

Why Is Unemployment Duration a Sorting Criterion in Hiring?*

Eva Van Belle,¹ Ralf Caers,² Marijke De Couck,³ Valentina Di Stasio,⁴ and Stijn Baert⁵

Abstract

Recent evidence from large-scale field experiments has shown that employers use job candidates' unemployment duration as a sorting criterion. In the present study, we investigate the mechanisms underlying this pattern. To this end, we conduct a lab experiment in which participants make hiring decisions concerning fictitious job candidates with diverging unemployment durations. In addition, these participants rate the job candidates on statements central to four theoretical mechanisms often related to the scarring effect of unemployment: general signalling theory, (perceived) skill loss, queuing theory, and rational herding. We use the resulting data to estimate a multiple mediation model, in which the effect of the duration of unemployment on hiring intentions is mediated by the four theories. The lower hiring chances of the long-term unemployed turn out to be dominantly driven by the perception of longer unemployment spells as a signal of lower motivation.

Keywords: unemployment scarring; signalling theory; queuing theory; rational herding.

JEL-codes: J64, J24, J23, C91.

* **Acknowledgements.** We are grateful to Nick Deschacht, David Neumark, Greet Van Hoyer, and the participants of the 3rd Royal Economic Society Symposium of Junior Researchers, the Belgian Day for Labour Economists 2017, the 4th annual conference of the International Association for Applied Econometrics, and the IZA/CREST/OECD Workshop on Recent Advances in the Economics of Discrimination for their constructive suggestions and comments that helped to improve our manuscript.

¹ **Corresponding author.** Ghent University. Sint-Pietersplein 6, 9000 Ghent, Belgium. Eva.VanBelle@UGent.be.

² KU Leuven.

³ Vrije Universiteit Brussel.

⁴ University of Oxford.

⁵ Ghent University, Research Foundation – Flanders, University of Antwerp, Université catholique de Louvain, IZA, GLO, and IMISCOE.

1. Introduction

The negative duration dependence of unemployment, that is, the observation that an individual's probability of exiting unemployment decreases the longer she/he is unemployed, is a hot topic in the fields of sociology of labour and labour economics (Biewen & Steffes, 2010; Cockx & Dejemeppe, 2005; Cockx & Picchio, 2013; Imbens & Lynch, 2006; Luijkx & Wolbers, 2009; Mooi-Reci & Ganzeboom, 2015; Plum & Ayllón, 2015; Shimer, 2008). This phenomenon also receives much attention in policy circles (OECD, 2013). This is not surprising as, firstly, the psycho-social costs related to unemployment, such as lower life satisfaction, lower self-reported health, lower job satisfaction, and higher rates of depression later in life, are found to be more severe the longer the unemployment duration (Clark, Georgellis, & Sanfey, 2001; Knabe & Rätzl, 2011). Secondly, the negative duration dependence of unemployment impedes the activation of the long-term unemployed and, as a consequence, the reduction of overall unemployment and its large costs to society (Bell & Blachflower, 2011; Eriksson & Rooth, 2014; Kroft, Lange, & Notowidigdo, 2013). However, in view of adequate policy interventions, it is crucial to fully grasp the mechanisms underlying the duration dependence of unemployment.

Recently, the most prominent economics journals published results from large-scale field experiments conducted in Sweden and the United States showing that at least part of this negative duration dependence of unemployment can be explained by employers' reluctance to hire long-term unemployed (Eriksson & Rooth, 2014; Kroft et al., 2013). In these audit studies, fictitious job applicants with a longer unemployment spell received significantly fewer job interview invitations than identical applicants with a shorter unemployment spell.¹ However, while these field experiments are convincing in terms of their clean measurement of the effect of a long unemployment spell in terms of hiring chances, they do not allow disentangling the reasons for this pattern. They show whether or not an employer invites a candidate for a job interview, but no insight is given in the

¹ Also other studies provided (often indirectly) an insight into the impact of unemployment duration on hiring chances. While some of them found pronounced negative effects of unemployment duration on callback rates, others reported no effect overall or negative effects only for certain subpopulations (Baert, De Visschere, Schoors, Vandenberghe, & Omeij, 2016; Baert & Verhaest, 2014; Farber, Silverman, & Von Wachter, 2016; Nunley, Pugh, Romero, & Seals, 2017; Oberholzer-Gee, 2008).

thought process behind this decision. Apparently, long-term unemployment is seen as a negative signal by employers, but it remains unclear what exactly is signalled by longer unemployment spells. Investigating this is the logical next step to take in this literature.

In this study, we explore the empirical importance of four theoretical mechanisms potentially underlying employers' reluctance to hire long-term unemployed. To this end, we bring the experimental design of the aforementioned audit studies by Eriksson and Rooth (2014) and Kroft et al. (2013) from the field to the lab. More concretely, we propose a state-of-the-art vignette experiment in which human resource (HR) professionals make fictitious hiring decisions with respect to job candidates with different unemployment durations. In addition, these candidates are evaluated concerning characteristics based on which they are rejected by employers according to the four theories. This allows us to measure the empirical power of these theories by estimating a multiple mediation model.

The remainder of this article is structured as follows. Section 2 gives a brief overview of the four leading theoretical explanations for employers' reluctance to hire long-term unemployed, as found in the multidisciplinary literature on this topic in the social and behavioural sciences. Section 3 describes the experiment we conducted. The experimental data is then analysed in Section 4 to test the empirical value of the theories. Section 5 concludes with some take-away messages for scholars contributing to the literature on the duration dependence of unemployment as well as for interested policy makers.

2. Theoretical Mechanisms

Theories explaining the phenomenon of negative duration dependence of unemployment are abundant in both the fields of sociology (of labour) and (labour) economics. In the present study, we focus on four widely cited theories, each offering a different explanation as to why employers may be reluctant to hire long-term unemployed: general signalling theory, (perceived) skill loss, queuing theory, and rational herding.²

² Explanations for the negative duration dependence of unemployment that are exclusively situated on the employee and institutional side are ruled out by design in our vignette experiment. One such explanation is that a long unemployment spell reduces one's motivation to search for a job. Clark et al. (2001) showed that the

Under the umbrella of signalling theory, we can bracket various models in the social and behavioural sciences, arguing that when people are confronted with limited information, they use this available information as a signal for other, unobserved factors (Arrow, 1973; Blanchard & Diamond, 1994; Eriksson & Rooth, 2014; Kroft et al., 2013; Moscarini, 1997; Spence, 1973; Vishwanath, 1989). According to this theory, long-term unemployment might in particular be perceived as a signal of lower motivation (Luijkx & Wolbers, 2009) or lower intellectual and social capabilities (Vishwanath, 1989), both of which are negatively associated with productivity.

Skill loss or skill depreciation theory was first described by Becker (1962; 1994). Crucial in this theory is that it is costly for the unemployed to maintain their skill level during the stretch of unemployment (Acemoglu, 1995; Mincer & Ofek, 1982). Edin and Gustavsson (2008) provided empirical evidence for this human capital depreciation while out of work: in their study in Sweden, a year-long spell of unemployment was associated with a 5-percentile move down the skill distribution. Moreover, employers cannot detect the genuine skill depreciation of a (long-term) unemployed applicant. As shown by Acemoglu (1995), these two observations may result in an inefficient equilibrium in which employers discriminate against the long-term unemployed (and in which the unemployed do not invest to maintain their skill level).

Queuing theory (Thurow, 1975) suggests that employers rank all job candidates by their (perceived) trainability, with the person they believe will be easiest to train holding the first position in the queue and the person they perceive as the least trainable holding the last. Subsequently, employers decide on a cut-off and only the individuals above the cut-off are invited for a job interview. Because employers, again, do not possess full information, they have to use the limited information available to assess a job applicant's trainability (Di Stasio, 2014). If employers believe unemployment has a negative effect on trainability, people with a longer unemployment spell will be ranked lower in the labour queue and, as a

unemployed can become indifferent to the prospect of becoming employed after a lengthy unemployment spell. In addition, Arulampalam, Booth, and Taylor (2000) argued that the long-term unemployed will reduce their reservation wage and will be more willing to accept low-quality jobs, which are more likely to be unstable. Another possible explanation on the employee side is the lack of a network experienced by the long-term unemployed (Calvó-Armengol & Jackson, 2004). Finally, Mortensen (1986) pointed towards the role of labour market institutions, stating that unemployment insurance constitutes a disincentive to search for the long-term unemployed.

consequence, have a lower chance of getting invited for a job interview.

A final theory stipulates that employers follow the behaviour of other employers when making the decision to invite someone for a job interview. This behaviour is termed rational herding (Banerjee, 1992; Bikhchandani, Hirshleifer, & Welch, 1992; Oberholzer-Gee, 2008). One such factor from which employers might infer the screening behaviour of their colleagues is job candidates' unemployment duration. If the unemployment spell is relatively long, HR professionals might conclude that other employers have found the candidate's productivity to be low. Following this theory, a long unemployment spell might thus also lead to the conclusion that it is unprofitable to hire the candidate.

The last three theories are in fact broad sense applications of signalling theory. Indeed, apart from the direct signals of unemployment mentioned, higher unemployment durations might signal skill loss, lower trainability, and rejections by other employers. In other words, in all of the above-mentioned mechanisms, the role of the employer's perceptions is crucial.

To make sure that, given our selection of theoretical models, we were not omitting important potential mechanisms, we conducted interviews with three HR professionals.³ Over the course of the interviews, we asked these HR professionals whether they would hire a person with a long unemployment spell and, if not, which reasons they voiced for this decision. Independently, all the HR professionals linked long-term unemployment to lower motivation and/or a signal of fewer hard or soft skills. Related to skill loss theory, the fact that the workplace goes through quick technological changes over the course of an unemployment spell was also cited multiple times. In a second step, we discussed with the interviewees the four theoretical mechanisms we selected for the present research. More concretely, we asked them whether any of these mechanisms had ever driven their hiring decisions in practice. The HR professionals evaluated all of the theoretical mechanisms listed above as being relevant in practice.

We are not aware of previous studies comparing the empirical power of these theories in explaining the lower hiring chances of long-term unemployed. However, as mentioned in the introduction, we believe that examining exactly why unemployment duration is a sorting criterion in hiring is the logical next step to take in the multidisciplinary literature on the

³ An extensive report of these interviews is available on request.

duration dependence of unemployment. Moreover, we believe this is also relevant from a policy perspective. If the unemployed (and the people who guide them) are made aware of the (mis)perceptions about them standing in the way of their employment opportunities, they may attempt to compensate for these perceptions (for instance, by underlining relevant personal characteristics and attainments in their résumé and/or taking action to prevent skill loss).

