by a measure of occupational exposure, which is arguably a very similar measure. The advantage is that information on the past occupation exercised by the unemployed is readily available in the Swedish PES. In Section 3.6 we also clarify how this exposure measure is constructed.*

Changes mentioned in points 1. and 2. were entirely due to administrative reasons at the Swedish PES and the COVID-19 crisis/ All changes were implemented before we had access to the data.

1. Introduction

1.1. *Brief summary of project*

Finding a suitable job is a central objective of most people as it is one of the key drivers of their well-being. However, job search is a difficult process often associated with failed job applications and lost social connections, making it difficult for unemployed workers to stay

[1] *Note that this point was already mentioned in footnote 15 (p. 18) in the previous (first) version of the pre-analysis plan, but we forgot to mention this in the section on research design.*

motivated. Hence, a key public policy question is how the public employment service (PES) can best strengthen and keep up the motivation of job seekers. Research in economics and psychology seems to result in conflicting advice. In psychology – Self-Determination Theory (SDT) (Deci and Ryan, 1985; 2000; 2012) differentiates between different sources of motivation. Controlled motivation occurs when people search for jobs, because they feel pressured to do so. Autonomous motivation occurs when people search for jobs because they find it interesting, or if they search for jobs because they find it meaningful and/or personally relevant. According to SDT autonomous motivation yields better results than controlled motivation in that it predicts that it leads to more effective job search effort and, hence, in a higher likelihood of finding a job. By contrast, in economics standard job search theory (JST) (Ehrenberg and Oaxaca, 1976; Mortensen, 1977) predicts that controlling job seekers stimulates job search and job finding more strongly. This research aims at empirically testing the validity of these conflicting theories.

To this aim, we set up a large scale randomized controlled trial (RCT) to study the effects of an intervention dispensed to unemployed job seekers aimed at triggering controlled and autonomous motivation. We will examine whether the intervention affects labor market outcomes and job search behavior as predicted by the SDT, or that they are consistent with standard JST instead.

The intervention consists of a series of six electronic messages that are sent for each condition that aims to be triggered (controlled or autonomous motivation) to unemployed job seekers in Sweden during the first half year of unemployment. A control group receives no messages. The initial sampling plan involved the drawing of a 2/3 random sample of all Swedes who start a spell of insured unemployment between January 20, and December 19, 2020. These individuals are in turn randomly assigned with 25% probability to each of the two aforementioned conditions and with a 50% probability to the control group. Due to the COVID-19 crisis the intervention temporarily halted and the intervention was shifted such that a new start date was set to May 20, 2020. *Due to the new start date, we also updated the end date of the experiment. The final experiment involved individuals who started a spell of insured unemployment between May 20, 2020 and December 19, 2021.*

1.2. Aims and relevance

There are several reasons why contrasting controlled and autonomous motivation is important. First, from a public policy perspective, there is a long-lasting debate on which type of policy works best to integrate unemployed job seekers into the labor market. Should policies be supportive and stimulate autonomy, or rather constrain and control job search behavior, a distinction that is sometimes labeled as "carrots or sticks" (Arni, van den Berg and Lalive, 2020). Our study aims at objectivating this discussion by providing scientific empirical evidence. Second, contrasting the two types of motivation is important from a theoretical perspective, since currently only little is known about the relevance of SDT *within a job search context*. In economics there have not been any studies that have directly tested the validity of SDT in this context, and the findings of studies reporting indirect evidence are mixed. In social psychology, only a few empirical studies have investigated SDT in a job search context. Findings seem to support SDT in that autonomous job search motivation generally shows a more positive relationship with job search behavior, job seeker well-being, and finding

employment than controlled motivation. However, there are some inconsistent findings and almost no studies have looked at job search quality or actual employment outcomes (including employment quality). In addition, these studies typically use a non-experimental identification strategy questioning their internal validity, and small samples which may put into question their external validity. Here, we evaluate SDT in a job search context based on a RCT and on a much larger scale. Third, this study will also reveal whether we can *trigger* autonomous and controlled job search motivation by a simple intervention, namely by sending text messages. To the best of our knowledge, there is no research that has investigated whether the aforementioned types of motivation can be induced by an intervention *within a job search context*. If this is possible by just sending the appropriate text messages, this is not only interesting from a theoretical point of view, but also from a policy perspective, because being a low-cost intervention it is potentially very cost-effective. In the next section we briefly review SDT and these two literatures.

2. Scientific background

While the implications of SDT have been studied in social psychology and behavioral economics in a variety of contexts, and scholars in social psychology have advocated the relevance of applying SDT on job search (Vansteenkiste & Van den Broeck, 2018), surprisingly few studies have actually empirically investigated SDT in this context. Here we first review the fundamental propositions of SDT, followed by its application in job search in the social psychology literature. Next, we present relevant studies within economics. We first briefly review how some researchers in economics have attempted to integrate the distinction between intrinsic and extrinsic motivation and other aspects of SDT in economic analysis. We discuss this first from a general behavioral perspective and then focus on the research on job search behavior. We end by discussing the commonalities and differences between predicted job search behavior resulting from SDT and standard job search theory (SDT), which is a central research question in this study.

2.1. Self-determination theory

Self-determination theory (SDT) is a macro theory of human motivation that has been successfully applied across a wide range of life domains such as education, healthcare, sports, and work organizations (Deci, Olafsen, & Ryan, 2017). Whereas other theories often focus on the overall amount of motivation that people have to perform particular behaviors, SDT focuses on the type or quality of a person's motivation (Deci & Ryan, 2008). A primary distinction is made between autonomous and controlled motivation (Gagné & Deci, 2005; Ryan & Deci, 2000). When people are autonomously motivated, they experience a strong sense of willingness and choice; they self-endorse their actions. *Autonomous (or self-determined) motivation* includes both purely intrinsic motivation (engaging in an activity because people find it inherently interesting or enjoyable) and internalized extrinsic motivation (engaging in an activity because people find it meaningful, personally relevant, and contributing to goals that are important to them). With *controlled motivation*, people experience pressure to behave in a certain way. This can be due to external pressure (external demands, rewards, or punishments), but also internal pressure (e.g., guilt, shame, seeking approval, moral obligation). It is thus

important to note that in SDT not all extrinsic motivation (i.e., performing an activity to attain a particular outcome) represents controlled motivation (Ryan & Deci, 2000). When people identify with the desired outcomes and internalize the regulation of the behavior, it becomes self-determined.

Whereas both autonomous and controlled motivation can direct behavior (in contrast to *amotivation*, referring to a lack of motivation and intention), SDT proposes that autonomous motivation leads to more effective performance, greater long-term persistence, and higher subjective well-being (Deci & Ryan, 2008). Although controlled motivation can lead to short-term gains, it can also narrow the range of one's efforts and negatively affect performance and attitudes, especially in the long term (Deci et al., 2017). These theoretical propositions have received wide empirical support across many different research domains (Deci et al., 2017; Deci & Ryan, 2008; Moran, Diefendorff, Kim, & Liu, 2012).

SDT further proposes that the amount and type of motivation depend on the degree to which people's basic psychological needs are satisfied (Deci & Ryan, 2000). Three innate universal needs are put forth: the need for autonomy, competence, and relatedness. The need for autonomy refers to volition and the need to self-organize and regulate one's own behavior. The need for competence involves the need to feel efficient and effective in what one does. The need for relatedness refers to the desire to feel connected to others. In order for people to develop and maintain autonomous motivation, all three of these needs must be met (Ryan & Deci, 2000). Social and contextual factors play an important role here, as they can either support or thwart need satisfaction (Deci & Ryan, 2008). In other words, environments and interventions that support the satisfaction of the needs for autonomy, competence, and relatedness can facilitate autonomous motivation and thus better performance, persistence, and well-being (Deci et al., 2017). Importantly, an autonomy-supportive context does not necessarily mean total freedom or offering no guidance at all; rather it might consist of showing understanding for one's personal perspective and values, providing a meaningful rationale for a requested behavior, or providing choices in if, when and how to conduct particular actions (Deci & Ryan, 2000).

2.2. SDT in job search: a review of the social psychology literature

A few studies have examined the propositions of SDT in a job search context. In two cross-sectional studies among unemployed individuals (Vansteenkiste, Lens, De Witte, De Witte, & Deci, 2004; Vansteenkiste, Lens, De Witte, & Feather, 2005), job search intensity was positively related to autonomous motivation to search for a job but not related to controlled motivation. In addition, controlled job search motivation was more negatively related to several indicators of subjective well-being than autonomous motivation. Although no positive relationship was observed between autonomous job search motivation and well-being, this might be explained by the fact that autonomously motivated unemployed people are constantly denied an important outcome (i.e., employment) in their lives, which was not the case in SDT studies in other domains (Vansteenkiste et al., 2005).

In a two-wave study, Koen, Klehe, and van Vianen (2015) found that long-term unemployed individuals with more autonomous relative to controlled motivation to find

reemployment (measured as a single Relative Autonomy Index) reported higher employability and job search intensity after taking a reemployment course. Even though the course was mandatory for everyone, its perceived usefulness (which might support the needs for autonomy and competence) was positively related to developing a more autonomous job search motivation. In a three-wave study, Koen, van Vianen, van Hooft, and Klehe (2016) observed that newly unemployed job seekers who experienced more autonomy in their reemployment guidance reported higher autonomous and lower controlled job search motivation. Only autonomous job search motivation was positively related to job search intensity and quality, and indirectly to finding reemployment.

In a student sample, da Motta Veiga and Gabriel (2016) found that autonomous job search motivation was consistently positively related to job search effort and quality. Overall, controlled motivation was negatively related to job search behavior, although this relationship became more positive over time. In a recent study, van der Vaart, Van den Broeck, Rothmann, and De Witte (2020) observed no significant relationships of autonomous and controlled job search motivation with job search attitudes and behavior measured six months later. However, in line with SDT, controlled motivation was positively related to basic psychological need frustration. The lack of a positive relationship between autonomous motivation and job search behavior, which contradicts the findings reported in the above empirical studies, might be due to the specific sample of low-educated individuals who had been unemployed for most of their lives and the South-African context where the unemployment rate is high and access to unemployment benefits is scarce.

Together, these studies suggest that autonomous job search motivation can have beneficial effects on job search behavior (intensity and quality) and finding employment, in line with SDT. Controlled job search motivation seems largely unrelated to job search behavior and negatively related to unemployed individuals' well-being. Note however that only one of these studies has looked at actual employment outcomes. Moreover, all these studies rely on non-experimental variation, which questions whether they identify causal effects. Although some of these studies suggest that aspects of the reemployment guidance context might help to satisfy job seekers' basic psychological needs and trigger autonomous motivation, there was no systematic variation in the offered guidance to test this key assumption of SDT. To the best of our knowledge, there does not currently exist a randomized controlled trial (RCT) that tests SDT in the context of job search. Even if such studies would exist, they would in psychology typically use small sample sizes. This questions their external validity.

