

## VU Research Portal

### **Employment Opportunities for Applicants with Cybercrime Records: A Field Experiment**

Peelen, Anuschka A.E. ; van de Weijer, Steve G. A.; van den Berg, Chantal; Leukfeldt, E. Rutger

***published in***

Social Science Computer Review  
2022

***DOI (link to publisher)***

[10.1177/08944393221085706](https://doi.org/10.1177/08944393221085706)

***document version***

Publisher's PDF, also known as Version of record

***document license***

Article 25fa Dutch Copyright Act

[Link to publication in VU Research Portal](#)

***citation for published version (APA)***

Peelen, A. A. E., van de Weijer, S. G. A., van den Berg, C., & Leukfeldt, E. R. (2022). Employment Opportunities for Applicants with Cybercrime Records: A Field Experiment. *Social Science Computer Review*, 1-19.  
<https://doi.org/10.1177/08944393221085706>

**General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

**Take down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.


**E-mail address:**

[vuresearchportal.ub@vu.nl](mailto:vuresearchportal.ub@vu.nl)

# Employment Opportunities for Applicants with Cybercrime Records: A Field Experiment

Social Science Computer Review  
2022, Vol. 0(0) 1–19  
© The Author(s) 2022  
Article reuse guidelines:  
[sagepub.com/journals-permissions](https://sagepub.com/journals-permissions)  
DOI: 10.1177/08944393221085706  
[journals.sagepub.com/home/ssc](https://journals.sagepub.com/home/ssc)



Anuschka A. E. Peelen<sup>1</sup>, Steve G. A. van de Weijer<sup>1</sup> ,  
Chantal J. W. van den Berg<sup>1,2</sup>, and Eric Rutger Leukfeldt<sup>1,3</sup>

## Abstract

Various studies have shown that convicted offenders often face difficulties in finding employment. These studies, however, only examined traditional types of crime and little is known about the job opportunities of convicted cybercrime offenders. Therefore, this study examines the influences of being convicted for a cybercrime on labour market chances in the IT sector in the Netherlands. An experiment was conducted in which fictitious job applications were sent to existing job openings between March and June 2021 ( $N = 300$ ), varying for type of crime (cybercrime, property crime, no offence) and ethnic background (Dutch or Turkish). In order to test the hypotheses, logistic regression analyses were carried out to test whether differences in responses were significant. No significant differences in positive responses were found between cybercrime offenders and non-offenders, implying that cybercrime offenders do not have less labour market opportunities. Moreover, significant differences were found between Dutch and Turkish applicants. The results of this study indicate that results from previous studies on job opportunities of traditional offenders are not generalisable to cybercrime offenders. Possibly, a cybercrime record gives a positive signal of IT-skills that are useful for employees, while a criminal record for a property crime is associated with negative characteristics.

## Keywords

cybercrime, criminal record, employment, labour market, discrimination, ethnic background, experimental audit

## Introduction

For convicted offenders, having a job plays an important role in reducing the chances of recidivism (Berg & Huebner, 2011; Mesters et al., 2015; Nally et al., 2014; Tripodi et al., 2010; Uggen, 2000).

---

<sup>1</sup>Netherlands Institute for the Study of Crime and Law Enforcement (NSCR), Amsterdam, the Netherlands

<sup>2</sup>VU University Amsterdam, Amsterdam, The Netherlands

<sup>3</sup>Center of Expertise Cyber Security, The Hague University of Applied Sciences, Den Haag, The Netherlands

## Corresponding Author:

Steve G. A. van de Weijer, Netherlands Institute for the Study of Crime and Law Enforcement, Amsterdam 1008 BH, Netherlands.

Email: [svandeweijer@nscr.nl](mailto:svandeweijer@nscr.nl)

However, this group often encounters difficulties in finding employment, which can hamper a successful reintegration (Denver et al., 2017; Solinas-Saunders et al., 2015; Visher et al., 2011). Therefore, criminological research has attempted to reveal the extent to which this is caused by the criminal record or whether this is the consequence of other characteristics of ex-offenders, such as a lower educational attainment or lower socio-economic status (Visher et al., 2011). It is, however, difficult to distinguish a causal relationship from selection effects with observational data. A suitable method to eliminate these problems and to examine the impact of having a criminal record on labour market opportunities is to conduct a field experiment (i.e. an experimental audit) by sending fictional job applications to employers. Most studies using this type of experiments find that ex-offenders are less likely to be invited for a job interview (e.g. Baert & Verhofstadt, 2013; Boshier & Johnson, 1974; Buikhuisen & Dijksterhuis, 1969; Pager, Bonikowski & Western, 2009). However, previous studies using these kinds of experiments only considered traditional forms of crime, such as drug possession or property crime, while no studies have examined the job opportunities of cybercrime offenders.