3. Experiment

In order to not only determine whether job candidates' unemployment duration affects their hiring chances, as former studies did, but also gain an insight into the thought process leading to this pattern, we conducted a vignette study. Vignette studies are based on the factorial survey method (Auspurg & Hinz, 2014; Rossi & Nock, 1982) and are commonly used to study human judgements (Jasso, 2006). While used intensively by psychologists during the last two decades, vignettes have also recently been employed in studies published in the most prominent journals in sociology and economics (Ambuehl & Ockenfels, 2017; Auspurg, Hinz, & Sauer, 2017; Eriksson & Kristensen, 2014; Mathew, 2017; Rivera & Tilcsik, 2016). Across fields, this method has been increasingly used to study dynamics in hiring decisions (Auer, Bonoli, Fossati, & Liechti, 2016; Damelang & Abraham, 2016; Di Stasio, 2014; Di Stasio & Gërxhani, 2015; Liechti, Fossati, Bonoli, & Auer, 2017; McDonald, 2017; Van Hove & Lievens, 2003).

Each participant in a vignette experiment is asked to judge several short hypothetical descriptions of situations or individuals described on vignettes, whose characteristics (or factors) vary randomly or systematically over a defined number of categories (or levels; Sauer, Auspurg, Hinz, & Liebig, 2011). As a consequence, correlations between the vignette factors are minimised to a value close to zero (Rossi & Nock, 1982). This orthogonal design allows a causal interpretation of the effects of the vignette factors on participants' judgements (Damelang & Abraham, 2016; Wallander, 2009). When vignette experiments are employed to study hiring decisions, the vignette factors are characteristics of fictitious job applicants who are evaluated by the participants of the experiment. The simultaneous manipulation of different applicant characteristics closely resembles the multidimensional

nature of selection decisions in the field, as in practice employers (and their HR professionals) also compare candidates who vary in a number of characteristics, such as gender, level of education, and employment history.

In what follows, we first discuss the design of our vignettes and then describe the data-gathering process. The research limitations inherent in our experimental design are discussed in Section 5.

3.1. Vignette Design

We asked the sample of HR professionals described in the following subsection to evaluate a set of five vignettes describing each a fictitious job applicant. The job applicants varied in five factors.⁴ These vignette factors are presented in Table 1. The vignette factor of main interest for our study is the unemployment duration, operationalised as the number of months a candidate reported to have been unemployed prior to the job application. In line with Kroft et al. (2013), this number could take on any integer from 1 to 36 (resulting in 36 vignette levels for this factor). By means of this flexible approach, we did not have to make any prior judgement on the time-pattern of unemployment scarring. As can be seen from Table 1, the fictitious candidates within our experiment also differed in gender (male or female), highest degree obtained (secondary education degree or bachelor's degree), work experience (two years or five years), and whether they mentioned social activities (none or volunteering activities).

< Table 1 about here >

The five vignette factors used were chosen on the basis of our literature review and tested over the course of the aforementioned explorative interviews we conducted with HR professionals. We also ran a pilot study with 30 master's students in economics to assess whether our vignettes were perceived as plausible, which reassured us that no crucial information was omitted.

⁴ In the methodological literature on vignette experiments (Sauer et al., 2011), five is the lower bound suggested for the number of factors to vary in each vignette. We decided to stick to this minimum to limit respondents' fatigue, taking into account the relatively large number of judgements we asked them to make (see Section 3.2).

After fully crossing all the vignette levels for the five factors, we obtained a vignette universe of 576 (i.e. $36 \times 2 \times 2 \times 2 \times 2$) vignettes. In principle, we could have randomly assigned five out of these 576 vignettes to each participant. However, we used a D-efficient randomisation to minimise correlations between the vignette factors in our experimental data. More concretely, following the algorithm in Auspurg and Hinz (2014), we selected 60 particular sets of five vignettes and, as a consequence, achieved a D-efficiency of 99.820. These 60 sets were alternately assigned to the participants. The resulting correlations among the vignette factors in our data are shown in Table A1 (in Appendix A).

3.2. Data Collection

Our vignette experiment was integrated into a large-scale web-based survey sent to a total of 89,847 individuals living in Flanders, the northern Dutch-speaking region of Belgium, in January 2017. These individuals indicated to one of this study's co-authors being interested in (participating in) research on human resource management. In the first question, each individual was asked whether she/he had been involved in evaluating job candidates for a minimum of five vacancies over the last year. As we wanted to conduct our experiment with HR professionals only, the answer to this question determined whether or not a person was eligible to take part in our experiment. If this first question was answered positively, she/he was assigned with a chance of 0.50 to our experiment (and with a similar chance to another one). Otherwise, she/he was referred to a regular, policy-oriented survey on burn-out. A total of 10,488 individuals answered this first question, giving us an overall response rate of about 12%. Out of these respondents, 242 of those who indicated being actively involved in the hiring process a minimum of five times over the last year completed our experiment.⁵ Twenty-three among them left one or more questions unanswered, leaving us with a final sample of 219 participants with complete responses. As they each rated five vignettes, the number of (participant x vignette) observations is 1,095.

Participants first received experimental instructions. At the beginning of the web-based survey, they were introduced to their role as employer at a fictitious company selling

⁵ In addition, another 234 of those who indicated being actively involved in the hiring process a minimum of five times over the last year completed a different experiment.

building materials. This company was in search of a new counter assistant.⁶ Participants were informed that this counter assistant should be (i) customer oriented, (ii) service minded, and (iii) commercially oriented. In addition, the assistant was expected to be efficient and reliable in managing administrative tasks. Subsequently, participants were shown the vignettes describing five fictitious candidates (as discussed in the previous subsection). It was stressed that these candidates were formally qualified for the job. Following the literature, information about the candidates was presented in a tabulated way. Participants were not informed about the goal of the experiment.

After this, participants were asked to indicate, for each candidate, their intention to hire this candidate by rating the statements “The probability that I will invite this candidate for a job interview is high” and “The probability that I will hire this candidate for the position is high” on a 7-point Likert scale. In the remainder of this article, we will refer to these items as the “interview scale” and the “hiring scale”, respectively.

Then, in view of investigating the mechanisms underlying the relationship between unemployment duration and hiring chances, participants were additionally prompted to rate eight statements for each candidate, linked to the four theories described in Section 2, on a 7-point Likert scale. These statements are reported, theory by theory, in Table 2.

< Table 2 about here >

Firstly, we included three statements to test (general) signalling theory. In line with our discussion in Section 2, participants were asked whether they thought the candidate was sufficiently motivated (statement 1) and had a high enough level of intellectual ability (statement 2) and social ability (statement 3) to properly perform the job. Secondly, three statements tested for perceived skill loss of the candidate. Inspired by the interviews with HR professionals mentioned in Section 2, the candidate was scored with respect to being up to date with technologies (statement 4). In addition, perceived deterioration in general skills (statement 5) and social skills (statement 6) were scored. Thirdly, closely linked to queuing theory, the participants were asked to rate the candidate’s trainability (statement 7). Fourthly, participants judged whether the candidate had, in their perception, been rejected often by other employers (statement 8), which is the explanation for the negative duration

⁶ We discuss the research limitations related to these choices in Section 5.

dependence of unemployment put forward by rational herding theory.

In the mediation model presented below, we include four mediators, one for each theory, based on these eight statements. The first mediator, the signalling scale, groups statements 1 to 3 (Cronbach's alpha for internal consistency: $\alpha = 0.763$). Its value is, for each observation, computed as the average over these three statements. The second mediator, the skill loss scale, is made up of the scores of statements 4 to 6 ($\alpha = 0.716$). The scores of statement 4 were reverse scored (so that a higher score became consistent with higher perceived skill loss also for this statement) before grouping the three statements for this scale. The third mediator, the trainability scale, reflects the score of statement 7. The fourth and final mediator, the rational herding scale, is fully determined by the score of statement 8.⁷

After judging the five job candidates, participants were asked to provide some personal information, including their gender (male or female), nationality (native or foreign), level of education (secondary education or lower, tertiary education outside university, or tertiary education at university), frequency of taking hiring decisions (less than weekly or at least weekly) and experience as an HR professional (less than 10 years or more than 10 years).

Table 3 reports the distribution of our participants according to the unemployment duration of the candidates they judged. This table shows that our randomisation was successful. For instance, as shown in Panel A, the subsample of vignettes disclosing 3 months of unemployment or fewer and the subsample of vignettes disclosing more than 3 months of unemployment were scored by participants with comparable characteristics. Overall, about 57% of our participants were female. They were mainly highly educated (almost 90% had completed some form of tertiary education), with an average age of about 42 and an average of around 10 years of experience as an HR professional.

< Table 3 about here >

⁷ Factor analysis yielded the same number (i.e. four) of scales with a comparable composition.

4. Results

We estimate a multiple mediation model (Baron & Kenny, 1986; Hayes, 2013) to analyse the total effect of unemployment duration on hiring chances as well as the part of this effect passing through the four mediators related to the four theoretical mechanisms discussed in Section 2. A simplified version of the estimated model is depicted in Figure 1.

< Figure 1 about here >

In a first step (presented in Section 4.1), we estimate the total effect of the unemployment duration of our fictitious job candidates on the hiring intentions of the HR professionals who participated in the experiment. Thereby, we mimic what was done in the field by Eriksson and Rooth (2014) and Kroft et al. (2013). Subsequently, we explore the mediation effects related to the signalling scale, skill loss scale, trainability scale, and rational herding scale, as introduced in Section 3.2. Each mediation effect is calculated as the product of the effect of unemployment duration on the respective mediation scale and the effect of this scale on the outcome scale (i.e. $\delta_i \theta_i$, with i ranging from 1 to 4, in Figure 1). In Section 4.2 we explore the mediation effects separately and in Section 4.3 we estimate the complete mediation model, in which the mediation scales are included jointly. The latter model allows us to decompose the total effect discussed in Section 4.1 into four “indirect” effects via the mediators and a remaining “direct” effect δ' (so that the total effect δ equates $\delta' + \sum_{i=1}^4 \delta_i \theta_i$).

4.1. Unemployment Duration and Hiring Chances

To get a first impression of the (total) effect of the candidates’ unemployment duration on their hiring chances, we plot the average scores on the interview scale of the 1,095 evaluated vignettes by the unemployment duration they mentioned. As is clear from Figure 2, the likeliness of getting invited for an interview exhibits a clear downward trend as the unemployment duration increases.⁸

⁸ The same pattern is seen when the average value on the hiring scale by the candidates’ unemployment duration is plotted.