2.3. *SDT in job search: a review of the economics literature*

A central theme of mainstream economics is that incentives can motivate individuals to perform a particular behavior. Research has focused on the impact of monetary incentives (rewards and sanctions) and generally finds that individuals react according to expectations (e.g. Lazear 2000). In general, how this motivation is generated, intrinsically or extrinsically, does not matter. While within mainstream economics this criticism from social psychology is

largely ignored,[2] it is taken more seriously within behavioral economics. Fehr and Falk (1999), Fehr and Schmidt (2000) and Gneezy and Rustichni (2000a, b) are the first to recognize that extrinsic incentives may backfire. Bénabou and Tirole (2003) are the first to build a formal theory and model that can explain such behavior. Extrinsic motivation induced by rewards or punishments can increase motivation in short-run, but as it negatively affects self-confidence, it decreases intrinsic motivation and backfires in the long-run. Since then a small literature has developed to study the pitfalls of providing extrinsic motivation: See Frey and Jegen (2001), Gneezy, Meier and Rey-Biel (2011), and Kószegi (2014) for general surveys of this literature; Koch, Nafziger and Skyt Nielsen (2015) review the literature with regards to incentives in education, and Cassar and Meier (2018) in a work environment.

The economic literature on non-pecuniary incentives is quite fragmented. Cassar and Meier (2018) are the first to propose a unifying theoretical framework centered around SDT. In the standard neoclassical model of motivation, the individual's utility function depends on two arguments: financial compensation and effort. Cassar and Meier propose to add a third argument, which they call *utility from meaningful work*, as they focus on work environments. This new argument of the utility function depends positively on a weighted average of four aspects of job meaning (mission, and the three basic psychological needs according to SDT: autonomy, competence, and relatedness) and on effort, and possibly also on financial compensation. The latter dependence captures that not all extrinsic motivation corresponds to controlled motivation but can be self-determined if it is meaningful (see above).

The framework proposed by Cassar and Meier can capture different aspects of non-pecuniary motivation that have been discussed in the economic literature in isolation from each other. For instance, Benabou and Tirole (2003) consider how performance incentives offered by an informed principal can adversely affect an agent's perception of ability to perform a task, and in turn intrinsic motivation. In the framework of Cassar and Meier, this aspect of workers' utility would be captured by workers' preferences over the *competence* dimension of meaning. Similarly, Falk and Kosfeld (2006) show that attempting to control motivation by imposing a minimum performance requirement on a costly activity can even entail an *immediate* reduction in performance, instead of a delayed one as predicted in the model of Bénabou and Tirole. This can occur if individuals perceive this control as a signal of distrust and a limitation of their choice *autonomy*. Reciprocal behavior can also contemporaneously affect effort. Reciprocal individuals can respond to a sanction by reducing effort as a form of retaliation, but may also increase effort reciprocating rewards or "kind" actions (Rabin, 1993; Falk and Fischbacher, 2006; Dohmen, Falk, Huffman and Sunde, 2009). In this framework this reciprocal behavior is incorporated captured by the fundamental preference for *relatedness*. By integrating the ingredient of SDT into a single framework in which standard economic model is a special case, Cassar and Meier provide an analytical tool which economists can use to evaluate to what extent and under which circumstances SDT and, hence, the distinction between *autonomous* and *controlled* motivation can improve our understanding of economic behavior. However, its

[2] Lazear (2018, p. 209-2010), e.g., considers this evidence as "scattered facts and inconsistencies" (that) "do not form a scientific literature".

usefulness still remains to be proven, and research to provide more content to it is still largely lacking.

Within the field of economics, only very few researchers who study job search behavior have explicitly based analysis or interpretation on SDT. Notable exceptions are the studies of Welters, Mitchell, and Muysken (2014) and of Gerards and Welters (2020). Welters et al. (2014) analyze job search of Australian employees based on the Household, Income and Labour Dynamics Australia (HILDA) panel survey. Consistent with SDT, they find that workers who face externally regulated pressures (pressure arising from involuntary part-time or casual labor contracts) to search for alternate employment are less likely to find better work, than workers who use autonomous motives to search for work. Gerards and Welters (2020) study the job search behavior of unemployed using the same dataset. They find that liquidity constraints intensify job search without improving short-run employment outcomes or job quality (if a job is secured), whereas subjective job quality outcomes are worse. As mentioned, the negative impact on job search quality (an outcome that is lacking in most studies) is not consistent with job search theory, but it is with SDT.

van den Berg, Kesternich, Müller and Siflinger (2019) find that "sticks" policies that impose constraints on search effort can negatively interact with negatively reciprocal traits of long-term unemployed individuals, which is in line with the findings of Dohmen, Falk, Huffman and Sunde (2009) that negative reciprocity and unemployment correlate negatively. This research empirically back-ups research of Fehr, Gächter and Kirchsteiger (1997), and Fehr and Gächter (1998) showing that the introduction of explicit incentives can even be harmful with reciprocal workers who may retaliate in response even if this is costly for themselves. As mentioned above, these results are also consistent with SDT, as negative reciprocity can be seen to originate from a violation of the fundamental need of relatedness.

Arni, van den Berg and Lalive (2020) distinguish between the actual content of active labor market programs for unemployed and their regime effects. Policy regimes capture "the intended use of a particular policy or program by a caseworker or Public Employment Service unit that cannot be explained by job seekers characteristics." They can be "supportive" ("carrots") or constrain individual behavior ("sticks"). These policy regimes seem very much related to the notion of triggering autonomous and controlled motivation, respectively. The study finds that both supportive and restrictive policies strongly increase the exit rate from unemployment, while supporting policies increase earnings after job seekers leave unemployment and restricting policies reduce them, which is coherent with SDT.[3] However, the authors did not relate their findings to SDT.

The above-mentioned studies are very much related to the studies of Behnke, Fröhlich and Lechner (2010a, b), but display opposite findings. The latter studies show that caseworkers who apply more pressure on unemployed job seekers increase more the employment rate and the job stability of their clients than case workers who are more cooperative with their clients. The findings are in contradiction with the predictions of SDT. While these studies are robust to

[3] Note that these findings are not consistent with standard job search theory (JST), because supportive policies would decrease rather than increase the exit rate from unemployment (see below for a further discussion).

various sensitivity analyses, their weakness is that they rely on the validity of the assumption of conditional independence, and that they do not provide a theory that can justify these findings, in particular how more pressure on job seekers does not come at the cost of reduced job stability.

A number of empirical economic studies *in the field of job search* find results that are consistent with SDT in that constraining or *controlling* job search effort or benefit sanctions ("sticks") stimulates job finding,[4] but backfires in the longer run in the sense of having negative effects on the quality of these jobs (See e.g. Manning, 2009; Petrongolo, 2009; Arni, Lalive and van Ours, 2013; van der Klaauw and van Ours, 2013; van den Berg and Vikström, 2014; Arni, Lalive and van den Berg, 2020). However, these findings are usually framed as evidence of predictions of standard job search theory (JST). Within this theory the imposition of monitoring or sanctions imposes an immediate cost that induces the job seeker not only to increase job search effort, but also to become less selective in their job acceptance behavior by reducing their "reservation wage" (Ehrenberg and Oaxaca, 1976; Mortensen, 1977). However, job search theory does not distinguish between job search intensity and job search quality and would also lead to different behavioral predictions with respect to *supportive* measures that respect individual autonomy ("carrots"). In the standard job search theory supportive measures would affect job search behavior via its welfare enhancing effect. This would raise the reservation wage and, hence, job quality, but also reduce job search effort and, hence, job finding. By contrast, SDT predicts that supportive measures would positively influence *both job finding and job quality*. The empirical sign of the impact of supportive measures on job search effort and job finding may therefore provide insights on SDT and standard job search theory.

3. Research design

3.1. Main hypotheses and outcome variables

- *Main hypotheses*

As mentioned in the introduction, the main objective of this research is to get a better understanding of whether it is the triggering of autonomous or controlled motivation that results in better labor market outcomes of unemployed job seekers. In the literature review we have explained that standard theories in psychology and economics make different predictions with respect to the relative effectiveness of triggering the autonomous or controlled motivation of unemployed job seekers, in particular with respect to their impact on job search effort and job finding. In psychology, SDT predicts that the triggering of autonomous job search motivation will always result in more job search effort and, as a consequence, a higher job finding rate than both triggering controlled motivation or than doing nothing (i.e. the "no intervention" control condition). SDT does not have a clear prediction on the relative effectiveness of triggering controlled motivation or doing nothing. By contrast, to the extent that autonomous messages are experienced as *supportive* or *welfare enhancing* and controlled messages as *welfare reducing,* JST predicts that triggering controlled motivation is more effective than both

[4] Note that SDT has no clear prediction whether controlled motivation relative to the status quo stimulates job finding, but such a finding would not be in conflict with SDT (see next Section).

autonomous motivation and doing nothing, and that triggering autonomous motivation is less effective in stimulating job search effort and job finding than having no intervention. These main hypotheses are summarized in the first two lines of Table 1.

Table 1: Predicted signs of the effects on outcomes according to theory: JST versus SDT

Outcomes	Autonomous motivation vs. No intervention		Controlled motivation vs. No intervention		Autonomous motivation vs. Controlled motivation	
	JST	SDT	JST	SDT	JST	SDT
JS effort	-	+	+	?	-	+
Job finding	-	+	+	?	-	+
Job quality	+	+	-	-	+	+

Notes: JS = job search; JST = job search theory; SDT = self-determination theory.

From a welfare and policy perspective not only the job finding rate matters, but also the job quality is key. In the last line of Table 1 we therefore report the predictions from SDT and JST with respect to job quality. This reveals that for this outcome the predictions from both theories are more aligned. However, there are empirical studies in the economics literature that conflict these predictions of JST. Most notably, the research of Behnke, Frölich and Lechner (2010a, b) that controlling motivation cannot only stimulate job finding, but also job quality by enhancing job stability. Such a finding is neither consistent with JST, nor with SDT. A secondary research question is therefore whether triggering autonomous motivation is more effective than controlled motivation in reinforcing the job quality. In case this hypothesis is rejected, this would call for the elaboration of a theory that helps understanding such a finding.