Our increased use of technology has given rise to two new types of crime: cyber-dependent crimes and cyber-enabled crime (McGuire & Dowling, 2013). Cyber-dependent crime refers to novel crimes where the use of Information Technology (IT) is both the means and the end, such as hacking or a so-called Distributed Denial of Service (DDoS) attack. Cyber-enabled crime refers to traditional crime committed through the use of IT, such as online fraud. The current study focuses on offenders of cyber-dependent crimes and their chances of getting a job in the IT sector, in the Netherlands.

Research on the employment opportunities for cybercrime offenders is important for a number of reasons. First, victimisation surveys of Statistics Netherlands (2020) shows that a decreasing number of people in the Netherlands are becoming victims of traditional crime, while the number of victims of cybercrime is rising. In 2019, 13 percent of the Dutch people over the age of 15 reported that they had been the victim of cybercrime in the last 12 months. Although cybercrime is on the rise, relatively little is known about the causes of cybercrime (Holt & Bossler, 2014; Maimon & Louderback, 2019), and hardly any study has examined the consequences of a cybercrime record on the life course of cybercrime offenders. More insight into this type of crime is therefore necessary for policymaking. Current policies, interventions and legislation to prevent and sentence traditional forms of crime may not have the same effect on cybercrime, because of differences between cybercrime offenders and traditional street crime offenders, which will be elaborated below.

Second, it is possible that having a criminal record for cybercrime has different effects on job opportunities compared to a record for a traditional crime. Previous studies suggest that the profile of cybercrime offenders differs from that of traditional street crime offenders in a number of areas. For instance, cybercrime is more often committed out of interest or curiosity (Maimon & Louderback, 2019; Steinmetz, 2015). Cyber-dependent crime offenders are relatively more likely to be individuals with a higher socio-economic status (Van der Wagen et al., 2019) and are also more often highly educated than traditional street crime offenders (Dietrich et al., 2016; Harbinson & Selzer, 2019; Leukfeldt, 2017). These characteristics might make them more appealing to employers than lower educated traditional street crime offenders. Furthermore, committing a cybercrime demonstrates technical skills that are relevant within the IT sector, which may in fact increase their labour market chances. This contrasts the labour market opportunities of individuals convicted for traditional crimes, where committing a crime is expected to lead to fewer opportunities in the labour market due to a lower degree of human capital or stigma (Visher et al., 2011).

Apart from offering more insight into this relatively new form of crime, this study contributes to the scientific literature in other ways. This study explores labour opportunities in the IT sector

that require a high level of education, while previous studies focused mainly on jobs requiring a low level of education (e.g. [Dirkzwager et al., 2015](#); [Van den Berg et al., 2020](#)). Furthermore, the current study also examines the influence of ethnicity on labour market opportunities. This is, to the authors' knowledge, the first time that the effect of ethnicity in combination with having a criminal record is examined for jobs requiring a higher educational level in this type of experiments. Ethnic background is relevant to include, because previous research on labour market opportunities of offenders consistently showed that ethnic minorities less often receive a positive response to vacancies ([Dirkzwager et al., 2015](#), [Van den Berg et al., 2020](#)). The experiment by [Van den Berg et al. \(2020\)](#) even showed that ethnicity is more determining for finding employment than a criminal record. This might be different among those with a higher education, because of their higher level of human capital. In sum, this article aims to answer the following research questions:

'Does a criminal record for cybercrime influence an applicant's likelihood to secure employment in the Netherlands?'

'Does ethnicity influence an applicant's likelihood to secure employment in the Netherlands?'

## Theory

Based on several theories it can be expected that individuals with criminal records have less opportunities on the labour market. On the one hand, signalling, statistical discrimination, and taste-based discrimination theories predict that groups with stigmatising features (e.g. a criminal record) experience barriers in the labour market as potential employers rely on information and beliefs about these groups. Human capital theory, on the other hand, suggests that it is not the criminal record that decreases labour market opportunities but the lack of appropriate human capital among offenders. In this section, we discuss how each of these theories explain decreased labour market opportunities for individuals with a criminal record and summarise the results from previous studies on this topic.