< Figure 2 about here >

However, due to the relatively low number of observations for each potential unemployment duration,⁹ Figure 2 captures some noise. Therefore, a clearer picture of the total effect is presented in Table 4. In this table, we divide the pool of evaluated candidates by their unemployment duration by analogy with what we did in Table 3 and look at these subsamples' average scores on the interview scale and hiring scale. More concretely, we compare the outcome scales for candidates with an unemployment spell of 3 months or fewer to the outcome scales for candidates with an unemployment spell of more than 3 months (Panel A), and repeat this with 12 months (Panel B) and 24 months (Panel C) as cut-off points. A t-test is used to determine whether the differences in means between these subsamples are significantly different from 0. With respect to the calculation of these t-statistics, it is important to account for the nested structure of data collected through a vignette experiment, with multiple vignettes judged by the same participant (Jasso, 2006). To this end, we take into account the dependence of the error term within participants by clustering all estimated t-values at the participant level.

< Table 4 about here >

As shown in Table 4, the probability of getting invited for a job interview is always significantly higher for candidates belonging to a subsample with a shorter unemployment spell compared to candidates belonging to a subsample with a longer unemployment spell, regardless of the chosen cut-off for the unemployment duration. For instance, the average score on the interview scale for those with an unemployment duration of 3 months or fewer is 5.515 (i.e. just between an evaluation of “somewhat agree” and “agree” with respect to the statement “The probability that I will invite this candidate for a job interview is high”) while it is 4.050 (i.e. close to “neither agree or disagree”) for those with an unemployment duration of more than 3 months. A similar pattern is found for the probability that a candidate is hired for the position. Again, candidates with a shorter unemployment spell have a significantly higher probability of being hired than candidates with a longer unemployment spell.

As stressed in Section 3.1, all factors on which candidates could differ, are, by design,

⁹ On average, about 30 ($\approx 1,095/36$) observations for each duration.

orthogonal to one another. Therefore, the candidates with a longer unemployment spell are (on average) equal to the candidates with a shorter unemployment spell on all vignette factors observed by the participants other than their unemployment duration. As a consequence, the measured differences in hiring intentions presented in Table 4 can only be driven by differences in unemployment duration. So, in line with Eriksson and Rooth (2014) and Kroft et al. (2013), our experiment provides evidence for a clear scarring effect of long-term unemployment related to employer preferences.

4.2. Exploration of the Mediation Effects

As mentioned above, a significant role for the mediation scales in explaining the negative relationship between unemployment duration and hiring chances is conditional on two things. Firstly, candidates' unemployment duration should affect the mediation scales (left part of Figure 1). Secondly, these mediation scales should affect participants' hiring intentions (right part of Figure 2). In this subsection, we explore both conditions for each mediator separately.

To get a first idea of the effect of unemployment duration on the four mediation scales, we examine the candidates' scores for these scales by their unemployment duration. In addition to the aggregated scores at the mediation scale level, we present the scores on the individual statements. The results of this exercise are reported in Table 5.

< Table 5 about here >

As Table 5 shows, the unemployment duration has a significant effect on all four mediators. Candidates with a longer spell of unemployment score significantly lower on the "positive" mediators (signalling and trainability), while they score significantly higher on the "negative" mediators (skill loss and rational herding). When we look at the individual statements, it is apparent that the subsample means differ highly significantly for all statements in the expected direction.

As a last step prior to discussing our full multiple mediation model, in which we investigate the independent mediation effects, we also check that a positive evaluation with respect to the mediation scales is correlated with higher hiring intentions. To this end, we calculate correlations between the mediation scales (and their underlying statements) and

the interview and hiring scales. A correlation matrix can be found in Table A2 (in Appendix A). Here we suffice with reporting that all correlations are significantly different from 0 and have the expected sign.

4.3. Multiple Mediation Regression Model

Finally, we estimate a multiple mediation regression model in which all four mediators are included jointly. The estimated model consists of the following system of linear regression equations (by analogy with Hayes (2013)):

$$M_1 = \alpha_{M_1} + \beta_{M_1}CC + \gamma_{M_1}PC + \delta_1UD + \varepsilon_{M_1}; \quad (1)$$

$$M_2 = \alpha_{M_2} + \beta_{M_2}CC + \gamma_{M_2}PC + \delta_2UD + \varepsilon_{M_2}; \quad (2)$$

$$M_3 = \alpha_{M_3} + \beta_{M_3}CC + \gamma_{M_3}PC + \delta_3UD + \varepsilon_{M_3}; \quad (3)$$

$$M_4 = \alpha_{M_4} + \beta_{M_4}CC + \gamma_{M_4}PC + \delta_4UD + \varepsilon_{M_4}; \quad (4)$$

$$Y = \alpha_Y + \beta_YCC + \gamma_YPC + \delta'UD + \theta_1M_1 + \theta_2M_2 + \theta_3M_3 + \theta_4M_4 + \varepsilon_Y. \quad (5)$$

In these equations, M_1 , M_2 , M_3 , and M_4 are the signalling, skill loss, trainability, and rational herding mediation scales, respectively; UD is the candidate's unemployment duration; CC is the vector of other vignette factors; PC is the vector of participant characteristics included in Table 3; and Y is the interview scale or hiring scale. β_{M_i} , γ_{M_i} , and δ_i are the (vectors of) parameters associated with CC , PC , and UD in the equations with M_i as dependent variable, and α_{M_i} represents the intercept in these equations. β_Y , γ_Y , δ' , and α_Y are the corresponding parameters in the equation with Y as dependent variable. Finally, θ_1 , θ_2 , θ_3 , and θ_4 are the parameters associated with the mediator scales in the latter equation. As a consequence, δ' is the remaining direct effect of the unemployment duration after controlling for the mediators. However, our main interest lies in the products $\delta_i\theta_i$, namely the indirect effects of the unemployment duration on Y through each mediator M_i . In line with Hayes (2013), we estimate equations (1) to (5) simultaneously and correct the standard errors ε_{M_1} , ε_{M_2} , ε_{M_3} , ε_{M_4} , and ε_Y for clustering of the observations at the participant level.

The main results of our mediation analysis with the interview scale (hiring scale) as the Y -variable are depicted in Figure 1 (Figure A1). The corresponding full estimation results are

reported in Table 6 and Table A3 (in Appendix A).

The total effect of unemployment duration on the interview scale ($\delta = -0.062$; $p = 0.000$) is in line with what was reported in Section 4.1. One additional month of unemployment decreases the interview scale by 0.062 (i.e. about one sixteenth of a unit decrease on this scale ranging from 1 to 7). As mentioned, by means of our mediation regression model, this total effect can be broken down into one direct effect and four indirect effects (one for each mediator). The direct effect, which can be interpreted as the part of the total effect that does not pass through any of the four mediators, is substantial ($\delta' = -0.026$; $p = 0.000$). It accounts for 41.9% (i.e. 0.026 divided by 0.062) of the total effect, while all mediation effects together account for the remaining 58.1%.

Next, we investigate the relative importance of the four mediators. On the one hand, unemployment duration significantly affects all four mediation scales. The signs of these effects are in line with our discussion in Section 4.2. On the other hand, three of the mediation scales—the signalling scale ($\theta_1 = 0.851$; $p = 0.000$), the trainability scale ($\theta_3 = 0.106$; $p = 0.041$), and the rational herding scale ($\theta_4 = -0.117$; $p = 0.001$)—appear to significantly influence the interview probability. Multiplying the first set of coefficients by the second set yields the mediation effects. As expected, we find three significant mediation effects.¹⁰ Firstly, the effect of the unemployment duration on the interview outcome is highly significantly mediated by the signalling scale ($\delta_1\theta_1 = -0.025$, i.e. the product of -0.029 and 0.851 ; $p = 0.000$). This mediation effect accounts for 38.7% of the total effect. In addition, we find a smaller—but still highly significant—mediation via rational herding ($\delta_4\theta_4 = -0.005$; $p = 0.003$) and a small mediation via perceived trainability ($\delta_3\theta_3 = -0.004$; $p = 0.048$). No significant mediation via perceived skill loss is found. In other words, employers seem to believe that unemployment duration correlates with fixed (unobservable) employee characteristics rather than that the unemployment spell causes skills to deteriorate. We return to the relative weights of the three statements underlying the signalling scale below.

< Table 6 about here >

The total, direct, and indirect effects of unemployment duration on the hiring scale are

¹⁰ The confidence intervals for the mediation effects are based on 10,000 bootstrap samples.

similar to what is found with respect to the interview scale. We can conclude that the majority of the total effect ($\delta = -0.054$; $p = 0.000$) of unemployment duration on hiring chances is explained by a direct effect ($\delta' = -0.021$; $p = 0.000$) and an indirect effect through signalling ($\delta_1\theta_1 = -0.021$; $p = 0.000$). Each account for about 38.9% of the total effect. What remains can be attributed to relatively small indirect effects through the three remaining mediators: perceived skill loss ($\delta_2\theta_2 = -0.003$; $p = 0.030$), perceived trainability ($\delta_3\theta_3 = -0.003$; $p = 0.020$), and rational herding ($\delta_4\theta_4 = -0.006$; $p = 0.001$).

We briefly discuss some secondary results reported in Panel B and Panel C of both Table 6 and Table A3. Firstly, we can see that being female positively affects both the likeliness of interview invitation and the likeliness of getting hired in a direct way. In addition, being female positively influences the signalling scale, but it does not have a significant impact on any of the other scales. Secondly, and in line with our expectations, having a bachelor's degree affects the mediation scales in the opposite direction as unemployment duration: it is positively associated with the signalling and trainability scales and negatively associated with the skill loss and rational herding scales. Thirdly, having five years of professional experience (as opposed to two years) has the expected positive effect on the signalling scale and negative effect on the skill loss scale, while it does not significantly impact the trainability and rational herding scales. Fourthly, whether or not a candidate mentions volunteering in her/his résumé significantly impacts the signalling, skill loss, and trainability scales, with the expected signs, but there is no significant effect on the rational herding scale. Fifthly, when focussing on the participants' characteristics (Panel B), we observe that female HR professionals give significantly lower scores on the rational herding scale. In addition, we see that being older and having a tertiary education outside of university (compared to having a tertiary education degree from university) as a participant is associated with more lenient ratings on the four scales. However, the associations based on Panel B cannot be given a causal interpretation as the measured participant characteristics may correlate with unmeasured determinants of our participants' judgements.