- *Primary outcome variables*

While Table 1 summarizes the primary research hypotheses, Table 2 summarizes the primary and secondary outcomes that will be used to test these hypotheses and to evaluate the success of the interventions. Primary outcomes are designated in bold. We limit the number of primary outcomes to two as to reduce issues related to multiple testing.[5] These primary outcomes are chosen from an administrative data source as to maximize the statistical power.

The first primary outcome is *job search* effort. We choose to measure it by the average number of job applications per month during months 2 to 7 of unemployment, as reported in the activity reports that unemployed job seekers are obliged to hand in each month. We restrict the measurement of this outcome to the first seven months because this corresponds to the duration of the intervention. We do not take the first month into account, as the messages are generally only sent on the deadline day on which the report has to be handed in. The effect of a message on job applications can therefore only appear in the month following the message. That is why we also incorporate job applications in month 7, to capture the effects of the final message.

[5] In Section 3.5 we explain in more detail how we will deal with the multiple testing problem.

The second primary outcome is *job finding,* an outcome commonly considered in both the economic and psychological literature. As measure of job finding we will use an indicator of leaving unemployment within 7 months.[6] As job finding responds with some delay to job search effort, it is measured until one month after the last message has been sent. In principle the intervention may continue to have an impact beyond 7 months, but we expect it to decay rapidly after the last message has been sent. We will therefore use leaving unemployment within 12 months as a secondary outcome (see below).

Table 2: Overview of primary **(in bold**) and secondary outcomes

Outcome category	Administrative data	Survey data
1. Job search motivation		- Controlled job search motivation; - Autonomous job search motivation.
2. Job search effort	- Fraction of times clicked on url's in messages (only available by treatment condition aggregated over all months); - Fraction of times handed in activity reports (months 1-3, 4-6, 1-6); - **Average number of job applications per month** (months 2-4, 5-7, **2-7**).	- Number of hours searched last week.
3. Job search quality	- Average number of spontaneous applications per month (months 2-4, 5-7, 2-7).	- Job search quality.
4. Job search outcomes	- Average number of job interviews per month (months 2-4, 5-7, 2-7).	
5. Job finding	- **Leaving unemployment within 7 months** (4 and 12 months); - Days unemployed within one year of the start of unemployment.	
6. Job quality	- Employment (as measured by non-unemployment) lasts more than 6 months (3/12 months);[2] - Wage in first job[1, 2]; - First job[1, 2] lasts more than 3/6/12 months.	- Job satisfaction; - Perceived fit; - Stay intention; - Composite perceived job quality score (mean of job satisfaction, perceived fit and stay intention).

Notes:

1. The availability of these variables is conditional on access to data from Statistics Sweden.
2. Refers to exits from unemployment and jobs within the first 7 months of unemployment.

[6] This outcome is used in other research (see e.g. Cheung et al. 2019) and is readily available in the administrative data of the Swedish PES.

- *Secondary outcome variables*

Aside from using the aforementioned primary outcome variables, we consider a number of secondary outcome variables. The impacts of the interventions on these secondary outcomes are more "exploratory" and aim at further illuminating the mechanisms that drive our results.

First, within each primary outcome (job search effort, job finding) we have chosen one particular measure. This choice aims at limiting the multiple testing problem. However, this choice is somewhat arbitrary as other outcome variables could have been chosen. We will therefore analyze the robustness of our findings to a different choice of outcome variables. Initially, we will distinguish between the short- and medium run effects of the interventions on job search effort and time in unemployment. According to SDT it can be expected that in the short run the messages that trigger controlled motivation may be close to as effective as those that trigger autonomous motivation. However, in the longer run the effectiveness of controlled motivation is expected to taper off. We therefore make for the measures of job search effort a distinction between the short-run (1-3 months or 2-4 months) and the medium-run (4-6 months or 5-7 months). For time in unemployment we distinguish between the short-run (leaving unemployment within 4 months), the medium run (7 months) and the long-run (12 months). As an overall measure we will also consider the number of days unemployed within one year of the start of the unemployment spell.

For job search effort we will also consider the following measures: (i) the fraction of times clicked on url's in messages (only available at the aggregate level by treatment condition without mention of the timing in the unemployment spell); (ii) the fraction of times handed in the activity reports based on administrative data; (iii) and the reported number of hours searched last week as reported in the intermediate survey.

Second, we test whether the controlled and autonomous messages indeed succeed in triggering more *controlled and autonomous motivation*. Based on the survey data, we therefore measure the impact of the messages on validated measures of controlled and autonomous job search motivation. In case that we find that controlled and autonomous messages trigger indeed, respectively, controlled and autonomous motivation, our findings can be more convincingly seen as evidence for testing the validity of SDT.

A third set of secondary outcomes relates to the *job search quality.* According to SDT the quality of job search effort should be higher for autonomous than for controlled motivation. By contrast, standard JST does not have a direct prediction on job search quality, as it does not make the distinction between job search quantity and quality. Nevertheless, to the extent that job search quality is not easily measurable, one could expect within the framework of JST that controlling messages will rather spur job search quantity than quality, as the sanction associated to the control can only be based on behavior that can be objectively measured: the number of applications can much more easily be measured than the quality of the applications. We will measure job search quality using the *average number of spontaneous applications per month* (administrative measure in the report) and a validated measure of search quality used in the psychological literature (based on survey data).

Fourth, our intervention may not be strong enough to detect any effect on job finding. We therefore introduce as a secondary job search outcome the average number of job interviews to which job seekers are invited per month (administrative measure in the report).

A fifth set of secondary outcomes relates to *job quality*. Here, the main outcome is an indicator that measures whether the duration of the first employment spell (measured as time non-unemployed using PES data) exceeds 6 months or not. We measure this for exits from unemployment that occur within the first 7 months of unemployment. We mainly focus on duration of the first employment as measure of job quality as it is more common in the literature to focus on job duration as a measure of job quality than on the wage or other measures (possibly because it is easier to measure). Note that this outcome is measured only among those individuals who have found a job within the first 7 months of unemployment. We restrict to these individuals because we cannot conduct the analysis without limiting the period of analysis at some point. As we expect the impact of the intervention to decay rapidly after the last messages have been sent, we have chosen to limit the analysis of job quality to those jobs that have been found within the first 7 months.

The duration of 6 months is set relatively arbitrarily but aims at avoiding a too long delay in the analysis. However, we will also consider job duration thresholds of 3 and 12 months in sensitivity analysis. We will also study job-quality based on data from the exit survey: (i) job satisfaction, (ii) perceived fit, (iii) stay intention, and (iv) composite perceived job quality score (mean of job satisfaction, perceived fit and stay intention). These survey variables are commonly used measures in the psychological literature. If we gain access to data from Statistics Sweden,[7] we can also study other measures of job quality, such as (i) the wage in the first job, and (ii) indicators for the first job lasting more than 3/6/12 months.

Finally, while our theories do not allow to form clear predictions with respect to variables that could moderate our intervention (i.e. treatment effect heterogeneity), we do aim to investigate exploratively the moderating effects of the following variables: initial job search motivation,[8] gender, labor market attachment, industry exposure to Corona, and local unemployment rate. We discuss this in further detail in Section 3.6.

3.2. Design of RCT and data collection

3.2.1. Design of the RCT

- *Geographic region*:
  Sweden

- *Research population*:

Two thirds of all individuals who register for the first time within 90 days as unemployed job seekers in the Swedish PES between May 20, 2020 and the end of the

[7] Even if we obtain permission of acquiring these data, they risk not being timely available due to substantial delays in delivery.

[8] Based on evidence from a field experiment Herz and Zihlmann (2021) find that the monitoring of remote workers reduces the average performance by reducing the performance of intrinsically motivated workers, but not that of the non-intrinsically motivated workers. This finding suggests that we may expect that among the individuals receiving the controlling messages only autonomously motivated individuals will reduce job search effort.

experiment.[9] Among this population we select individuals who are required to search a job and have to report this in an activity report one or two months after entry in unemployment. Individuals for whom this requirement does not start in month 1 or 2 are dropped as the aim of this research is to measure the impact of messages on those who are required to search from the beginning of the unemployment spell.

The end date of the experiment is determined by the knowledge that this light intervention requires a very large sample size to be able to detect a statistically significant effect and by the willingness of the Swedish PES to continue running the experiment. When we wrote this pre-analysis plan, we proposed to include all entrants into unemployment until the end of 2021 into a control group and treatment groups, and thus continue to send messages until the end of June 2022. However, we cannot be fully sure about the exact end date (and, hence, the sample size) as we depend on the discretion of the PES. *The aforementioned plan was eventually implemented. The final end date was set to December 19, 2021, and the last message was sent in June 2022.*

- *Randomization method*

The randomization is based on birthday (date-of-the-year). All born on 1/6 of the days of the year are assigned to the controlled condition, 1/6 of the days to the autonomous condition, 1/3 to the control group and 1/3 to a treatment condition unrelated to our research.

June 1, 2022: Due to administrative reasons and other ongoing activities at the SPES all born on 1/6 of the days (instead of the 1/3 days) was assigned to the control group during the period May 20, 2020 to October 31, 2020. After this period the control covers 1/3 of the days as planned.

- *Consent/ethical issues*:

The experiment and all research described in this pre-analysis plan have been approved by the Swedish Ethical Review Authority. The decision was taken on April 4, 2020 and the case number is 2019-06401.

- *Expected timeline*:

The starting date of the interventions (i.e. dispatch of messages) in the experiment is 2020-*05-20*.[10] Messages are sent each last day of a month (except if it is a Friday, Saturday or Sunday). The first message was sent each month to cohorts that have entered unemployment between the 20th of the preceding month until the 19th of the month in which the message is sent. The intervention continues for five months after the first message (six messages sent in total) or until one exits unemployment, or until the moment that an unemployed is no longer required to report activities.[11]

[9] Initially, the experimental period started on January 20, 2020, but due to the Corona epidemic the Swedish PES suspended the requirement for Swedish job seekers to hand in a report at the end of each month about their activities. As the experimental messages were very much linked to this reporting, we had to interrupt the experiment as well, until the reporting requirement was relaunched.

[10] As mentioned in the previous note, the Corona epidemic forced us to shift the period of intervention by 5 months.

[11] Furthermore, the intervention may be paused for individuals who are judged unable to actively search for a job at the time the message is sent (i.e. because they are receiving enhanced support/preparatory services or experience health issues). These individuals are exempted from standard activity reporting.

The final timeline includes individuals who started a spell of insured unemployment between May 20, 2020 and December 19, 2021, with the last message sent to the last cohort in June 2022.