First, signalling theory ([Spence, 1973](#)) states that individuals have to make decisions based on incomplete and possibly asymmetrically distributed information. Job seekers send out certain signals and employers consider the costs and benefits to invest in these signals, as they do not have complete information about these applicants ([Bergh et al., 2014](#); [Bushway & Apel, 2012](#)). On the base of certain signals during the application process, they decide on whether someone is suitable for a job or not ([Cai, 2013](#)). A criminal record of applicants can be expected to give a negative signal, because employers could associate the past criminal behaviour with less competences for the job, inferior personal characteristics ([Ramakers et al., 2012](#)) or less trustworthiness ([Holzer et al., 2006](#); [Solinas-Saunders et al., 2015](#)). For instance, employers might consider hiring an applicant who committed a property offence as a risk, because of the higher probability that this employee will steal from the company compared to an applicant who has not committed this type of crime. Furthermore, many companies require criminal background checks when hiring new staff ([Denver et al., 2017](#); [Solinas-Saunders et al., 2015](#)) and employers could be hesitant to select an applicant with a criminal record due to the expected reduced likelihood of getting a background check clearance (i.e. in the Netherlands: a certificate of conduct).<sup>1</sup> In short, the association with the signal of a criminal record can reduce the willingness of employers to invest in recruiting offenders.

Second, similar arguments can be found in statistical discrimination theories. These hypothesise that employers rely on group generalisations when assessing individual applicants, and consequently base their decision on the information or beliefs they have about the average

qualifications or trustworthiness of the groups to which applicants belong, such as offenders (e.g. [Bertrand & Duflo, 2017](#); [Van den Berg et al., 2020](#); [Zschirnt & Ruedin, 2016](#)).

Third, taste-based discrimination theories argue that employers' decisions are determined by their own preferences – based on prejudice, negative stereotypes, beliefs and attitudes towards groups to which applicants belong – and not by any other available information about the applicants (e.g. [Bertrand & Duflo, 2017](#); [Gaddis, 2018](#))

Fourth, according to human capital theory ([Becker, 1964](#)), people invest in obtaining a certain degree of knowledge and skills that enable them to contribute to the economy and thus make them interesting to a potential employer. For example, one can invest in obtaining a higher educational degree, which demonstrates the capacity to develop suitable skills for the labour market. However, offenders often have a lower educational level, less knowledge and skills, and thus lack the appropriate human capital to find employment ([Dirkzwager et al., 2015](#)). This lack of human capital can be exacerbated when offenders have to spend time in detention and have to quit their jobs or stop their education when being detained. They are then, temporarily, no longer able to develop relevant skills which further decreases their chances of finding employment.

Based on all these theories, it can thus be expected that criminal behaviour has a negative relationship with labour market opportunities. However, while signalling, statistical discrimination, and taste-based discrimination theories assume a causal effect of a conviction on labour market chances, human capital theory presumes a spurious effect: it is the lack of human capital rather than the criminal record that reduces offenders' opportunities on the labour market. Field experiments are able to examine which of these explanations is most suitable, as human capital can be controlled for by comparing applicants with the same characteristics.

To date, several of these field experiments have been conducted to examine the labour market opportunities of individuals with a criminal record. In such experiments, researchers sent job applications of fictitious persons to existing vacancies and randomly determine whether or not a crime committed in the past is described in the application, while keeping all other parts of the application and resumes identical. Subsequently, it was tested whether there were significant differences in the employers' reactions to these job applications between those with and without a criminal record. Significant results would be in line with theories that suppose a causal effect of having a criminal record on labour market opportunities, such as signalling theory. Non-significant results, on the other hand, could suggest that the negative relationship between a criminal record and finding employment is likely to be spurious, such as is presumed by human capital theory. Most of these experiments have been conducted in the United States ([Agan & Starr, 2018](#); [Decker et al., 2014](#); [Galgano, 2009](#); [Leasure, 2019](#); [Leasure & Stevens Andersen, 2017](#); [Pager, 2003, 2007](#); [Pager et al., 2009a](#); [Pager, Western & Sugie, 2009](#)), but there have also been experiments conducted in Belgium ([Baert & Verhofstadt, 2013](#); [Deliens, 1983](#)), the Netherlands ([Buikhuisen & Dijksterhuis, 1969](#); [Dirkzwager et al., 2015](#); [Van den Berg et al., 2020](#)), Sweden ([Ahmed & Lång, 2017](#)) and New Zealand ([Boshier & Johnson, 1974](#)).