To get a picture of the relative weights of the individual statements in the results reported in Table 6 and Table A3, we re-estimate our mediation model for both dependent variables including eight mediators, one for each of the individual statements mentioned in Table 2, instead of the four mediation scales. Estimation results are given in Table A4 and

Table A5 (both in Appendix A). These results indicate that the dominant mediation through the signalling scale is mainly driven by a long unemployment spell being viewed as a signal of lower motivation. Moreover, the results in Table A4 and Table A5 suggest that there is some evidence for an indirect effect through the “not up to date with technologies” statement. This did not translate into a significant effect of the overall skill loss scale in our benchmark mediation model because of the (insignificant) opposite effect of the statements capturing general skill loss and/or social skill loss.

5. Discussion

This study contributed to the scientific literature on unemployment in general and the multidisciplinary literature on the negative duration dependence of unemployment in particular. It complemented the recent large-scale field experiments showing that at least part of this negative duration dependence can be explained by employers’ reluctance to hire long-term unemployed. By means of transposing these experiments to a lab setting, we provided further evidence for a substantial scarring effect of long-term unemployment related to employer preferences and perceptions. More importantly, our vignette experiment allowed us to take the logical next step in this literature by empirically testing four leading theoretical explanations for unemployment scarring. Our analyses provided evidence that employers’ reluctance to hire long-term unemployed is to a large extent mediated by their perception of unemployment as signalling lower intellectual and social capabilities and, in particular, lower motivation. After controlling for this explanation, a smaller fraction of the total effect of unemployment duration on hiring intentions turned out to be associated with rational herding, that is, the belief that other employers found the candidate’s productivity to be low. An even smaller (and, depending on the specification, sometimes insignificant) mediating role was found for the two alternative mechanisms: perceived skill loss and queuing based on perceived trainability.

From a policy point of view, our findings show that long-term unemployed might benefit from including as many relevant details as possible regarding their motivation in their job applications. We believe that the focus in this respect should be on work motivation and not on general (social) motivation because an additional mediation analysis with interaction

variables showed that the effect of unemployment duration on hiring chances was not moderated by engagement as a volunteer.¹¹ Furthermore, the strong support for signalling theory in this study strengthens the argument raised by Kroft et al. (2013) that the optimal design of labour market policies should take into account the role of asymmetric information and social learning. These aspects have been largely neglected up to the present in policy design (Baily, 1978; Chetty, 2008; Gruber, 1997) but are clearly important.

We end this article by acknowledging limitations inherent to our experiment and briefly highlighting related directions for further research. First we elaborate on limitations related to the artificial nature of our setting and then we discuss limitations with respect to the generalisability of our findings.

Contrary to field experiments, the data collection within a vignette experiment does not take place under real-life circumstances. Instead, participants are aware that they are taking part in an experiment. Although this is an advantage from a research-ethical point of view (Charness, Gneezy, & Kuhn, 2013; Damelang & Abraham, 2016; Riach & Rich, 2004) participants may answer differently—in particular, in a socially desirable way—when not exposed to the urgency of real-life decision-making. While this is considered a serious issue for direct question-based surveys (Auspurg & Hinz, 2014; Pager & Quillian, 2005), we believe this to be less of a concern in vignette experiments in general, and in our design in particular, for a number of reasons. Firstly, in general, the widespread use of vignette studies in the social and behavioural sciences is related to the fact that self-reported measures of perceptions have been shown to correlate highly with actual behaviour and that changes in intentions clearly result in actual behavioural changes. Moreover, a vignette experiment addresses some limitations of other experimental approaches, which have been criticised for making too much abstraction of real-life situations. A vignette experiment allows both the realistic setting exemplified by the scenario and the survey aspect to be combined, which is necessary to get an insight into thought processes (Baert, in press; Baert & De Pauw, 2014; Colquitt, 2008; De Dreu, Evers, Beersma, Kluwer, & Nauta, 2001; Mook, 1983; Shadish, Cook, & Campbell, 2002; Van Hove & Lievens, 2003; Webb & Sheeran, 2006). Important, however, as shown by a recent validation study, is that the appropriate population is targeted for

¹¹ The results of this analysis are available on request.

participation (Hainmueller, Hangartner, & Yamamoto, 2015), which is the case in our setting, with HR professionals as participants. Secondly, with respect to potential bias by answering in a socially desirable way, an important feature of a vignette experiment is that each participant is only shown a small number of vignettes that vary with regard to multiple factors. As a result, every participant only sees a fraction of the set of possible profiles, and therefore it is almost impossible for the participant to know what the social desirable answer is (Auspurg, Hinz, Liebig, & Sauer, 2014; Liechti et al., 2017; Mutz, 2011). For instance, vignette experiments have been able to identify labour market discrimination in the past, even when used to investigate socially sensitive topics such unequal treatment based on gender or race (Auspurg & Hinz, 2014). In this respect, the reader should also note that the factor of interest in our study (unemployment duration) is less sensitive than, for example, race and, as a consequence, socially desirable answers are expected to be negligible in our experiment. Moreover, it is reassuring that the majority of the participants in our pilot study could not pinpoint at all the aim of the experiment. Thirdly, the main aim of this study is not to causally investigate the relationship between unemployment duration and hiring chances, but to shed light on the underlying explanations for this previously established relationship. As a consequence, even if the total effect of unemployment duration was somewhat over- or underestimated due to the artificial nature of our experiment, this should not have translated into a bias in our main results. In addition, since we focussed on the significance of the mediators and their relative size, and not on the absolute value of the mediation effects, a potential (small and similar) overestimation of these effects due to the relatively limited information on which the participants judged job candidates would not undermine our contribution. Nevertheless, we are in favour of future research investigating the mechanisms underlying unemployment scarring that employs alternative research strategies. For instance, semi-structured interviews with employers and/or employees could deepen the insights from our study. In addition, research that combines testing in the field with post-experimental surveys or psychological tests in the manner of Rooth (2010) seems to be fruitful.

With respect to the generalisability of our findings, our approach is subject to the same limitations as those found in the field experiments we mimicked. We only measured unequal treatment based on unemployment duration towards individuals with a specific profile (two or five years of experience, with a secondary education degree or a bachelor's degree)

applying for a specific position. As a consequence, the results of our study cannot be easily generalised to settings with jobs and candidate profiles different from those used in our experiment. It is possible that the stigma of unemployment is more or less present in settings other than those covered. However, one should again keep in mind that the contribution of this study lies in its exploration of the (relative) empirical importance of mechanisms underlying the duration dependence of unemployment and not in the measurement of the absolute value of the overall treatment effect of unemployment duration or the absolute value of the mediation effects. Still, it is not unthinkable that the relative value of some signals related to unemployment (i.e. the θ_i of our mediation model) differs by professional context. For instance, the value of social capabilities could be lower in occupations without (much) contact with customers or co-workers. On the other hand, we have no reason to believe that the relative weight of the perceptions of long-term unemployment we were able to identify (i.e. our δ_i) should be different in other contexts. Nevertheless, further research is necessary to ensure the robustness of our results in other settings.

References

- Acemoglu, D. (1995). Public policy in a model of long-term unemployment. *Economica*, 246, 161–178.
- Ambuehl, S., & Ockenfels, A. (2017). The ethics of incentivizing the uninformed: A vignette study. *American Economic Review*, 107, 91–95.
- Arrow, K. J. (1973). The theory of discrimination. In O. Ashenfelter & A. Rees (Eds.), *Discrimination in labor markets*. Princeton: Princeton University Press.
- Arulampalam, W., Booth, A. L., & Taylor, M. P. (2000). Unemployment persistence. *Oxford Economic Papers*, 52, 24–50.
- Auer, D., Bonoli, G., Fossati, F., & Liechti, F. (2016). *The matching hierarchies model: Evidence from a survey experiment on employers' hiring intent of immigrant applicants*. Unpublished manuscript.
- Auspurg, K., & Hinz, T. (2014). *Factorial survey experiments*. Thousand Oaks: Sage.

- Auspurg, K., Hinz, T., Liebig, S., & Sauer, C. (2014). The factorial survey as a method for measuring sensitive issues. In U. Engel, B. Jann, P. Lynn, A. Scherpenzeel, & P. Sturgis (Eds.), *Improving survey methods: Lessons from recent research*. New York: Routledge.
- Auspurg, K., Hinz, T., & Sauer, C. (2017). Why should women get less? Evidence on the gender pay gap from multifactorial survey experiments. *American Sociological Review*, 82, 179–210.
- Baert, S. (in press). Hiring a gay man, taking a risk? A lab experiment on employment discrimination and risk-aversion. *Journal of Homosexuality*.
- Baert, S., & De Pauw, A.-S. (2014). Is ethnic discrimination due to distaste or statistics? *Economics Letters*, 125, 270–273.
- Baert, S., De Visschere, S., Schoors, K., Vandenberghe, D., & Omeij, E. (2016). First depressed, then discriminated against? *Social Science & Medicine*, 170, 247–254.
- Baert, S., & Verhaest, D. (2014). *Unemployment or overeducation: Which is a worse signal to employers?* (IZA Discussion Papers, 8312).
- Baily, M. N. (1978). Some aspects of optimal unemployment insurance. *Journal of Public Economics*, 10, 379–402.
- Banerjee, A. (1992). A simple model of herd behavior. *Quarterly Journal of Economics*, 107, 797–817.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182.
- Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of Political Economy*, 70, 9–49.
- Becker, G. S. (1994). *Human capital: A theoretical and empirical analysis with special reference to education*. Chicago: University of Chicago Press.
- Bell, D. N., & Blanchflower, D. G. (2011). Young people and the Great Recession. *Oxford Review of Economic Policy*, 27, 241–267.
- Biewen, M., & Steffes, S. (2010). Unemployment persistence: Is there evidence for stigma