- *Sample size and power calculations*

In the initial *AEA RCT Registration* the power calculations were based on the past inflow population in unemployment in Sweden. In this pre-analysis plan we base the power calculations on an extrapolation of sample sizes and the survey response rates that we observed for the first 7 cohorts included in our experiment. We have also adapted our power calculations for our two primary outcomes (see Table 2) based on means and standard deviations of the two outcomes using historical data. This update of the power analysis has been implemented *without unblinding the data*, that is, without separating the data by treatment arms.

We consider for each outcome three different effects: treatment 1 (T_1) versus control (C), T_2 versus C, and T_2 versus T_1. We use the following formula's to calculate the MDE's of these treatment effects:

$$MDE_k = \left(t_{\frac{\alpha}{2}} + t_{1-\kappa}\right)\sqrt{\frac{\sigma^2}{(N_1+N_0)P_1(1-P_1)}} \quad for\ k\epsilon\{1,2\}$$

$$MDE = \left(t_{\frac{\alpha}{2}} + t_{1-\kappa}\right)\sqrt{\frac{2\sigma^2}{N_1}}$$

where $t_{\frac{\alpha}{2}}$ and $t_{1-\kappa}$ are the t-values[12] that depend on, respectively, the significance level α and the power $1-\kappa$, σ^2 is the variance of the outcome variable, N_0 and N_1 are the effective sample sizes of, respectively, the control and treatment groups and $P_1 = \frac{N_1}{N_1+N_0}$. The MDE for either treatment effect (k=1 or k=2) relative to the control is of the same size. The MDE of the treatment effects relative to each other simplifies in the second equation because both treatment groups are of equal size.

In the above formula the MDEs depend on the *effective* sample sizes. For the outcomes based on administrative data (comprising the two primary ones defined above) these sample sizes depend on the number of individuals that enter unemployment, are required to report at least once an activity report at the Swedish PES, and are assigned to each treatment arm. As mentioned above, we have revised the estimated sample sizes based on extrapolations of the available data on February 24, 2021, and under the assumption that we send the last messages in June 2022 to the cohort that has entered unemployment in December 2021. All together this gives estimated sample sizes, but we stress that the final sample sizes may be different, both because we extrapolate sample sizes during 2021 and because we assume that we can continue the experiment until June 2022 (new entrants until December 2021).

It should also be stressed that these effective sample sizes are not reduced to take into account the "noncompliance" induced by the fact that not all individuals who receive these messages read them. In this sense the MDE's reported in Panel A refer to minimum detectable *intention to treat* effects. For the outcomes that are based on the survey data the *effective* sample

[12] In the first formula this t-value has $(N_1 + N_0 - 2)$ degrees of freedom and in the second $(2N_1 - 2)$. Note that in view of the large sample sizes these can be safely approximated by the corresponding z-values of the standard Normal distribution. For a significance level of 5% and a power of 80% the value of the first term between parentheses is therefore 1.96+.84 = 2.80.

sizes are smaller as they have to be reduced by the survey non-response to each of the surveys.[13] These sample sizes are reported in Table 3.

Table 3: Power calculations and minimum detectable effect sizes
Experiment until December 2021

	Sample size			$\alpha = .05$ **and** $1-\kappa = .8$				$\alpha = .025$ **and** $1-\kappa = .8$			
Outcomes	**N**	**N_1**	**N_0**	**T_k vs C**		**T_2 vs T_1**		**T_k vs C**		**T_2 vs T_1**	
				MDE	% Δ	MDE	% Δ	MDE	% Δ	MDE	% Δ
Panel A: Outcomes based on admin data											
1	275	75	125	.0776	1.8%	.0868	2.1%	.0854	2.0%	.0955	2.3%
2	275	75	125	.0062	1.0%	.0069	1.1%	.0068	1.1%	.0076	1.2%
Standardized	275	75	125	.01290	-	.0145	-	.0142	-	.0159	-
Panel B: Outcomes based on intermediate survey											
Standardized	43.38	12.12	23.12	.0314		.0360		-	-	-	-
Panel C: Outcomes based on exit survey											
Standardized	17.85	4.69	8.48	.0510		.0579		-	-	-	-

Notes: MDE = minimum detectable effect size; % Δ = percentage of the effect relative to the mean.
Outcome 1 = *average number of job applications between months 2 and 7* (mean = 4.2; standard deviation = 6.0);
Outcome 2 = *leaving unemployment within 7 months* (mean = 0.63; standard deviation = 0.48);
Standardized = outcome variable standardized to have mean = 0 and standard deviation = 1;
N*1000=Effective total sample size adjusted for the response rate (100% for admin data and less than 100% for survey data), N_1*1000 = the effective sample size of the 2 treatment groups; N_0*1000 = the effective sample size of the control groups;
The power ($= 1-\kappa$) is always set at 80%, while the significance level (α) is set at 5% in the standard case. For the two primary outcomes we also consider a Bonferroni adjustment for multiple testing (which for 2 outcomes implies α=0.025).

Besides MDE's for the two primary outcomes (outcome 1 is the average number of job applications per month as measured between months 2 to 7 and outcome 2 is leaving unemployment within 7 months.), Table 3 also reports the MDE's for a standardized outcome (of mean zero and standard deviation equal to one) for each possible configuration. For this standardized outcome we set, as is standard, the significance level at 5% and the power at 80%. For the two primary outcomes in Panel A we report some additional information: the percentage size of the effect relative to the mean, and we also consider the case where we set the significance level at 2.5%, which corresponds to the Bonferroni adjustment for multiple testing in the case of two outcomes. As the Bonferroni adjustment is conservative, this scenario provides an upper bound for the corresponding MDE's.[14]

For the comparisons of treated to controls (resp. of treated to each other) the MDE of a standardized variable is not larger than 1.3% (resp. 1.4%) of a standard deviation for an intention to treat effect on an outcome in the admin data, 3.1% (resp. 3.6%) of a standard deviation for an outcome measured in the intermediate survey, and 5.1% (resp. 5.8%) for an outcome in the exit survey. For the interaction of the initial survey and an admin outcome the MDE is 3.9% (resp. 4.0%) of a standard deviation.

It is difficult to gauge whether these MDE's are small enough, as we cannot rely on results of prior studies. The study of Altmann, Falk, Jäger and Zimmermann (2018) can nevertheless

[13] Also, because the surveys are sent out only from August 25, 2020, i.e. excluding the first 2 cohorts from the initial survey.

[14] If we use the corresponding z-values instead of the t-values in the above formula, this means that the first term between brackets of the formula's determining the MDE increases from 2.80 to 3.08 (= 2.24+.84), and therefore increases the MDE by about 10% (= (3.08/2.80-1)*100).

provide some benchmark. This study investigated the impact on time in employment and earnings after one year of dispatching an information brochure about job search strategies and the consequences of unemployment to unemployed job seekers in Germany. The point estimate of the intention to treat effect on the full population was of the order of 1% of the means of the considered outcomes, and based on the confidence interval the effect could not be larger than 3%, or lower than -1%. If we consider our two benchmark outcomes (average number of job applications and probability of leaving unemployment over 7 months) the MDE's are 1.8%, resp. 1.0% of the means these outcomes, and, hence, permit to detect effect sizes of the same order of magnitude as the ones reported by Altman et al. (2018).

3.2.2. Data collection

We will collect information on labor market outcomes using admin data and surveys. The admin data are based on the available information in the PES files. The retained outcomes are listed in Table 2. The control variables are the ones used in Cheung et al. (2019). The surveys are taken for a subpopulation.[15] We are considering three surveys:

(i) An *initial survey* generally within the first month of unemployment about a week prior to the moment at which the first message is sent. The time lag between this survey and the first message aims at avoiding a *priming effect*.[16] It aims at measuring initial job search motivation.
(ii) An *intermediate survey* is sent between 3 and 4 months after entry in unemployment to ask the unemployed about their job search behavior (effort and quality) and job search motivation. At this moment, people in the treatment groups should normally have received three of the six intended messages (when they were still unemployed).[17]
(iii) All participants who reported finding employment were sent a short *exit survey* 2 to 7 weeks later. The survey was kept short to increase response rate and to comply with PES guidelines. It aims at gathering information about perceived job quality (job satisfaction, perceived fit, and stay intention).

A more complete justification of the content of the surveys can be found in Appendices 2-4. Appendix 5 provides more information on the timing of the messages and surveys.

3.3. Intervention

3.3.1. Procedure (how messages constructed, including pilot study)

On the basis of SDT and prior research in other contexts, two of the researchers developed six initial e-mail messages for both the autonomous and controlled conditions in English. The autonomous messages were aimed at triggering autonomous job search motivation

[15] Surveys are sent out for the first time from August 24, 2020, i.e. excluding the first 2 cohorts from the initial survey. Also, the surveys were only sent to half of the control group.
[16] We will test for this priming effect by comparing outcomes measured in the administrative data of members of the control group to which we will have sent this initial survey to members of the control group to whom this survey will not be sent: Remember that we will send surveys only to a 50% random sample of the control group. Actually this test can only be realized on the data gathered from November 2020 onwards, as we found out that until the end of October 2020 the control group without messages was confounded by another treatment.
[17] For individuals who exited unemployment before the intermediate survey was sent, the intermediate and exit survey were merged into a single survey. This was decided in consultation with the PES to avoid that these people would receive two separate surveys within a short time period.

by supporting the needs for autonomy, relatedness, and competence, whereas the controlled messages were designed to elicit controlled job search motivation. Importantly, whereas different wording, approach, and emphasis were used across the conditions, its general content (e.g., specific job search tips) in each month was kept constant to avoid alternative explanations for observed differences. Every month, a different webpage related to job search was shared at the end of the message, which was the same in both conditions. In addition, the word count of the messages was about the same for both conditions in every month.

All messages in both conditions personally addressed the job seeker (using the first name, which is common in Sweden), to increase attention and probability of being read. The topic line of the e-mail messages varied across months but was also kept constant between conditions to avoid differences in being opened or read.

The messages were intensively discussed among all authors and several rounds of revisions were undertaken. Then, the three other researchers translated the messages to Swedish and made sure the original meaning was kept as much as possible. This was checked by backtranslating the messages to English in a later stage. Messages were discussed with policymakers and caseworkers of the Swedish PES as well as Swedish labor market experts. Their feedback was incorporated into another round of revising the messages. In a pilot test conducted in June 2019, these twelve (six autonomous, six controlled) optimized messages were sent to 2923 unemployed Swedish job seekers, corresponding to their respective time in unemployment and randomized for the autonomous versus controlled condition. Of these, 864 (29.6%) responded to a follow-up survey about these messages. We checked whether job seekers perceived the messages overall as autonomous versus controlling and to what extent the messages supported their needs for autonomy, relatedness, and competence in particular. Not all messages were perceived as intended. These results were thoroughly analyzed and used as input for further revising the messages, which was again intensively discussed among all authors and checked with the PES. In addition to finalizing the messages, this pilot test enabled us to test and adapt the procedures used for conducting the main study. Due to some changes at the PES with respect to activity reporting and the coronavirus outbreak, some final adaptations were made (e.g., replace “plenty of jobs out there” with “other jobs out there”).