Although most studies in the United States found a negative effect of a criminal record on employment opportunities ([Decker et al., 2014](#); [Leasure, 2019](#); [Leasure & Stevens Andersen, 2017](#); [Pager, 2003, 2007](#); [Pager et al., 2009b](#)), [Galgano \(2009\)](#) found no significant effect of delinquency when only using fictitious female applicants. In Belgium, [Baert and Verhofstadt \(2013\)](#) found a significant negative effect of juvenile delinquency on labour market opportunities in jobs where no previous job experience is needed, with both low and high educated people included in the experiment. [Ahmed and Lång \(2017\)](#) looked at both low-skill and high-skill jobs for Swedish men and women and found a significant negative effect of delinquency but stress the importance of looking at different occupations as there can be variations in effects between different types of jobs. The experiment by [Dirkzwager et al. \(2015\)](#) found that adult ex-offenders in the Netherlands were not significantly more likely to receive a negative response to a job

vacancy that requires a low level of education. [Van den Berg et al. \(2020\)](#) looked at three different types of offences – namely, a violent offence, a property offence and a sexual offence – and found no significant differences between these three types of offenders and non-offenders, in the Netherlands.

### *Cybercrime Offenders*

Previous studies only focused on traditional offenders, while for cybercrime offenders the influence of a criminal record on job opportunities could be different, as results from previous studies suggest that they differ from traditional street crime offenders in some respects. For example, hackers often come into contact with technology at an early age and are curious about the way it works ([Holt & Bossler, 2014](#)). They therefore like to hack out of curiosity, are creative and often possess problem-solving abilities ([Maimon & Louderback, 2019](#)). On average, cybercrime offenders also have a higher level of education ([Dietrich et al., 2016](#); [Harbinson & Selzer, 2019](#); [Leukfeldt, 2017](#)) and higher intellectual capabilities ([Schiks et al., 2022](#)) than traditional offenders. Human capital theory ([Becker, 1964](#)) predicts that higher education entails higher productivity, which also translates into higher job performance. In the case of cybercrime offenders who have completed a higher level of education, it is therefore to be expected that employers will regard this higher educational attainment as highly valuable to their organisation.

This may be strengthened by mechanisms from signalling theory ([Spence, 1973](#)). Although committing a crime generally gives off a negative signal, committing a cybercrime could also be a signal of having important technical skills. It is possible that an employer regards the combination of higher educational attainment with the skills of a cybercrime offender as an asset, resulting in a positive final assessment of the candidate. The negative effects of a criminal record on labour market opportunities for cybercrime offenders can therefore be expected to be weaker than for traditional street crime offenders, or even non-existent.

### *Ethnicity*

Apart from discrimination based on criminal records, individuals could experience discrimination based on their ethnic origin. Previous field experiments have consistently shown the discrimination of ethnic minorities in finding employment. [Blommaert et al. \(2013\)](#), for example, conducted a field experiment in the Netherlands in which they created profiles of fictitious applicants on online resume databases for both applicants with a Dutch name and with an Arabic name. Those with Arabic names received fewer positive responses of employers than the fictitious applicants with Dutch names. Moreover, employers less often continued to check out the resumes of these fictitious applicants after seeing a short profile with an Arabic name.

Several experiments investigated the combination of ethnicity and having a criminal record. [Pager et al. \(2009a, 2009b\)](#) compared white applicants with criminal records with Latino and black applicants without criminal records in the United States. Their results showed that whites who had just come out of prison had a better chance of finding employment than Latinos or blacks without criminal records. Similar results were found for the Dutch labour market. [Dirkzwager et al. \(2015\)](#) found that Dutch individuals with a non-Western migration background were invited less often for job interviews than native Dutch persons, among both convicted and non-convicted applicants. [Van den Berg et al. \(2020\)](#) showed that Dutch criminals received a positive response more often than ethnic minorities without a criminal record. Their results even showed that Dutch applicants who had been convicted for a sexual offence were more likely to receive a positive response than ethnic minorities without a criminal record.