- effects? *Economics Letters*, 106, 188–190.
- Bikhchandani, S., Hirshleifer, D., & Welch, I. (1992). A theory of fads, fashion, custom and cultural change as informational cascades. *Journal of Political Economy*, 100, 992–1026.
- Blanchard, O. J., & Diamond, P. (1994). Ranking, unemployment duration, and wages. *Review of Economic Studies*, 61, 417–434.
- Calvó-Armengol, A., & Jackson, M. O. (2004). The effects of social networks on employment and inequality. *American Economic Review*, 94, 426–454.
- Charness, G., Gneezy, U., & Kuhn, M. A. (2013). Experimental methods: Extra-laboratory experiments-extending the reach of experimental economics. *Journal of Economic Behavior & Organization*, 91, 93–100.
- Chetty, R. (2008). Moral hazard versus liquidity and optimal unemployment insurance. *Journal of Political Economy*, 116, 173–234.
- Clark, A., Georgellis, Y., & Sanfey, P. (2001). Scarring: The psychological impact of past unemployment. *Economica*, 68, 221–241.
- Cockx, B., & Dejemeppe, M. (2005). Duration dependence in the exit rate out of unemployment in Belgium. Is it true or spurious? *Journal of Applied Econometrics*, 20, 1–23.
- Cockx, B., & Picchio, M. (2013). Scarring effects of remaining unemployed for long-term unemployed school-leavers. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 176, 951–980.
- Colquitt, J. A. (2008). From the editors publishing laboratory research in AMJ: A question of when, not if. *Academy of Management Journal*, 51, 616–620.
- Damelang, A., & Abraham, M. (2016). You can take some of it with you! *Zeitschrift für Soziologie*, 45, 91–106.
- De Dreu, C. K., Evers, A., Beersma, B., Kluwer, E. S., & Nauta, A. (2001). A theory-based measure of conflict management strategies in the workplace. *Journal of Organizational Behavior*, 22, 645–668.
- Di Stasio, V. (2014). Education as a signal of trainability: Results from a vignette study with

- Italian employers. *European Sociological Review*, 30, 796–809.
- Di Stasio, V., & Gërxhani, K. (2015). Employers' social contacts and their hiring behavior in a factorial survey. *Social Science Research*, 51, 93–107.
- Edin, P., & Gustavsson, M. (2008). Time out of work and skill depreciation. *ILR Review*, 61, 163–180.
- Eriksson, S., & Rooth, D. O. (2014). Do employers use unemployment as a sorting criterion when hiring? Evidence from a field experiment. *American Economic Review*, 10, 1014–1039.
- Eriksson, T., & Kristensen, N. (2014). Wages or fringes? Some evidence on trade-offs and sorting. *Journal of Labor Economics*, 32, 899–928.
- Farber, H. S., Silverman, D., & Von Wachter, T. (2016). Determinants of callbacks to job applications: An audit study. *American Economic Review*, 106, 314–318.
- Gruber, J. (1997). The consumption smoothing benefits of unemployment insurance. *American Economic Review*, 87, 192–205.
- Hainmueller, J., Hangartner, D., & Yamamoto, T. (2015). Validating vignette and conjoint survey experiments against real-world behavior. *Proceedings of the National Academy of Sciences*, 112, 2395–2400.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.
- Imbens, G. W., & Lynch, L. M. (2006). Re-employment probabilities over the business cycle. *Portuguese Economic Journal*, 5, 111–134.
- Jasso, G. (2006). Factorial survey methods for studying beliefs and judgments. *Sociological Methods & Research*, 34, 334–423.
- Knabe, A., & Rätzl, S. (2011). Scarring or scaring? The psychological impact of past unemployment and future unemployment risk. *Economica*, 78, 283–293.
- Kroft, K., Lange, F., & Notowidigdo, M. J. (2013). Duration dependence and labor market conditions: Evidence from a field experiment. *Quarterly Journal of Economics*, 128, 1123–1167.

- Liechti, F., Fossati, F., Bonoli, G., & Auer, D. (2017). The signaling value of labor market programs. *European Sociological Review*, 33, 257–274.
- Luijkx, R., & Wolbers, M. H. (2009). The effects of non-employment in early work-life on subsequent employment chances of individuals in the Netherlands. *European Sociological Review*, 25, 647–660.
- Mathew, S. (2017). How the second-order free rider problem is solved in a small-scale society. *American Economic Review*, 107, 578–581.
- McDonald, P. (2017). *Improving our understanding of employer decision-making thanks to factorial survey analysis*. (LIVES Working paper, 2017/61).
- Mincer, J., & Ofek, H. (1982). Interrupted work careers: Depreciation and restoration of human capital. *Journal of Human Resources*, 17, 3–24.
- Mooi-Reci, I., & Ganzeboom, H. B. (2015). Unemployment scarring by gender: Human capital depreciation or stigmatization? Longitudinal evidence from the Netherlands, 1980–2000. *Social Science Research*, 52, 642–658.
- Mook, D. G. (1983). In defense of external invalidity. *American Psychologist*, 38, 379–387.
- Mortensen, D. T. (1986). Job search and labor market analysis. *Handbook of Labor Economics*, 2, 849–919.
- Moscarini, G. (1997). *Unobserved heterogeneity and unemployment duration: A fallacy of composition*. Unpublished manuscript.
- Mutz, D. C. (2011). *Population-based survey experiments*. Princeton: Princeton University Press.
- Nunley, J. M., Pugh, A., Romero, N., & Seals, R. A. (2017). The effects of unemployment and underemployment on employment opportunities. Results from a correspondence audit of the labor market for college graduates. *ILR Review*, 70, 642–669.
- Oberholzer-Gee, F. (2008). Nonemployment stigma as rational herding: A field experiment. *Journal of Economic Behavior & Organization*, 65, 30–40.
- OECD. (2013). *Employment outlook 2013*. Paris: OECD.
- Pager, D., & Quillian, L. (2005). Walking the talk? What employers say versus what they

- do. *American Sociological Review*, 70, 355–380.
- Plum, A., & Ayllón, S. (2015). Heterogeneity in unemployment state dependence. *Economics Letters*, 136, 85–87.
- Riach, P., & Rich, J. (2004). Fishing for discrimination. *Review of Social Economy*, 62, 465–486.
- Rivera, L. A., & Tilcsik, A. (2016). Class advantage, commitment penalty: The gendered effect of social class signals in an elite labor market. *American Sociological Review*, 81, 1097–1131.
- Rooth, D. A. (2010). Automatic associations and discrimination in hiring: Real world evidence. *Labour Economics*, 17, 523–534.
- Rossi, P. H., & Nock, S. L. (1982). *Measuring social judgments: The factorial survey approach*. Thousand Oaks: Sage.
- Sauer, C., Auspurg, K., Hinz, T., & Liebig, S. (2011). The application of factorial surveys in general population samples: The effects of respondent age and education on response times and response consistency. *Survey Research Methods*, 5, 89–102.
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin.
- Shimer, R. (2008). The probability of finding a job. *American Economic Review*, 98, 268–273.
- Spence, M. (1973). Job market signalling. *Quarterly Journal of Economics*, 87, 355–374.
- Thurow, L. C. (1975). *Generating inequality: Mechanisms of distribution in the U.S. economy*. New York: Basic Books.
- Van Hove, G., & Lievens, F. (2003). The effects of sexual orientation on hirability ratings: An experimental study. *Journal of Business and Psychology*, 18, 15–30.
- Vishwanath, T. (1989). Job search, stigma effect, and escape rate from unemployment. *Journal of Labor Economics*, 7, 487–502.
- Wallander, L. (2009). 25 years of factorial surveys in sociology: A review. *Social Science Research*, 38, 505–520.
- Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behaviour

change? A meta-analysis of the experimental evidence. *Psychological Bulletin*, 132, 249–268.

Appendix A: Additional Figures and Tables

< Figure A1 about here >

< Table A1 about here >

< Table A2 about here >

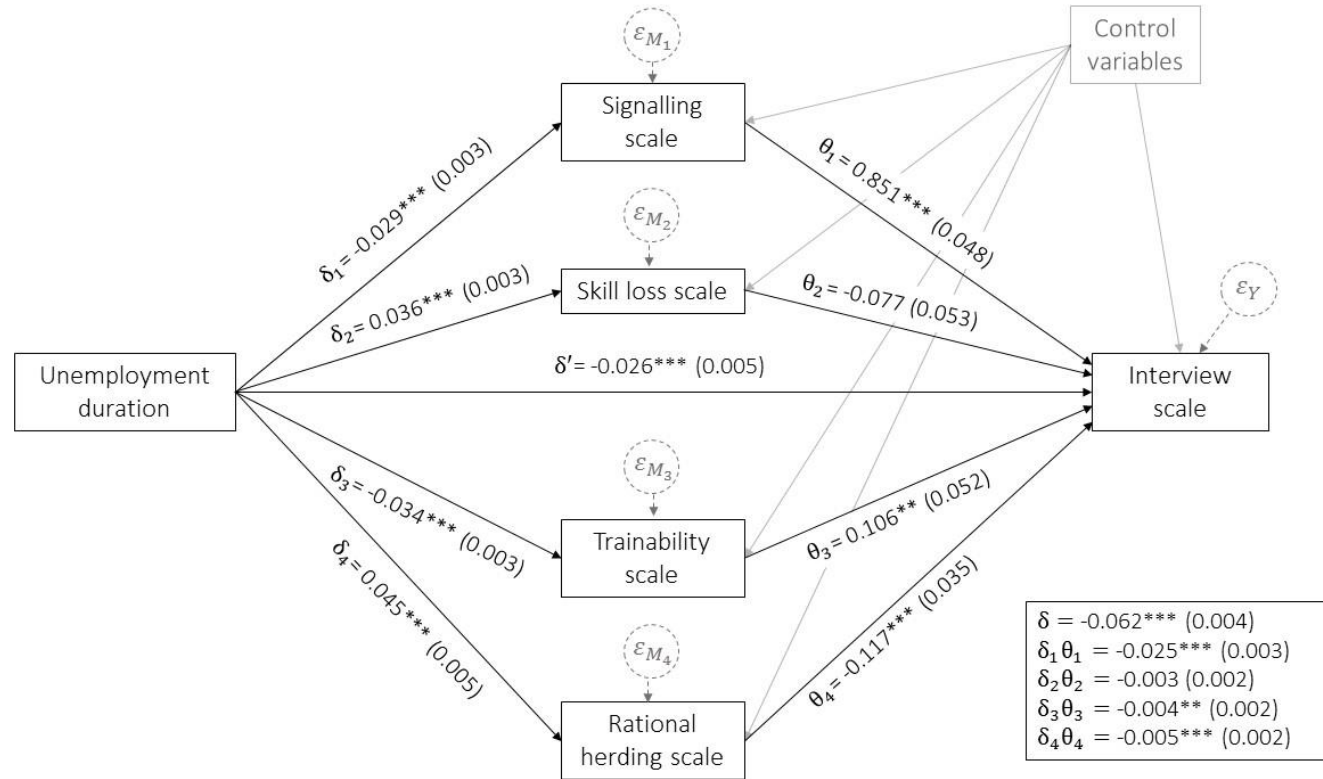
< Table A3 about here >

< Table A4 about here >

< Table A5 about here >

Figure 1.