3.3.2. Definition (final messages)

There are two treatment group conditions (controlled or autonomous motivation) and one control group. The controlled treatment group condition receives a series of six electronic messages (of about 120-160 words) during the first half year of unemployment (so conditional on still being unemployed). The messages were sent a few days prior to submitting the activity report and referred to the upcoming activity report deadline. The content of these messages aims at inducing controlled job search motivation by thwarting the needs for autonomy, competence, and relatedness, the three inborn needs of people according to SDT. The autonomous treatment group condition also receives six messages according to the same timing, but their content aims rather at triggering autonomous job search motivation by supporting the needs for autonomy, competence, and relatedness. The control group receives no messages. Appendix 1 contains both the messages in Swedish as well as a translated version of the messages from Swedish to English.

3.4. Definition of outcome variables

An overview of the considered outcome variables are listed in Table 2 above. Here we provide the precise definitions of each of these variables.

- Non-response and sample selection indicators: Indicator equal to one in case of non-response or sample selectivity (because found a job or still unemployed). Separately for each of survey outcome variables of interest and for each administrative outcome for which there is non-response (e.g. those not handing in a report) or there is an issue of sample selection (e.g. job search effort only measured for those still unemployed). These indicators are used to evaluate and correct for selective non-response and sample selection (see Section 3.5).
- Job search motivation
  - *Controlled job search motivation:* Mean of six items from the intermediate survey (see Appendix 3). Sample consists of those who answered the intermediate survey.
  - *Autonomous job search motivation:* Mean of four items from the intermediate survey (see Appendix 3). Sample consists of those who answered the intermediate survey.
  - For each of these two variables separately, we will first calculate Cronbach's alpha as an indicator of internal consistency reliability. A coefficient alpha higher than or equal to .70 is generally considered acceptable (Cortina, 1993). If the coefficient alpha is lower than .70, items will be removed one by one from the scale on the basis of the "Cronbach's alpha if item deleted" statistic. Items resulting in the largest increase in alpha will be deleted first until the minimal threshold of .70 is reached. Second, we will conduct a confirmatory factor analysis on the remaining items of both variables together to check whether our expected two-factor model fits 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 the two latent motivation factors are allowed to co-vary. We will use two fit indices to assess how well this two-factor model fits the data: the comparative fit index (CFI) and the standardized root mean square residual (SRMR). Hu and Bentler (1998) recommend a cutoff value close to .95 for CFI and close to .08 for SRMR before one can conclude there is a relatively good fit between the hypothesized model and the observed data. If these fit criteria are not attained, we will remove items with the lowest factor loading one by one until the thresholds are met. The mean of the remaining items will be calculated and used as the score for controlled and autonomous job search motivation respectively.
- Job search effort
  - *Fraction of times clicked on url's in messages:* This information is only available by treatment condition aggregated over all months. It cannot be linked to specific individuals or timing in the unemployment spell. It is not available for the control group as they received no messages.
  - *Activity reporting:* fraction of times an individual hands in an activity report (1-3, 4-6, 1-6). The fraction is measured for each individual over the time periods that (s)he is still unemployed and required to submit a report (as in Cheung et al., 2019).
  - *Number of job applications:* average number of job applications per month over the number of months considered (2-4, 5-7, 2-7), using data from the activity reports. It

includes formal job applications, unsolicited/spontaneous applications and job applications following vacancy referrals and proposals. Sample consists of those who submitted a report. Data are used from the activity reports; periods in which no activity reports are handed in are ignored in calculating the average. The same holds for all variables based on the activity reports.

- *Survey-reported job search effort:* number of hours per week spent on job search activities, using data from the intermediate survey (see Appendix 3). Sample consists of those who answered the intermediate survey.

- Job search quality
  - *Spontaneous applications:* Average number of spontaneous applications per month (months 2-4, 5-7, 2-7), using data from the activity reports. Only measured for those who hand in a report.
  - *Survey-reported job search quality:* Mean of five items from the intermediate survey (see Appendix 3). Sample consists of those who answered the intermediate survey. We will first calculate Cronbach's alpha as an indicator of internal consistency reliability. A coefficient alpha higher than or equal to .70 is generally considered acceptable (Cortina, 1993). If the coefficient alpha is lower than .70, items will be removed one by one from the scale on the basis of the "Cronbach's alpha if item deleted" statistic. Items resulting in the largest increase in alpha will be deleted first until the minimal threshold of .70 is reached. The mean of the remaining items will be calculated and used as the score for job search quality.
- Job search outcomes
  - *Job interviews:* average number of job interviews per month considering the following months after entry in unemployment: 2-4, 5-7, 2-7. Sample consists of those who submitted at least one report in the considered period.
- Job finding
  - *Job finding:* Defined as leaving unemployment within 4, 7 and 12 months. Measured using administrative data from the Swedish PES. Unemployment includes full-time unemployment and participation in an active labor market program. Defined as in Cheung et al. (2019).
  - *Days unemployed during the first year*: first year after entry to unemployment (defined as in Cheung et al., 2019). This includes unemployment in the initial spell and re-unemployment after a period of employment.
- Job quality
  - *Employment duration:* If the first period of non-unemployment exceeds 3, 6 or 12 months or not. Non-unemployment is the time from exit from unemployment to re-entry to unemployment. Unemployment measured using PES data as above. Only exits from unemployment that occur within the first 7 months of unemployment are taken into account.

- *Wage first job:* Full-time equivalent monthly wage rate from Statistics Sweden (Strukturlönestatistiken).[18]
- *First job lasts more than 3/6/12 months:* Duration of first job measured using employment records (RAMS) from Statistics Sweden. [19]
- *Job satisfaction:* One item from the exit survey (see Appendix 4).
- *Perceived fit:* One two-item scale and three separate items from the exit survey (see Appendix 4).
- *Stay intention:* One item from the exit survey (see Appendix 4).
- *Composite perceived job quality score:* mean of job satisfaction, perceived fit and stay intention.

3.5. Methods of analysis

- *Benchmark analysis*

We have three comparisons between the two treatment groups and the control group. The RCT identifies the causal effect of a treatment relative to the control or the other treatment in a simple way by regressing in the research population the outcomes of interest (Y_i) on treatment indicators ($T_i^c = 1$ in case individual i belongs to the random group that receives messages that aim 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 that aim at triggering autonomous motivation and $T_i^a = 0$ otherwise) with control variables ($\boldsymbol{X}_i$):

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

where α, β_c, β_a, $\boldsymbol{\gamma}$ are parameters to be estimated and u_i is the error of the regression. The following set of null hypotheses to be tested (see Table 1):

H1: $\beta_a = 0$ for autonomous messages versus no intervention;

H2: $\beta_c = 0$ for controlled messages versus no intervention;

H3: $\beta_a = \beta_c$ for the autonomous versus controlled condition.

Note that we do not pre-commit to any theory (JST or SDT). As a consequence, we cannot pre-commit to a one-sided hypothesis test as to increase statistical power (Olken, 2015, p. 70).

We will study the sensitivity of findings by comparing results with and without control variables, but the main reported results will be based on a specification which includes control variables. To avoid an arbitrary selection of control variables that enter into our main regression, we will use double machine learning LASSO methods to select the control variables (Belloni, Chernozhukov, and Hansen, 2014). This method selects the variables that are unbalanced

[18] The availability of these variables is conditional on access to data from Statistics Sweden.

[19] The availability of these variables is conditional on access to data from Statistics Sweden.

between the treatment and control groups and those that are correlated with the outcome variable of interest. The variables will be selected from a rich set of administrative data describing the labor market history of individuals. The full set of variables from which we make a selection based on LASSO methods corresponds to the set control variables used in Cheung et al. (2019). We will include quadratic terms of non-binary variables and first-order interaction terms between all variables in the set of potential variables.

In case the randomization is well implemented, and the treatment and control samples are balanced the findings should be robust for this inclusion. Nevertheless, if they are not, this would suggest that we are facing an unlucky draw, in which case the inclusion of control variables is the best that we can do to correct for potential biases. The inclusion of the control variables generally will also help in increasing the precision of our parameter estimates (see e.g. Duflo, Glennester and Kremer, 2007, p. 3924).

- *Treatment of potentially selective non-response and sample selection*

Non-response is not an issue for the unemployment outcomes as they are based on administrative data that is observed for everyone. However, the outcomes based on activity reports are only observed for those who file the report. To study this we will examine whether the probability of reporting differs between the treatment and the control groups. More importantly, all outcome variables based on survey data are expected to be subject to important non-response. We will therefore also systematically study whether the non-response is selective between treatment conditions.

Another potential source of selectivity is that the job-search outcomes can only be measured for those who are still unemployed. A similar non-response issue arises for our measures of job quality, which are only observed for individuals that found a job. We will study this selectivity by regressing an indicator of sample selectivity on the treatment conditions.

In case of selective nonresponse or sample selection we will aim at controlling as much as possible for this selectivity by using methods based on the conditional independence assumption (CIA) (see e.g. Imbens and Rubin 2015).

- *Accounting for multiple outcomes and multiple hypothesis testing*

Since we are considering two primary outcomes, we are facing a multiple testing problem. Apart from reporting the standard t-tests from the OLS regressions, we will explore adjusted p-values following Hochberg's (1988) step-up procedure, and to increase power, possibly use resampling procedures that account for the dependence structure in the p-values (Westfall and Young, 1993; Romano and Wolf, 2005a, b). These adjustments also apply to effect heterogeneity in Section 3.6.

- *Treatment of outliers*

Most of the outcome variables that we consider are binary and do not require any adjustment for outliers. However, some outcomes are measured on a continuous scale (e.g. the wage in the first job) or a discrete scale (average number of job applications, days unemployed) and the measurement of the effects on these outcomes can be sensitive to outliers. For all non-binary outcomes we will assess the sensitivity of the results for trimming the data at the 99th percentile. In case the estimated treatment effects are found to be sensitive to this trimming, only the trimmed outcomes will be used in the analysis.