However, these studies mainly focused on low-skill jobs, while the current study focuses on high-skill jobs within the IT sector. For several reasons, it can be expected that there is less discrimination among higher educated ethnic minorities. Since there is more demand for highly educated people (De Graaf-Zijl et al., 2015), employers are more inclined to consider qualities and skills more important than ethnic origin (Andriessen et al., 2012). In addition, employers who recruit and select employees for high-skill jobs are more often higher educated themselves, and they are therefore expected to have fewer negative attitudes towards ethnic minorities (Ceobanu & Escandell, 2010). A possible explanation for this is the liberalising effect of education due to more knowledge, more exposure to other cultures, and more acceptance of diversity (Ceobanu & Escandell, 2010). Higher educated individuals, on average, also have developed more cognitive abilities to see ethnic stereotypes as simplifications of social reality, which makes them more likely to reject these prejudices (Coenders & Scheepers, 2003). Finally, ethnic competition theory (Scheepers et al., 2002) states that negative attitudes towards the outgroup can be reinforced when they experience competition for scarce resources, such as jobs (Savelkoul et al., 2011). As the average educational level among ethnic minorities is lower (Jongen et al., 2019), higher educated individuals experience less ethnic competition for these resources. A quantitative study by Savelkoul et al. (2011) indeed shows that higher educated people experience less threat and therefore also have fewer negative attitudes towards Muslims in the Netherlands.

By conducting field experiments, it was empirically tested whether there is indeed less discrimination in high-skill jobs. Andriessen et al. (2012) found that there was less discrimination towards ethnic minorities in high-skill level jobs than in low- and medium-skill levels. Moreover, a field experiment in India that focused specifically on IT jobs compared fictitious applicants from different castes with or without an Islamic background. They found no significant discrimination in software jobs requiring high technical skills (Banerjee et al., 2009). Based on these previous studies, it can be expected that ethnic background has a less negative influence on labour market chances among the highly educated applicants in this experiment, compared to previous studies among low educated applicants in the Netherlands (Dirkzwager et al., 2015; Van den Berg et al., 2020). However, previous studies among high-skill job vacancies only examined the effects of ethnicity among the higher educated, without taking the influence of a criminal record into account. It remains unclear whether discrimination takes place among highly educated ethnic minorities with a criminal record. This experiment is the first to offer insight into this question.

Summarising, the current study contributes to the literature in several ways. First, it focuses on cybercrime offenders and their chances on the Dutch labour market, which are expected to be better compared to those of traditional street crime offenders. Second, this study focuses on high-skill jobs in the IT sector, whereas previous research has mainly focused on low-skill jobs. Finally, this is the first field experiment that looks at the influence of ethnicity in combination with a criminal history among high-skill applicants.

## Methods

For this study, a field experiment was conducted, in which fictitious job applications were sent to existing job vacancies. Six resumes and motivation letters were created for the fictitious applicants, which were as realistic as possible. They all had the same background characteristics, educational level and interests. Their motivation letters were identical, apart from the manipulations for type of crime and ethnicity. In this way, differences in responses from employees could be attributed to these manipulations. The manipulation of type of crime consisted of three conditions: the fictitious applicants had either committed a cybercrime, a property crime, or no crime at all. In addition, there was a fictitious applicant with a typically Dutch name and a typically Turkish name for each of the three offense categories, in order to examine the effect of ethnic

background. This resulted in six fictitious applicants who differed in their criminal history and ethnic background.

All the fictitious applicants were men born in 1999. Since the data was collected in 2021, the fictitious applicants represented men between 21 and 22 years of age, who had graduated from a university of applied sciences (in Dutch: hoger beroepsonderwijs (hbo)) six months before the application. They all completed the same IT-bachelor's programme at the same hbo in Utrecht, a large city located centrally in the Netherlands. The internships and work experience were at the same companies for all the fictitious applications. The bachelor's programme in Utrecht offers five eligible IT-specialisations: Cyber Security & Cloud, Artificial Intelligence, Business IT & Management, Software Development and Computer Engineering. The resume and motivation letter were adjusted each time, using these specialisations, the subject of the internship and the required skills to best fit the job opening (see [Appendix](#)). Each fictitious applicant had his own e-mail address and telephone number which the employer could use to contact them. Employers who called the telephone number were automatically connected to the voicemail, so that they could leave a message.