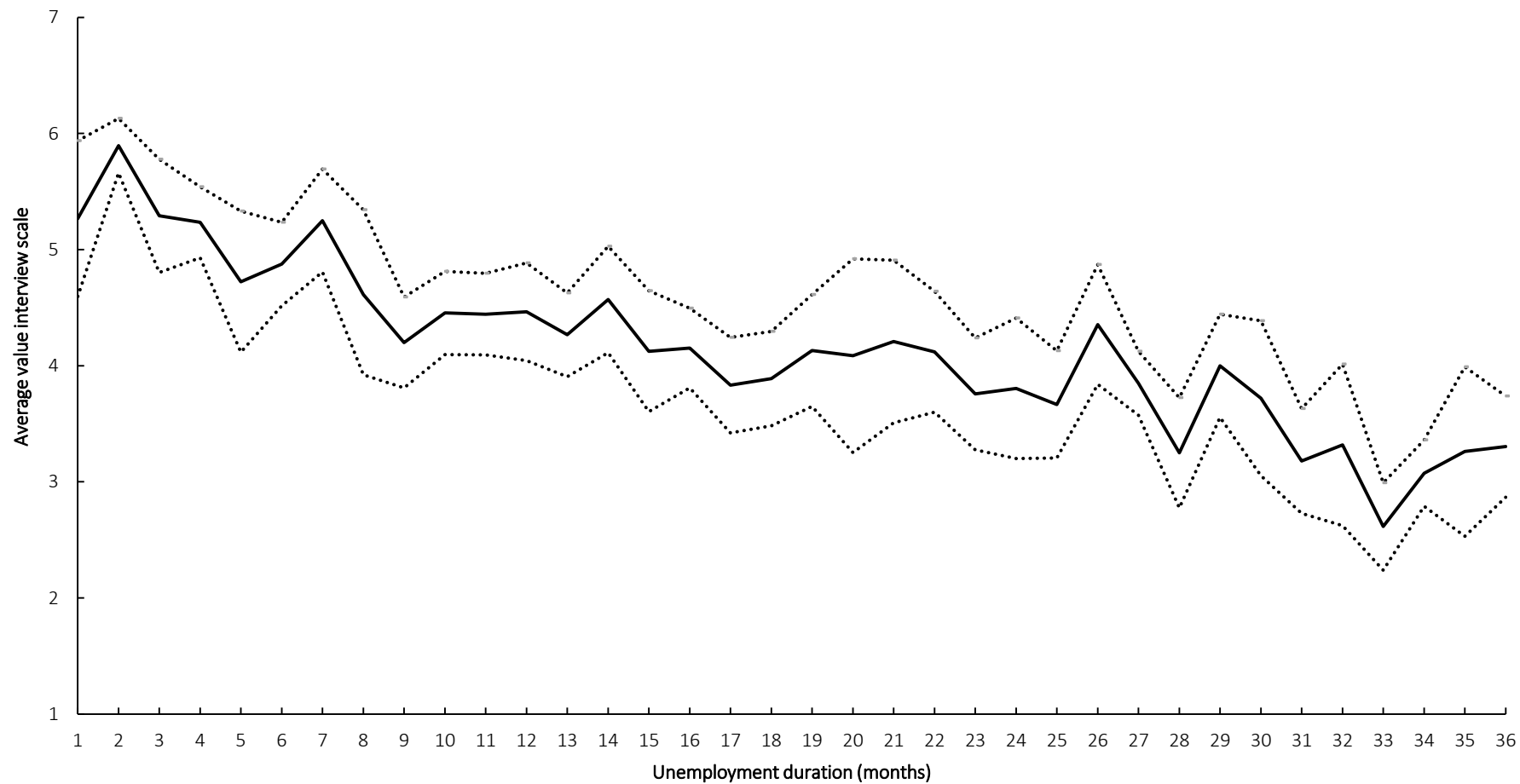
Mediation Model with Interview Scale as Outcome



Note. The presented statistics are coefficient estimates and standard errors in parentheses for the mediation model outlined in Section 4. δ stands for the total effect, δ' for the direct effect, and $\delta_i \theta_i$ for the indirect effects of unemployment duration on the interview scale, passing through mediator M_i . Standard errors are corrected for clustering of the observations at the participant level. The confidence intervals for the mediation effects are based on 10,000 bootstrap samples. *** (**) ((*)) indicates significance at the 1% (5%) ((10%)) significance level.

Figure 2.

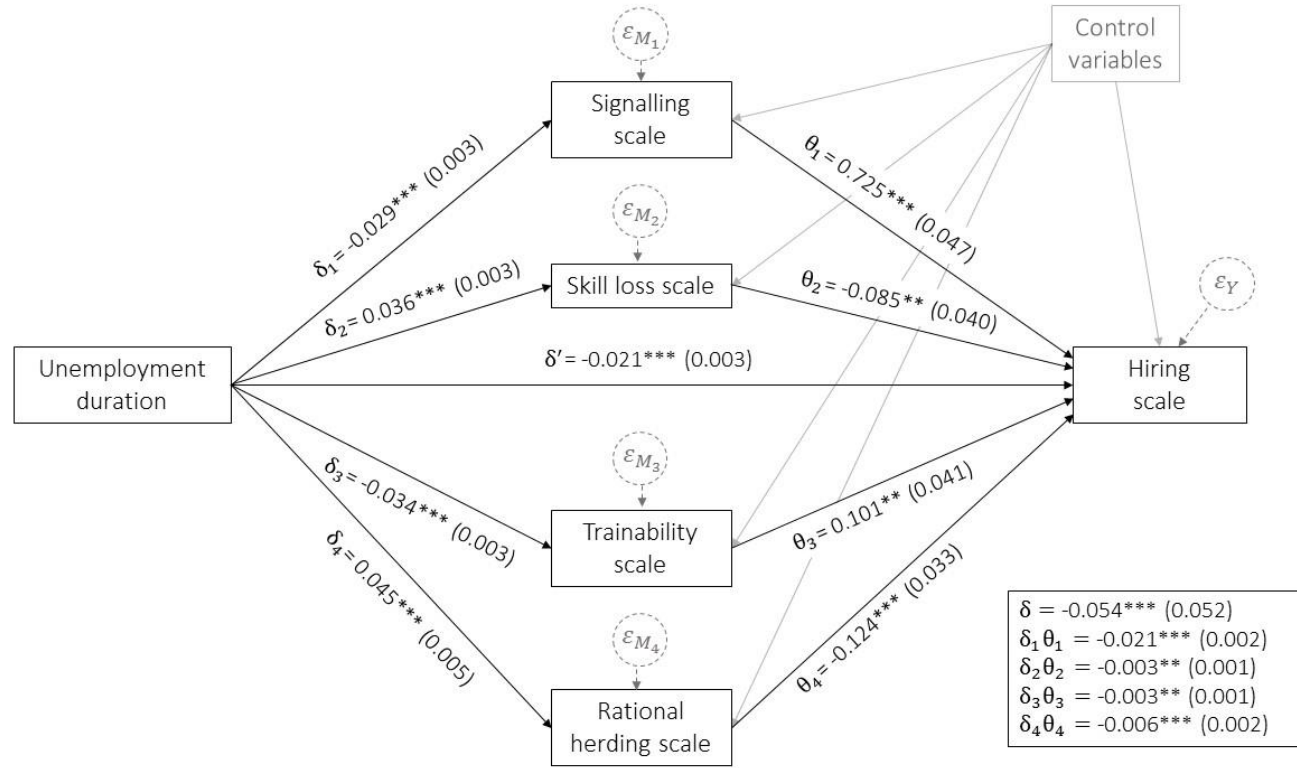
Average Value on Interview Scale by Unemployment Duration



Note. The thick line shows the average value on the interview scale for each unemployment duration. The dotted lines show the upper and lower bounds of the 95%-level confidence interval around these average values. The confidence bounds are corrected for clustering of the observations at the participant level.

Figure A1.

Mediation Model with Hiring Scale as Outcome



Note. The presented statistics are coefficient estimates and standard errors in parentheses for the mediation model outlined in Section 4. δ stands for the total effect, δ' for the direct effect, and $\delta_i \theta_i$ for the indirect effects of unemployment duration on the hiring scale, passing through mediator M_i . Standard errors are corrected for clustering of the observations at the participant level. The confidence intervals for the mediation effects are based on 10,000 bootstrap samples. *** (**) (*) indicates significance at the 1% (5%) (10%) significance level.

Table 1.
Vignette Factors and Levels

Vignette factors	Vignette levels
Gender	{Male, Female}
Highest degree obtained	{Secondary education degree, Bachelor's degree}
Previous work experience	{Two years of experience, Five years of experience}
Mentioned social activities	{None, Volunteering}
Unemployment duration	{1 month, 2 months, ..., 36 months}

Note. The factorial product of the vignette levels (2 x 2 x 2 x 2 x 36) resulted in 576 possible combinations. Sets of five vignettes were drawn from this vignette universe using a D-efficient design (D-efficiency: 99.820; Auspurg & Hinz, 2014) and were distributed at random to the participants as described in Section 3.1. This guaranteed that the vignette factors were nearly orthogonal, as shown in Table A1.

Table 2.*Theoretical Mechanisms and Accompanying Statement(s)*

Theoretical mechanism (and related scale)	Statement: content (and label)
Signalling theory (signalling scale)	1. I think this person will be sufficiently motivated to perform properly in this job (signalling: motivation).
	2. I think this person possesses sufficient intellectual abilities to perform properly in this job (signalling: intellectual capacities).
	3. I think this person possesses sufficient social abilities to perform properly in this job (signalling: social capacities).
Perceived skill loss (skill loss scale)	4. I think this person is sufficiently aware of the evolutions in the field to perform properly in this job (skill loss: not up to date with technologies).
	5. I think this person has lately had a deterioration in her/his general skills (skill loss: general skill loss).
	6. I think this person has lately had a deterioration in her/his social skills (skill loss: social skill loss).
Queuing theory (trainability scale)	7. I think this person will be easy to train (trainability).
Rational herding (rational herding scale)	8. I think this person has often been rejected by other employers (rational herding).

Note. The theoretical mechanisms are discussed in Section 2. The accompanying statements are transformed into the four mediation scales as described in Section 3.2. The scores of statement 4 were reverse scored so that a higher score became consistent with higher perceived skill loss also for this statement.