- *Identification of "pure" message effects*

A concern is that part of the effects that we measure could be partly "pure" message effects, irrespectively of their content: the unemployed could react simply because they receive a message. This concern is particularly relevant in case we would find that the effects of our two interventions are equal because we could then not exclude the hypothesis that the effects that we measure are just "pure" message effects and that the content of the messages does not matter. To deal with this concern we propose the following analyses:

1. *In footnote 16 we mentioned that we could test for a priming effect of sending a survey, by comparing from November 2020 onwards the outcomes of those members of the control group (50%) to whom the initial surveys were sent to the other members (50%). Finding evidence that a zero priming effect cannot be rejected is suggestive evidence that "pure" message effects are zero. However, finding evidence of a significant priming effect does not necessarily imply the presence of a "pure" message effect because this effect could still depend on the content of the message: a survey has very different content than the messages we sent.*
2. *In section 3.2.1 (bullet point on the Randomization method) we mentioned that 1/3 of the individuals who register as unemployed job seekers in the Swedish PES were assigned to a treatment condition unrelated to our research, and from May 20, 2020, to October 31, 2020, also half of our control group was inadvertently assigned to this same treatment condition. This treatment condition consisted in sending various types of messages to unemployed job seekers. We will therefore test whether these messages have any significant effects on our outcomes of interest. If we find that these messages do not have any significant impact then this would again be evidence for zero "pure" message effects. By contrast, in case effects are significantly different from zero, no conclusions can be drawn, because these could (partly) reflect an effect of the content of these messages.*

3.6. Effect heterogeneity (moderating effects)

As an exploratory analysis we will study effect heterogeneity in several pre-defined dimensions. To limit multiple testing issues, we will mainly consider effect heterogeneity for the primary outcomes.

- Initial job search motivation: We will exploratively examine whether initial job search motivation moderates the effect of our intervention on all outcomes. We will check for this in the benchmark analysis by interacting the treatment indicator by the measures of initial controlled and autonomous job search motivation (see Appendix 2).
- Males and females: there is some evidence that males react stronger to increased control of job-search activities (Lombardi, 2018), and gender differences are a prioritized area for the Swedish PES. We will therefore study separate effects for males and females by interacting the treatment with a gender dummy.
- *Occupational* exposure to Corona: Our experiment was planned before the outbreak of the Corona-crisis and after some changes to messages we decided to start the experiment during the crisis. The widespread impact of Corona on the labor market motivates heterogeneity analyses for job seekers from *different occupations*, for instance, comparing individuals *in* highly negatively affected *occupations* by Corona (e.g. *waiters in* restaurants) and job seekers who used to work in *occupations* with less negative or even positive employment

following Corona (e.g. *ICT-specialists or nurses*). Using aggregated data from Statistics Sweden *(wage statistics and employment records)* on *aggregate* employment *in each occupation* we intend to classify *occupation* exposure to Corona *by an indicator that selects those occupations for which the relative drop in number of workers employed in the occupation between the end of May 2020 and the end of May 2019 exceeds the median decrease.* Each job seeker *is then assigned to this exposure measure based on the last occupation exercised before entry into unemployment*. To study effects heterogeneity we interact the *occupational* exposure measure with treatment status.

- Local unemployment rate: high and low unemployment rate may affect job search motivation and the response to the two treatments in different ways. Even though we have no clear theoretical prediction we will explore if the treatment effects are smaller or larger in high and low unemployment markets. This is especially important since our experiment coincides with the Corona-crisis so that understanding effects heterogeneity across high and low unemployment markets may give some insights on the effects for more normal labor market periods. Following Cheung et al. (2019) we classify sample according to whether the monthly local unemployment rate is above or below median unemployment among the Swedish municipalities and interact this binary variable with treatment status.
- Indicators of labor market attachment: The effects of the intervention may also vary by labor market attachment. We distinguish between individuals with short/long unemployment history, defined as having below/above the median number of unemployment days during the last four years prior to registration.

APPENDIX

APPENDIX 1: The intervention

Below the 6 messages sent out during the intervention are reported. For each of the messages first the message of the controlling condition is reported, and subsequently that of the autonomous condition. For each message first the original message in Swedish is stated, and subsequently the translation from Swedish to English. For each message the number of words is reported between brackets. The aim was to have a similar number of words for each treatment condition in any given month.

1. *Message 1*

1.1. Controlling

Meddelande 1: Kontrollerande [156 words]

Hej [q1answer]

Den första [q3answer] öppnar aktivitetsrapporteringen. Kom ihåg att lämna in din aktivitetsrapport i tid.

Arbetsförmedlingen granskar din rapport bland annat för att kontrollera att du är tillräckligt aktiv i ditt arbetssökande. Det är nödvändigt att du är aktiv för att öka dina möjligheter att snabbt hitta jobb eller utbildning. Du förväntas också tacka ja till lämpliga jobberbjudanden så att din tid i arbetslöshet blir så kort som möjlig.

Om du får arbetslöshetsersättning, eller deltar i en arbetsmarknadspolitisk insats som berättigar till ersättning, kräver regelverket att du aktivt letar efter lämpliga jobb eller lämplig utbildning. Sök jobb via platsannonser, genom att använda ditt nätverk och genom att kontakta företag direkt.

Du är skyldig att känna till och följa de regler som gäller för arbetssökande. Om du får ersättning och bryter mot reglerna riskerar du en varning eller avstängning från ersättning.

Besök till exempel Platsbanken för att hitta lediga jobb:
Till Platsbanken

Med vänliga hälsningar,
Arbetsförmedlingen

Message 1: Controlling [155 words]

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 jobseekers. 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

1.2. Autonomous

Meddelande 1: Inre drivkraft [155 words]

Hej [q1answer]

Den första [q3answer] öppnar aktivitetsrapporteringen. Tack för att du lämnar in din rapport.

Din rapport ger oss bättre förståelse för hur ditt arbetssökande går. Den hjälper oss att förstå just din situation, så att vi kan ge dig rätt stöd på vägen till jobb eller utbildning.

Vi förstår att det är viktigt för dig att uppnå dina personliga mål och att hitta ett jobb eller en utbildning som passar dig. Arbetsförmedlingen tror på din förmåga och vill stödja dig i att hitta det arbete eller den utbildning du letar efter.

Det finns flera sätt att hitta ett passande och intressant jobb. Beroende på vilken typ av jobb du letar efter kan du välja att söka via platsannonser, genom att kontakta företag direkt eller genom att använda ditt nätverk.

Om du inte tidigare har besökt Platsbanken har du möjlighet att söka efter lediga jobb via den här länken:
Till Platsbanken

Med vänliga hälsningar,
Arbetsförmedlingen

Message 1: Autonomous [163 words]

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

2. *Message 2*

2.1. Controlling

Meddelande 2: Kontrollerande [123 words]

Hej [q1answer]

Från och med den första [q3answer] kan du lämna in din aktivitetsrapport. Din rapport är avgörande för att vi ska kunna följa upp ditt jobbsökande. Kom ihåg att varje rapport granskas av Arbetsförmedlingen. Lämna därför inte felaktiga uppgifter.

Enligt reglerna är du skyldig att aktivt söka jobb eller utbildning. Du förväntas fortsätta vara aktiv eftersom det är viktigt att du hittar ett jobb så snart som möjligt. Om du inte uppfyller kraven på aktivt arbetssökande kan du få en varning eller avstängning från rätt till ersättning från a-kassan eller Försäkringskassan.

Att ha ett tydligt och genomtänkt cv är avgörande för chansen att få ett jobb. På vår hemsida beskrivs hur du skriver ett fungerande cv:
Skriv cv

Med vänliga hälsningar,
Arbetsförmedlingen

Message 2: Controlling [129 words]

Hi [#name]

From the first of [#month] you may start handing in your activity report. Your report is important, as it allows us to monitor your job search. Remember that each report is screened by Arbetsförmedlingen. Do not leave incorrect information.

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

Having a clearly written 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

2.2. Autonomous

Meddelande 2: Inre drivkraft [128 words]

Hej [q1answer]

Tack för att du berättar för oss hur det går för dig via dina aktivitetsrapporter. Den första [q3answer] öppnar nästa inlämningsperiod.

Vi på Arbetsförmedlingen förstår att det är viktigt för dig att hitta ett jobb som passar och känns rätt för dig. Vi tror på din förmåga att nå dina mål. Om du vill ha hjälp och inspiration i ditt arbetssökande kan du hitta tips på vår hemsida. Har du frågor kring ditt jobbsökande, eller andra frågor, så tveka inte att ta upp dessa i din kontakt med oss.

Att skriva ett intresseväckande cv kan vara nyckeln till jobbet du letar efter. Vår hemsida kanske kan hjälpa dig att skriva ett cv som passar de jobb du är intresserad av:
Skriv cv

Med vänliga hälsningar,
Arbetsförmedlingen

Message 2: Autonomous [129 words]

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

3. *Message 3*

3.1. Controlling

Meddelande 3: Kontrollerande [142 words]

Hej [q1answer]

Arbetsförmedlingen granskar hur du sköter ditt arbetssökande och det är därför viktigt att du fortsätter att lämna in dina aktivitetsrapporter. Den första [q3answer] öppnar aktivitetsrapporteringen.

Regelverket kräver att du aktivt söker arbete eller lämplig utbildning. Du förväntas löpande tänka igenom hur du kan förbättra ditt sökande. Exempelvis är det viktigt att du försöker förstå varför vissa ansökningar inte varit framgångsrika, och kommer fram till vad du kan behöva ändra på för att öka dina möjligheter att få ett jobb.

Att skriva ett informativt cv och ett genomtänkt personligt brev kan vara avgörande för chansen att bli kallad till en jobbintervju. Lägg därför tid på att gå igenom dina ansökningshandlingar. För att få ett jobberbjudande behöver du även förbereda dig noggrant inför alla jobbintervjuer. På vår hemsida beskrivs hur du förbereder dig inför en intervju:
Inför jobbintervjun

Med vänliga hälsningar,
Arbetsförmedlingen

Message 3: Controlling [147 words]

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

3.2. Autonomous

Meddelande 3: Inre drivkraft [147 words]

Hej [q1answer]

Att skriva aktivitetsrapport hjälper dig att överblicka allt du har gjort på vägen till jobb eller utbildning. Den första [q3answer] öppnar aktivitetsrapporteringen.

Vi förstår att du redan gjort mycket för att försöka nå dina mål. Att tänka igenom allt du hittills har gjort på vägen till jobb eller utbildning kan ge dig en bättre bild av vad du gör bra och hur du kan utvecklas.

Exempelvis betyder en inbjudan till en jobbintervju att din ansökan var framgångsrik. Om du däremot inte blivit inbjuden till någon jobbintervju är det viktigt att inte ta det personligt. En utebliven inbjudan är en naturlig del av jobbsökandet. Tänk också på att du alltid har en ny chans om du fortsätter att söka jobb!