Table 3.*Summary Statistics: Participant Characteristics by Unemployment Duration of the Fictitious Candidate*

	A. THRESHOLD OF CANDIDATE'S UD: 3 MONTHS			B. THRESHOLD OF CANDIDATE'S UD: 12 MONTHS			C. THRESHOLD OF CANDIDATE'S UD: 24 MONTHS		
	Mean		Difference: (A.2) – (A.1)	Mean		Difference: (B.2) – (B.1)	Mean		Difference: (C.2) – (C.1)
	US ≤ 3 months	US > 3 months		US ≤ 12 months	US > 12 months		US ≤ 24 months	US > 24 months	
	N = 99	N = 996		N = 395	N = 700		N = 739	N = 356	
	(A.1)	(A.2)	(A.3)	(B.1)	(B.2)	(B.3)	(C.1)	(C.2)	(C.3)
Female gender	0.616	0.561	-0.055 [1.170]	0.562	0.569	0.007 [0.246]	0.579	0.539	-0.040 [1.019]
Age	42.707	42.346	-0.361 [0.369]	41.903	42.647	0.743 [1.095]	42.042	43.079	1.037 [1.276]
Foreign nationality	0.121	0.113	-0.008 [0.299]	0.109	0.117	0.008 [0.333]	0.110	0.124	0.014 [0.829]
Highest degree obtained									
Secondary education or lower	0.121	0.098	-0.023 [0.750]	0.119	0.090	-0.029* [1.710]	0.104	0.093	-0.011 [0.474]
Tertiary education: outside university	0.485	0.454	-0.031 [0.645]	0.438	0.467	0.029 [0.995]	0.456	0.458	0.002 [0.053]
Tertiary education: university	0.394	0.448	0.054 [1.115]	0.443	0.443	0.000 [0.006]	0.440	0.449	0.010 [0.260]
Frequency of hiring: weekly	0.566	0.531	-0.035 [0.741]	0.559	0.520	-0.039 [1.229]	0.549	0.503	-0.047 [1.342]
Experience as HR professional: ≥ 10 years	0.535	0.554	0.019 [0.356]	0.525	0.569	0.045 [1.583]	0.525	0.610	0.085** [2.553]

Note. UD stands for unemployment duration. T-tests are performed to test whether the differences presented are significantly different from 0. Standard errors are corrected for clustering of the observations at the participant level. *** (**) (*) indicates significance at the 1% (5%) (10%) significance level. T-statistics are in brackets.

Table 4.*Effect of Unemployment Duration on the Score of the Outcome Scales*

	A. THRESHOLD OF CANDIDATE'S UD: 3 MONTHS			B. THRESHOLD OF CANDIDATE'S UD: 12 MONTHS			C. THRESHOLD OF CANDIDATE'S UD: 24 MONTHS		
	Mean		Difference: (A.2) – (A.1)	Mean		Difference: (B.2) – (B.1)	Mean		Difference: (C.2) – (C.1)
	UD ≤ 3 months	UD > 3 months		UD ≤ 12 months	UD > 12 months		UD ≤ 24 months	UD > 24 months	
	N = 99	N = 996		N = 395	N = 700		N = 739	N = 356	
	(A.1)	(A.2)	(A.3)	(B.1)	(B.2)	(B.3)	(C.1)	(C.2)	(C.3)
Interview scale	5.515	4.050	-1.465*** [8.620]	4.911	3.771	-1.140*** [10.404]	4.518	3.486	-1.032*** [9.301]
Hiring scale	4.859	3.583	-1.275*** [10.827]	4.339	3.337	-1.002*** [11.039]	3.988	3.098	-0.890*** [10.613]

Note. UD stands for unemployment duration. T-tests are performed to test whether the differences presented are significantly different from 0. Standard errors are corrected for clustering of the observations at the participant level. *** (**) (*) indicates significance at the 1% (5%) (10%) significance level. T-statistics are in brackets.

Table 5.*Effect of Unemployment Duration on the Score of the Mediation scales and Statements*

	A. THRESHOLD OF CANDIDATE'S UD: 3 MONTHS			B. THRESHOLD OF CANDIDATE'S UD: 12 MONTHS			C. THRESHOLD OF CANDIDATE'S UD: 24 MONTHS		
	Mean		Difference: (A.2) – (A.1)	Mean		Difference: (B.2) – (B.1)	Mean		Difference: (C.2) – (C.1)
	UD ≤ 3 months	UD > 3 months		UD ≤ 12 months	UD > 12 months		UD ≤ 24 months	UD > 24 months	
	N = 99	N = 996		N = 395	N = 700		N = 739	N = 356	
	(A.1)	(A.2)	(A.3)	(B.1)	(B.2)	(B.3)	(C.1)	(C.2)	(C.3)
Signalling scale	4.949	4.288	-0.661*** [5.866]	4.660	4.172	-0.488*** [6.899]	4.510	4.012	-0.498*** [6.364]
Signalling: motivation	4.919	4.020	-0.899*** [8.420]	4.516	3.867	-0.649*** [8.387]	4.322	3.643	-0.679*** [8.230]
Signalling: intellectual capacities	5.172	4.616	-0.555*** [3.595]	4.914	4.527	-0.387*** [3.918]	4.812	4.365	-0.447*** [4.823]
Signalling: social capacities	4.758	4.229	-0.529*** [2.945]	4.549	4.123	-0.427*** [4.597]	4.396	4.028	-0.368*** [3.644]
Skill loss scale	3.182	4.054	0.872*** [7.599]	3.534	4.224	0.690*** [8.262]	3.794	4.352	0.558*** [7.693]
Skill loss: not up to date with technologies	3.465	4.418	0.953*** [7.369]	3.835	4.611	0.776*** [8.244]	4.095	4.823	0.728*** [8.229]
Skill loss: general skill loss	3.071	4.030	0.959*** [5.991]	3.430	4.233	0.802*** [7.199]	3.752	4.340	0.588*** [5.503]
Skill loss: social skill loss	3.010	3.715	0.705*** [4.642]	3.337	3.829	0.492*** [5.329]	3.535	3.893	0.359*** [4.562]
Trainability scale	4.859	4.208	-0.651*** [4.516]	4.653	4.049	-0.605*** [6.933]	4.451	3.885	-0.566*** [6.654]
Rational herding scale	3.364	4.629	1.265*** [7.890]	3.922	4.849	0.927*** [8.899]	4.319	4.919	0.599*** [5.056]

Note. UD stands for unemployment duration. T-tests are performed to test whether the differences presented are significantly different from 0. Standard errors are corrected for clustering of the observations at the participant level. *** (**) (*) indicates significance at the 1% (5%) ((10%)) significance level. T-statistics are in brackets.

Table 6.

Mediation Analysis with Interview Scale as Outcome

Explanatory variables	Outcome variables				
	Signalling scale	Skill loss scale	Trainability scale	Rational herding scale	Interview scale
A. CANDIDATE CHARACTERISTICS					
Female gender	0.112*** (0.042)	-0.084 (0.060)	0.050 (0.048)	-0.045 (0.082)	0.170*** (0.054)
Bachelor's degree	0.354*** (0.049)	-0.232*** (0.057)	0.743*** (0.059)	-0.196** (0.079)	-0.213*** (0.065)
Five years of experience	0.146*** (0.044)	-0.179*** (0.041)	0.047 (0.056)	-0.062 (0.067)	0.061 (0.052)
Volunteering	0.475*** (0.056)	-0.361*** (0.055)	0.158*** (0.050)	-0.165 (0.067)	0.054 (0.057)
Unemployment duration	-0.029*** (0.003)	0.036*** (0.003)	-0.034*** (0.003)	0.045*** (0.005)	-0.026*** (0.004)
B. PARTICIPANT CHARACTERISTICS					
Female gender	0.083 (0.114)	-0.161 (0.100)	-0.065 (0.109)	-0.372*** (0.129)	-0.007 (0.095)
Age	0.005 (0.005)	-0.009* (0.005)	0.010** (0.005)	-0.019*** (0.007)	0.005 (0.006)
Highest degree obtained					
Secondary education or lower	0.181 (0.151)	-0.262 (0.179)	0.162 (0.141)	-0.211 (0.184)	0.215 (0.184)
Tertiary education: outside university	0.177* (0.104)	-0.293*** (0.082)	0.228** (0.102)	-0.016 (0.113)	0.133 (0.110)
Tertiary education: university (reference)					
Frequency of hiring: weekly	-0.055 (0.113)	0.195* (0.107)	-0.047 (0.110)	0.175 (0.125)	-0.144 (0.117)
Experience as HR professional: ≥ 10 years	-0.055 (0.106)	0.142 (0.107)	-0.085 (0.126)	0.104 (0.148)	-0.402*** (0.136)
C. MEDIATION SCALES					
Signalling scale					0.851*** (0.048)
Skill loss scale					-0.077 (0.053)
Trainability scale					0.106** (0.052)
Rational herding scale					-0.117*** (0.035)
Observations	1,095				

Note. The presented statistics are coefficient estimates and standard errors in parentheses for the mediation model outlined in Section 4. Standard errors are corrected for clustering of the observations at the participant level. *** (**) (*) indicates significance at the 1% (5%) (10%) significance level.

Table A1.*Correlations Between Vignette Factors*

	1	2	3	4	5
1 Gender	1.000				
2 Highest degree obtained	0.036	1.000			
3 Previous work experience	-0.083	0.034	1.000		
4 Mentioned social activities	0.026	-0.009	0.021	1.000	
5 Unemployment duration	-0.003	-0.017	-0.005	0.023	1.000

Note. Cramer's V is reported as all values are categorical. These statistics are based on the full sample of 1,095 observations.

Table A2.*Correlation Matrix Between Mediation Scales and Outcome Scales*

	Interview scale	Hiring scale
Signalling scale	0.695***	0.710***
Signalling: motivation	0.688***	0.705***
Signalling: intellectual capacities	0.490***	0.489***
Signalling: social capacities	0.542***	0.564***
Skill loss scale	-0.515***	-0.536***
Skill loss: not up to date with technology	-0.577***	-0.610***
Skill loss: general skills	-0.358***	-0.358***
Skill loss: social skills	-0.327***	-0.344***
Trainability scale	0.530***	0.544***
Rational herding scale	-0.333***	-0.355***

Note. Cramer's V is reported as all values are categorical. These statistics are based on the full sample of 1,095 observations. Standard errors are corrected for clustering of the observations at the participant level. *** (**) (*) indicates significance at the 1% (5%) (10%) significance level.

Table A3.

Mediation Analysis with Hiring Scale as Outcome

Explanatory variables	Outcome variables				
	Signalling scale	Skill loss scale	Trainability scale	Rational herding scale	Hiring scale
A. CANDIDATE CHARACTERISTICS					
Female gender	0.112*** (0.042)	-0.084 (0.060)	0.050 (0.048)	-0.045 (0.082)	0.073** (0.036)
Bachelor's degree	0.354*** (0.049)	-0.232*** (0.057)	0.743*** (0.059)	-0.196** (0.079)	-0.231*** (0.052)
Five years of experience	0.146*** (0.044)	-0.179*** (0.041)	0.047 (0.056)	-0.062 (0.067)	0.048 (0.049)
Volunteering	0.475*** (0.056)	-0.361*** (0.055)	0.158*** (0.050)	-0.165 (0.067)	0.024 (0.043)
Unemployment duration	-0.029*** (0.003)	0.036*** (0.003)	-0.034*** (0.003)	0.045*** (0.005)	-0.021*** (0.003)
B. PARTICIPANT CHARACTERISTICS					
Female gender	0.083 (0.114)	-0.161 (0.100)	-0.065 (0.109)	-0.372*** (0.129)	-0.076 (0.077)
Age	0.005 (0.005)	-0.009* (0.005)	0.010** (0.005)	-0.019*** (0.007)	-0.004 (0.005)
Highest degree obtained					
Secondary education or lower	0.181 (0.151)	-0.262 (0.179)	0.162 (0.141)	-0.211 (0.184)	0.117 (0.130)
Tertiary education: outside university	0.177* (0.104)	-0.293*** (0.082)	0.228** (0.102)	-0.016 (0.113)	0.096 (0.080)
Tertiary education: university (reference)					
Frequency of hiring: weekly	-0.055 (0.113)	0.195* (0.107)	-0.047 (0.110)	0.175 (0.125)	-0.080 (0.099)
Experience as HR professional: ≥ 10 years	-0.055 (0.106)	0.142 (0.107)	-0.085 (0.126)	0.104 (0.148)	-0.110 (0.100)
C. MEDIATION SCALES					
Signalling scale					0.725*** (0.047)
Skill loss scale					-0.085** (0.040)
Trainability scale					0.101** (0.041)
Rational herding scale					-0.124*** (0.033)
Observations	1,095				

Note. The presented statistics are coefficient estimates and standard errors in parentheses for the mediation model outlined in Section 4. Standard errors are corrected for clustering of the observations at the participant level. *** (**) (*) indicates significance at the 1% (5%) ((10%)) significance level.

Table A4.

Mediation Analysis with Interview Scale as Outcome and Eight Statements as Mediators

Explanatory variables	Outcome variables								
	Signalling: motivation	Signalling: intellectual capacities	Signalling: social capacities	Skill loss: not up to date with technologies	Skill loss: general skills	Skill loss: social skills	Trainability	Rational herding	Interview scale
A. CANDIDATE CHARACTERISTICS									
Female gender	0.170*** (0.057)	0.046 (0.052)	0.119** (0.060)	-0.048 (0.063)	-0.050 (0.067)	-0.154* (0.079)	0.050 (0.048)	-0.045 (0.082)	0.164*** (0.054)
Bachelor's degree	-0.078 (0.071)	0.917*** (0.063)	0.221*** (0.059)	-0.312*** (0.056)	-0.217** (0.084)	-0.166** (0.069)	0.743*** (0.059)	-0.196** (0.079)	-0.065 (0.065)
Five years of experience	0.097 (0.061)	0.183*** (0.056)	0.158*** (0.052)	-0.239*** (0.047)	-0.170** (0.072)	-0.128** (0.051)	0.047 (0.056)	-0.062 (0.067)	0.065 (0.049)
Volunteering	0.349*** (0.066)	0.150*** (0.054)	0.926*** (0.088)	-0.233 (0.054)	-0.240*** (0.075)	-0.611*** (0.078)	0.158*** (0.050)	-0.165** (0.067)	0.160*** (0.060)
Unemployment duration	-0.038*** (0.004)	-0.024*** (0.003)	-0.024*** (0.004)	0.043*** (0.003)	0.039*** (0.005)	0.024*** (0.003)	-0.034*** (0.003)	0.045*** (0.005)	-0.022*** (0.004)
B. PARTICIPANT CHARACTERISTICS									
Female gender	-0.050 (0.132)	0.152 (0.147)	0.147 (0.107)	-0.218** (0.102)	-0.042 (0.148)	-0.222* (0.120)	-0.065 (0.109)	-0.372*** (0.129)	0.038 (0.095)
Age	0.013** (0.006)	0.004 (0.007)	-0.003 (0.005)	-0.010* (0.006)	-0.009 (0.007)	-0.008 (0.006)	0.010** (0.005)	-0.019*** (0.007)	0.002 (0.006)
Highest degree obtained									
Secondary education or lower	0.105 (0.173)	0.218 (0.191)	0.221 (0.151)	-0.085 (0.187)	-0.271 (0.251)	-0.430* (0.243)	0.162 (0.141)	-0.211 (0.184)	0.281 (0.185)
Tertiary education: outside university	0.234* (0.137)	0.111 (0.108)	0.186* (0.106)	-0.208* (0.122)	-0.319*** (0.111)	-0.351*** (0.104)	0.228** (0.102)	-0.016 (0.113)	0.125 (0.107)
Tertiary education: university (reference)									
Frequency of hiring: weekly	0.010 (0.136)	-0.093 (0.133)	-0.083 (0.112)	0.197 (0.123)	0.289** (0.139)	0.100 (0.141)	-0.047 (0.110)	0.175 (0.125)	-0.155 (0.113)
Experience as HR professional: ≥ 10 years	-0.269* (0.152)	0.056 (0.129)	0.050 (0.102)	0.094 (0.110)	0.220 (0.160)	0.112 (0.123)	-0.085 (0.126)	0.104 (0.148)	-0.328*** (0.126)
C. MEDIATION SCALES									
Signalling: motivation									0.498*** (0.049)
Signalling: intellectual capacities									0.156*** (0.045)
Signalling: social capacities									0.126*** (0.053)
Skill loss: not up to date with technologies									-0.171*** (0.040)
Skill loss: general skills									-0.020 (0.033)
Skill loss: social skills									0.044 (0.036)
Trainability scale									0.095* (0.055)
Rational herding scale									-0.094*** (0.035)
Observations	1,095								

Note. The presented statistics are coefficient estimates and standard errors in parentheses for the mediation model outlined in Section 4. Standard errors are corrected for clustering of the observations at the participant level. *** (**) (*) indicates significance at the 1% (5%) ((10%)) significance level.

Table A5.

Mediation Analysis with Hiring Scale as Outcome and Eight Statements as Mediators

Explanatory variables	Outcome variables								
	Signalling: motivation	Signalling: intellectual capacities	Signalling: social capacities	Skill loss: not up to date with technologies	Skill loss: general skills	Skill loss: social skills	Trainability	Rational herding	Hiring scale
A. CANDIDATE CHARACTERISTICS									
Female gender	0.170*** (0.057)	0.046 (0.052)	0.119** (0.060)	-0.048 (0.063)	-0.050 (0.067)	-0.154* (0.079)	0.050 (0.048)	-0.045 (0.082)	0.064* (0.036)
Bachelor's degree	-0.078 (0.071)	0.917*** (0.063)	0.221*** (0.059)	-0.312*** (0.056)	-0.217** (0.084)	-0.166** (0.069)	0.743*** (0.059)	-0.196** (0.079)	-0.087 (0.054)
Five years of experience	0.097 (0.061)	0.183*** (0.056)	0.158*** (0.052)	-0.239*** (0.047)	-0.170** (0.072)	-0.128** (0.051)	0.047 (0.056)	-0.062 (0.067)	0.050 (0.045)
Volunteering	0.349*** (0.066)	0.150*** (0.054)	0.926*** (0.088)	-0.233 (0.054)	-0.240*** (0.075)	-0.611*** (0.078)	0.158*** (0.050)	-0.165** (0.067)	0.090** (0.044)
Unemployment duration	-0.038*** (0.004)	-0.024*** (0.003)	-0.024*** (0.004)	0.043*** (0.003)	0.039*** (0.005)	0.024*** (0.003)	-0.034*** (0.003)	0.045*** (0.005)	-0.017*** (0.003)
B. PARTICIPANT CHARACTERISTICS									
Female gender	-0.050 (0.132)	0.152 (0.147)	0.147 (0.107)	-0.218** (0.102)	-0.042 (0.148)	-0.222* (0.120)	-0.065 (0.109)	-0.372*** (0.129)	-0.049 (0.078)
Age	0.013** (0.006)	0.004 (0.007)	-0.003 (0.005)	-0.010* (0.006)	-0.009 (0.007)	-0.008 (0.006)	0.010** (0.005)	-0.019*** (0.007)	-0.006 (0.005)
Highest degree obtained									
Secondary education or lower	0.105 (0.173)	0.218 (0.191)	0.221 (0.151)	-0.085 (0.187)	-0.271 (0.251)	-0.430* (0.243)	0.162 (0.141)	-0.211 (0.184)	0.173 (0.137)
Tertiary education: outside university	0.234* (0.137)	0.111 (0.108)	0.186* (0.106)	-0.208* (0.122)	-0.319*** (0.111)	-0.351*** (0.104)	0.228** (0.102)	-0.016 (0.113)	0.088 (0.074)
Tertiary education: university (reference)									
Frequency of hiring: weekly	0.010 (0.136)	-0.093 (0.133)	-0.083 (0.112)	0.197 (0.123)	0.289** (0.139)	0.100 (0.141)	-0.047 (0.110)	0.175 (0.125)	-0.093 (0.093)
Experience as HR professional: ≥ 10 years	-0.269* (0.152)	0.056 (0.129)	0.050 (0.102)	0.094 (0.110)	0.220 (0.160)	0.112 (0.123)	-0.085 (0.126)	0.104 (0.148)	-0.050 (0.086)
C. MEDIATION SCALES									
Signalling: motivation									0.420*** (0.04)
Signalling: intellectual capacities									0.104** (0.041)
Signalling: social capacities									0.125*** (0.039)
Skill loss: not up to date with technologies									-0.186*** (0.039)
Skill loss: general skills									0.017 (0.028)
Skill loss: social skills									0.006 (0.030)
Trainability scale									0.089* (0.046)
Rational herding scale									-0.107*** (0.032)
Observations	1,095								

Note. The presented statistics are coefficient estimates and standard errors in parentheses for the mediation model outlined in Section 4. Standard errors are corrected for clustering of the observations at the participant level. *** (**) (*) indicates significance at the 1% (5%) ((10%)) significance level.