Det finns många bra sätt att förbereda sig inför en jobbintervju. Om du vill får du gärna läsa våra tips:

Before an interview

Med vänliga hälsningar,
Arbetsförmedlingen

Message 3: Autonomous [152 words]

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

4. *Message 4*

4.1. Controlling

Meddelande 4: Kontrollerande [123 words]

Hej [q1answer]

Den första [q3answer] öppnar aktivitetsrapporteringen. Varje månad granskar Arbetsförmedlingen din aktivitetsrapport. Lämna därför inte felaktiga eller vilseledande uppgifter.

För att du ska ha rätt till ersättning från a-kassan eller Försäkringskassan måste du uppfylla vissa krav. Du ska till exempel vara aktiv i ditt jobbsökande och vara beredd att ta de jobb du erbjuds, även under den nuvarande krisen.

Som arbetssökande är det viktigt att du upprätthåller struktur i vardagen, engagerar dig i meningsfulla aktiviteter och umgås med personer i din närhet. Om det finns saker som försvårar ditt arbetssökande är det viktigt att du talar om det när du har kontakt med Arbetsförmedlingen.

Du kan läsa på vår hemsida om hur du kan komma vidare:
Hitta jobbet

Med vänliga hälsningar,
Arbetsförmedlingen

Message 4: Controlling [126 words]

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

4.2. Autonomous

Meddelande 4: Inre drivkraft [131 words]

Hej [q1answer]

Den första [q3answer] öppnar aktivitetsrapporteringen. Din rapport hjälper oss att förstå hur ditt jobbsökande går.

Vi på Arbetsförmedlingen vill uppmuntra dig att jobba vidare mot dina personliga mål. Det finns många saker du kan göra för att undvika stressen som ibland uppstår när man försöker hitta ett jobb. Exempelvis kan det hjälpa att bevara strukturen i vardagen, engagera sig i aktiviteter som ger mening och att söka stöd från personer i din närhet.

Vi förstår att det kan finnas saker som försvårar ditt arbetssökande under den nuvarande krisen. När du har kontakt med Arbetsförmedlingen får du gärna ta upp det med oss. Vi vill hjälpa dig att finna lösningar och se nya möjligheter.

Vår hemsida kanske kan inspirera dig när du söker jobb:
Hitta jobbet

Med vänliga hälsningar,
Arbetsförmedlingen

Message 4: Autonomous [143 words]

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

5. *Message 5*

5.1. Controlling

Meddelande 5: Kontrollerande [134 words]

Hej [q1answer]

Den första [q3answer] öppnar aktivitetsrapporteringen. Kom ihåg att lämna in din aktivitetsrapport i tid.

Det är viktigt att du försöker undvika att bli långtidsarbetslös. Vissa arbetsgivare kan tveka att anställa någon som varit arbetslös en längre tid. Att vara arbetslös länge kan därför minska dina chanser att hitta ett jobb. Därför är det viktigt att du fortsätter att söka jobb eller utbildning.

Kom ihåg att du förväntas vara aktiv i ditt jobbsökande. Du kanske också måste bredda ditt sökande och testa nya yrken. Ibland kan det vara det enda sättet att få ett jobb.

För att hitta ett jobb bör du också använda ditt nätverk (familj, vänner eller andra personer). Det är ofta avgörande eftersom många lediga jobb inte annonseras ut. Läs mer här:
Använd ditt eget nätverk

Med vänliga hälsningar,
Arbetsförmedlingen

Message 5: Controlling [140 words]

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

5.2. Autonomous

Meddelande 5: Inre drivkraft [133 words]

Hej [q1answer]

Den första [q3answer] öppnar aktivitetsrapporteringen. Dina rapporter hjälper oss att förstå hur det går för dig.

Arbetsförmedlingen vill stötta dig i ditt jobbsökande. Vi tror på din förmåga att uppnå dina mål. Vi förstår samtidigt att det ibland kan vara frustrerande att söka jobb under dessa tider. Kanske kan du hitta intressanta jobb inom yrken du inte tänkt på tidigare.

Att prata om eventuella motgångar med vänner, familj eller andra personer kan vara ett sätt att höja självförtroendet och hjälpa dig framåt.

Många arbetsgivare hör sig ofta för bland personer de känner när de vill anställa. Att prata med personer i din närhet kan därför hjälpa när du söker jobb. Ditt nätverk är större än du tror och det kan vara värt mycket!
Använd ditt eget nätverk

Med vänliga hälsningar,
Arbetsförmedlingen

Message 5: Autonomous [149 words]

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

6. Message 6

6.1. Controlling

Meddelande 6: Kontrollerande [129 words]

Hej [q1answer]

Den första [q3answer] öppnar aktivitetsrapporteringen.

Du har nu varit registrerad hos Arbetsförmedlingen i ungefär ett halvår. Under den här tiden har Arbetsförmedlingen granskat dina rapporter och följt upp hur det går för dig. Att du är aktiv i ditt arbetssökande är ett krav för att du ska få ersättning från a-kassan eller Försäkringskassan.

Det är viktigt att du tänker igenom hur du kan förbättra sättet du söker arbete på. Du kan behöva leta bland platsannonser, kontakta företag direkt eller gå vägen via bemanningsföretag. Dessutom kan du behöva bredda ditt sökande ytterligare, både när det gäller typ av yrke och var i landet jobbet finns.

Lägg tid på att gå igenom dina personliga brev. På vår hemsida hittar du mer information:
Skriv personligt brev

Med vänliga hälsningar,
Arbetsförmedlingen

Message 6: Controlling [132 words]

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

6.2. Autonomous

Meddelande 6: Inre drivkraft [124 words]

Hej [q1answer]

Den första [q3answer] öppnar aktivitetsrapporteringen. Dina tidigare rapporter har hjälpt oss att förstå hur det gått för dig under det senaste halvåret.

Vi uppmuntrar dig att fortsätta utveckla ditt arbetssökande. Att tänka igenom dina mål och hur du når dessa kan hjälpa dig att ta nästa steg i ditt jobbsökande.

Du kanske kan prova andra sätt att söka de lediga jobben. Många arbetssökande hjälps av att kontakta företag direkt eller att vända sig till bemanningsföretag. Om det passar din situation kan du också fundera på att bredda ditt sökande till fler yrken och orter. Kanske kan det öppna upp nya möjligheter.

Du kan också välja att utveckla dina personliga brev. Inspiration finns på vår hemsida:
Skriv personligt brev

Med vänliga hälsningar,
Arbetsförmedlingen

Message 6: Autonomous [135 words]

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 jobseekers 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

APPENDIX 2: The initial survey

An initial survey was sent to all individuals in the treatment groups and 50% of the control group within the first month of registration in unemployment. The initial survey was only sent from the third cohort onwards (first survey sent August 20, 2020). It aims at capturing job search intention and initial job search motivation. We first justify the construction of the questionnaire and then provide a version of it translated from Swedish to English.

- ### Job search intention.

Based on Van Hooft et al. (2005), participants' intended job search effort at the start of their employment was measured with one open-ended question: "*Approximately how many hours a week do you, on average, plan to spend on your job search?*".

This question was mainly asked as a control item to identify non-job seekers.

- ### Initial job search motivation.

Our measure of controlled and autonomous motivation is based on Veiga and Gabriel (2016) who adapted Moran et al.'s (2012) theory-based motivation scales to a job search context. For controlled motivation, external and introjected motivations are combined. For autonomous motivation, identified and intrinsic motivations are combined. Similar to 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. For instance, "because my parents want me to find a job" was replaced by "because other people want me to find a job". Moreover, items were translated to Swedish and then backtranslated to English, resulting in some more slight changes in wording (but not in meaning). In addition, for each motivation subtype, the item least fitting with our research context was dropped, based on feedback from the PES and complying with their requirements regarding survey length. Finally, two new items were added that tapped into controlled (external) motivation and were specifically adapted to our research context: "because Arbetsförmedlingen [the Swedish PES] demands it" and "because I am afraid of having my benefits cut if I do not search for a job".

Participants were asked to indicate to what extent 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*. They could also select "no opinion", which was further treated as a missing value. For external motivation, the items were "because other people want me to find a job", "because I need to start getting paid", "because Arbetsförmedlingen demands it" and "because I am afraid of having my benefits cut if I do not search for a job". For introjected motivation, the items were "because I would feel guilty if I did not search for a job" and "because I would feel ashamed if I did not find a job". The mean of these six items is used as the score for the controlled motivation variable. We will first calculate Cronbach's alpha as an indicator of internal consistency reliability. A coefficient alpha higher than or equal to .70 is generally considered acceptable (Cortina, 1993). If the coefficient alpha is lower than .70, items will be removed one by one from the scale on the basis of the "Cronbach's alpha if item deleted" statistic. Items resulting in the largest increase in alpha will be deleted first until the minimal threshold of .70 is reached. Veiga and Gabriel (2016) reported $\alpha = .84$.

For identified motivation, the items were "because my job search is important to me" and "because finding a job is important to me". For intrinsic motivation, the items were "because it is interesting to search for fitting jobs" and "because job seeking is fun". The mean of these four items is used as the score for the autonomous motivation variable. We will first calculate Cronbach's alpha as an indicator of internal consistency reliability. A coefficient alpha higher than or equal to .70 is generally considered acceptable (Cortina, 1993). If the coefficient alpha is lower than .70, items will be removed one by one from the scale on the basis of the "Cronbach's alpha if item deleted" statistic. Items resulting in the largest increase in alpha will be deleted first until the minimal threshold of .70 is reached. Veiga and Gabriel (2016) reported $\alpha = .87$.

In addition, we will conduct a confirmatory factor analysis on the remaining items of both variables together to check whether our expected two-factor model fits 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 the two latent motivation factors are allowed to co-vary. We will use two fit indices to assess how well this two-factor model fits the data: the comparative fit index (CFI) and the standardized root mean square residual (SRMR). Hu and Bentler (1998) recommend a cutoff value close to .95 for CFI and close to .08 for SRMR before one can conclude there is a relatively good fit between the hypothesized model and the observed data. If these fit criteria are not attained, we will remove items with the lowest factor loading one by one until the thresholds are met. The mean of the remaining items will be calculated and used as the score for controlled and autonomous job search motivation respectively[20].

- *The translated questionnaire (see next pages)*

[20] If these analyses lead to a different selection of items than the analyses based on the intermediate survey, we will primarily follow the results of the latter analyses as those represent an outcome variable and we prefer to use the same items for both measures.

Initial survey: Why are you searching for a job?

Approximately how many hours a week do you, on average, plan to spend on your job search?

hours

Now you will be presented with statements on what motivates you to search for a job. For each statement, select a number between 1 (completely disagree) and 5 (completely agree). You may also answer no opinion.

Part 1 of 2

Why are you searching for a job?

	1 Completely disagree	2 Mainly disagree	3 Neither agree, nor disagree	4 Mainly agree	5 Completely agree	- No opinion
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 my job search is important to me	○	○	○	○	○	○

Part 2 of 2

Why are you searching for a job?

	1 Completely disagree	2 Mainly disagree	3 Neither agree, nor disagree	4 Mainly agree	5 Completely agree	- No opinion
f. Because finding a job is important to me	○	○	○	○	○	○
g. Because it is interesting to search for fitting jobs	○	○	○	○	○	○
h. Because job seeking is fun	○	○	○	○	○	○
i. Because Arbetsförmedlingen demands it	○	○	○	○	○	○
j. Because I am afraid of having my benefits cut if I do not search for a job	○	○	○	○	○	○

Consent *

In order for your answers to be used in the study, you must check the box for consent to the personal data processing described in the appendix you received as a pdf-file attached to the survey email.

- ☐ I give my consent to the processing of personal data described in the appendix

APPENDIX 3: The intermediate survey

All participants in the treatment groups and 50% of the control group were sent a survey about 3.5 months after entry in unemployment to ask about their job search behavior (effort and quality) and job search motivation.[21] At this moment, people in the treatment groups should have received three of the six intended messages (when they were still unemployed).

The intermediate survey was sent from the first cohort onwards (first survey sent mid-September 2020). It aims at measuring the intermediate outcomes job search effort, job search quality, and job search motivation. We first justify the construction of the questionnaire and then provide a version of it translated from Swedish to English.

- Job search quality.

To assess the quality of people's job search process, we used a measure of metacognitive activities during job search developed by Turban, Stevens and Lee (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. First, experts at the PES felt that the original answering scale (1= *I never did or thought this*; 5 = *I did or thought this all the time*) might be difficult to interpret and correctly assess for several items. Therefore, and in line with some prior research (Stremersch & Van Hoye, 2020), a more common rating scale ranging from 1 = *completely disagree* to 5 = *completely agree* was used. Note that the 5-point rating scale format was retained. Second, one item – "analyzed interviews to improve subsequent performance" – was dropped, because not everybody in the target population was expected to have conducted job interviews. Third, PES experts deemed the item "developed a coherent plan to guide my job search" too abstract. Therefore, we reworded it to make it more concrete while retaining the original meaning as much as possible: "I plan when and how I search for jobs". Finally, items were translated to Swedish and then backtranslated to English, resulting in some more slight changes in wording (but not in meaning).

So, in our final revised measure, participants were asked to indicate to what extent they agree with five statements about how they plan their job search. All items were rated on a 5-point scale ranging from 1 = *completely disagree* to 5 = *completely agree*. Participants could also select "no opinion". The items were: "I set personal goals to guide my job search activities", "I plan when and how I search for jobs", "I reflect on what progress I have made in my job search", "I think about how I may improve my job search", and "I think about how best to present myself in my job applications". The mean of these five items is used as the score for the job search quality variable. We will first calculate Cronbach's alpha as an indicator of internal consistency reliability. A coefficient alpha higher than or equal to .70 is generally considered acceptable (Cortina, 1993). If the coefficient alpha is lower than .70, items will be removed one by one from the scale on the basis of the "Cronbach's alpha if item deleted" statistic. Items resulting in the largest increase in alpha will be deleted first until the minimal

[21] As mentioned in the main text, individuals who were not required to search for a job at this moment were not sent the intermediate survey.

threshold of .70 is reached. The mean of the remaining items will be calculated and used as the score for job search quality. Turban et al. (2009) reported α = .82.

- *Job search effort.*

  Based on Van Hooft et al. (2005), participants' job search effort was measured with one open-ended question: "How many hours did you approximately spend on your job search last week?".

- Intermediate job search motivation.

  The same items and analyses were used as for initial job search motivation.

- *The translated questionnaire (see next pages)*

Intermediate survey: How do you plan your job search?

For each statement below, select a number between 1 (completely disagree) and 5 (completely agree). You may also respond no opinion.

How do you plan your job search?

	1 Completely disagree	2 Mainly disagree	3 Neither agree, nor disagree	4 Mainly agree	5 Completely agree	- No opinion
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	◯	◯	◯	◯	◯	◯

How many hours did you approximately spend on your job search last week?

hours

Now you will be presented with statements on what motivates you to search for a job. For each statement, select a number between 1 (completely disagree) and 5 (completely agree). You may also answer no opinion.

Part 1 of 2

Why are you searching for a job?

	1 Completely disagree	2 Mainly disagree	3 Neither agree, nor disagree	4 Mainly agree	5 Completely agree	- No opinion
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 my job search is important to me	○	○	○	○	○	○

Part 2 of 2

Why are you searching for a job?

	1 Completely disagree	2 Mainly disagree	3 Neither agree, nor disagree	4 Mainly agree	5 Completely agree	- No opinion
f. Because finding a job is important to me	○	○	○	○	○	○
g. Because it is interesting to search for fitting jobs	○	○	○	○	○	○
h. Because job seeking is fun	○	○	○	○	○	○
i. Because Arbetsförmedlingen demands it	○	○	○	○	○	○
j. Because I am afraid of having my benefits cut if I do not search for a job	○	○	○	○	○	○

Consent *

In order for your answers to be used in the study, you must check the box for consent to the personal data processing described in the appendix you received as a pdf-file attached to the survey email.

- ☐ I give my consent to the processing of personal data described in the appendix

APPENDIX 4: The exit survey

All participants in the treatment groups and 50% of the control group are sent a short survey within 2 to 7 weeks after leaving unemployment for employment. The survey was kept short to increase response rate and to comply with PES guidelines. The exit survey was only sent from mid September 2020. It aims at measuring perceived job quality: job satisfaction, perceived fit, and stay intention. We first justify the construction of the questionnaire and then provide a version of it translated from Swedish to English.

Participants were asked to indicate to what extent 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*. Participants could also select "no opinion".

- Job satisfaction.

Participants' satisfaction with their newly found job was assessed with one item based on Cammann, Fichman, Jenkins, and Klesh (1983): "I am pleased with my job". Prior research has demonstrated the validity of one-item scales for measuring job satisfaction (Wanous, Reichers, & Hudy, 1997).

- Perceived fit.

A two-item scale based on Wanberg, Hough, and Song (2002) was used to measure participants' perceived job-organizational fit: "This is the kind of job I was looking for" and "This is the kind of workplace I was looking for". The mean of these two items is used as the score for this variable.

It is also possible to analyze these items separately, as the first item corresponds to needs-supplies fit and the second item to person-organization fit (Cable & Derue, 2002). To complement this approach, a third item was added to assess the third type of fit that is typically distinguished, demands-abilities fit: "I think my education and experience are fitting for this job" (Cable & Derue, 2002). These three types of fit have been used in job search research to assess reemployment quality (Wanberg, van Hooft, Dossinger, van Vianen, & Klehe, 2020). Prior research has demonstrated the validity of one-item scales for measuring fit perceptions (Cable & Judge, 1996).

Analyses will be conducted for the two-item scale, as well as for the three separate items.

- Stay intention.

Participants' intention to stay in their new job was measured with one item based on Colarelli (1984): "I would like to stay in this company in the future".

- *The translated questionnaire (see next pages)*

Outcome survey: Are you satisfied with your work situation?

According to our information, you have recently been registered as a job seeker at Arbetsförmedlingen. What is your work situation today?

- ◯ Full time employed
- ◯ Part time employed
- ◯ Studying (not labor market training)
- ◯ Full time job seeker
- ◯ On sick leave/parental leave
- ◯ Other

Your current employment

Now you will be presented with statements about your current employment. For each statement, select a number between 1 (completely disagree) and 5 (completely agree). You may also answer no opinion.

	1 Completely disagree	2 Mainly disagree	3 Neither agree, nor disagree	4 Mainly agree	5 Completely agree	- No opinion
a. I am pleased with my job	○	○	○	○	○	○
b. This is the kind of job I was looking for	○	○	○	○	○	○
c. This is the kind of workplace I was looking for	○	○	○	○	○	○
d. I think my education and experience are fitting for this job.	○	○	○	○	○	○
e. I would like to stay in this company in the future	○	○	○	○	○	○

Consent *

In order for your answers to be used in the study, you must check the box for consent to the personal data processing described in the appendix you received as a pdf-file attached to the survey email.

- ☐ I give my consent to the processing of personal data described in the appendix

APPENDIX 5: Timing of messages and surveys

To illustrate our procedure, we describe, as a main rule, the timing of the messages and surveys for the third cohort, as they are the first cohort to receive all surveys. The dates in other cohorts might vary slightly because we want to avoid sending messages and surveys on weekends or holidays. In addition, there might be slight variations due to technical or pragmatic reasons.

- July 20, 2020 - August 19, 2020: entry in unemployment
- August 25, 2020: initial survey sent (+ reminder a few days later); this date is as close as possible to the 20th of the month (so that everyone can be included, also those entering unemployment on the 19th), but as far as possible from the message sent at the end of the month (to avoid priming or test effects)
- August 31, 2020: first message sent to treatment conditions (if still unemployed), this date is as close as possible to the last day of each month
- September 1, 2020 – September 14, 2020: submission of first activity report required (if still unemployed)
- September 30, 2020: second message sent
- October 1, 2020 – October 14, 2020: submission of second activity report required
- October 28, 2020: third message sent
- November 1, 2020 – November 16, 2020: submission of third activity report required (The last day for submission of the report is usually the 14th. However, if the 14th is a weekend or holiday, the last day to submit the activity report is the first weekday after this.)
- November 19, 2020: intermediate survey sent (+ reminder a few days later); this survey is sent between the third and the fourth message, approximately in the middle of the month, so after about 3.5 months of unemployment; for those who have exited unemployment a combined intermediate and exit survey is sent.
- November 30, 2020: fourth message sent
- December 1, 2020 – December 15, 2020: submission of fourth activity report required (deadline extended a day due to technical issues)
- December 30, 2020: fifth message sent
- January 1, 2021 – January 14, 2021: submission of fifth activity report required
- January 28, 2021: sixth message sent
- February 1, 2021 – February 15, 2021: submission of sixth activity report required
- Exit survey is sent once each month to those exiting unemployment, so that they receive it 2 to 7 weeks (about a month) after their exit. The exit survey is sent approximately in the middle of the month.

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