Only online vacancies for IT jobs that require an hbo-level of education were applied for. Apart from an internship, the fictitious applicants did not yet have any work experience in IT, so starter positions were applied for. Job sites for (IT) jobs ([www.ictergezocht.nl](http://www.ictergezocht.nl), [www.nationalevacaturebank.nl](http://www.nationalevacaturebank.nl), [www.indeed.nl](http://www.indeed.nl)) were used to search for job openings. The applications were sent between March and June 2021. Initially, the intention was to send applications to the first 300 job openings within this time frame, with a maximum of one application per company. However, during data collection, it became clear that recruitment agencies are widely used within the IT sector. Therefore, it was not possible to send all 300 applications to different companies within the time frame of this study. Hence, a decision was made to send another round of applications, in which the CV and the motivation letter were modified in order that applications could be sent to the same recruitment agencies or other companies twice.<sup>2</sup> It was ensured that in this second round, every company received an application from a different fictitious applicant than in the first round. In total, an equal number of applications for each of the six fictitious applicants ( $N = 50$ ) were sent to the companies.

This type of experiments has specific ethical issues that needed to be considered. The employers were not aware that they were participating in a scientific experiment, while in scientific research it is customary to work with informed consent. However, an explicit request to employers prior to the study was not possible, as it was important that employers behaved as they normally would. Because it is impossible to achieve the aim of this study when informing the employers, an exception can be made in some cases ([KNAW, 2003](#)). It was ensured that the collected data were treated confidentially, and that results were presented anonymously and untraceably. The burden on the employer was also minimised. Employers would be informed as soon as possible – in the event of a positive response – that the fictitious applicant was no longer interested in the job. On the resumes, only two large organisations for the internships were mentioned – without the name of a supervisor or contact person – to reduce the likelihood that employers of that organisation would be called for reference. Furthermore, it was made explicit in the motivation letter that the fictitious applicant committed his crime after leaving those organisations, to avoid the suggestion that the organisations mentioned in the resume employed offenders. After the data was collected, mailboxes and voicemails were deleted, and only the number of positive responses per applicant was saved.

## Variables

The dependent variable in this study was the response of the employer to the job application. Both an invitation for an interview and a request for more information were considered as positive responses. A rejection or no response at all was considered as negative responses.



The two independent variables in this study are the type of crime and the ethnic background. The first independent variable consists of three categories: fictitious job applicants convicted for a cybercrime (i.e. hacking), applicants convicted for a property crime (i.e. theft) and applicants who were never convicted. Fictitious job applicants who committed a property crime were added to measure the influence of negative signals of having a criminal record and possible difficulties in obtaining a certificate of conduct. These factors apply to both the cybercrime offender and the traditional street crime offender, with the distinction that having committed a cybercrime also attests to IT-skills. By comparing between these two types of crime, it can thus be distinguished whether rejections on job applications were because of the negative signals of a criminal record and the possible problems regarding the certificate of conduct, or because of the influence of the type of crime itself. Information about the type of crime was given in the motivation letter. In this letter it was specified that the fictitious applicant has committed a cybercrime (hacking) or a property crime (theft) and that he has done a community service. In the case of the fictitious applicant without a criminal record, this was not mentioned in the motivation letter. The community service indicated that it was not a severe offence. For employers, it may be unusual that an applicant mentions committing an offence in the motivation letter. That is why the fictitious applicant mentioned the following reason (see also [Appendix](#)): *'I prefer to be honest and transparent during my application process, because I do not want this to cause problems later on'*.

The independent variable ethnicity consists of two categories: typical Dutch names are used for a Dutch background and typical Turkish names are used for a non-Western background.<sup>3</sup> Turkish names were chosen because the Turkish are among the two largest ethnic minority groups in the Netherlands ([Statistics Netherlands, 2016](#)) and these names are clearly recognisable as non-Western to Dutch employers ([Blommaert et al., 2013](#)).

## Analyses

The percentages of positive responses were plotted with a 95 percent confidence interval, separately for fictitious applicants with different criminal histories and with different ethnic backgrounds. Furthermore, multivariate logistic regression analyses were carried out to test whether the differences between the groups were significant. Odds ratios were used to indicate the relative risk to receive a positive response on the job application. An interaction between type of crime and ethnicity was added to the regression model to examine whether the effects of having a criminal record were different for the fictitious applicants with a Dutch or a Turkish background.

## Results

In total, the number of positive responses received was 98 (32.7%). In the figures below, the percentages of positive responses per category are demonstrated, while the results of the regression analyses are displayed in [Table 1](#).

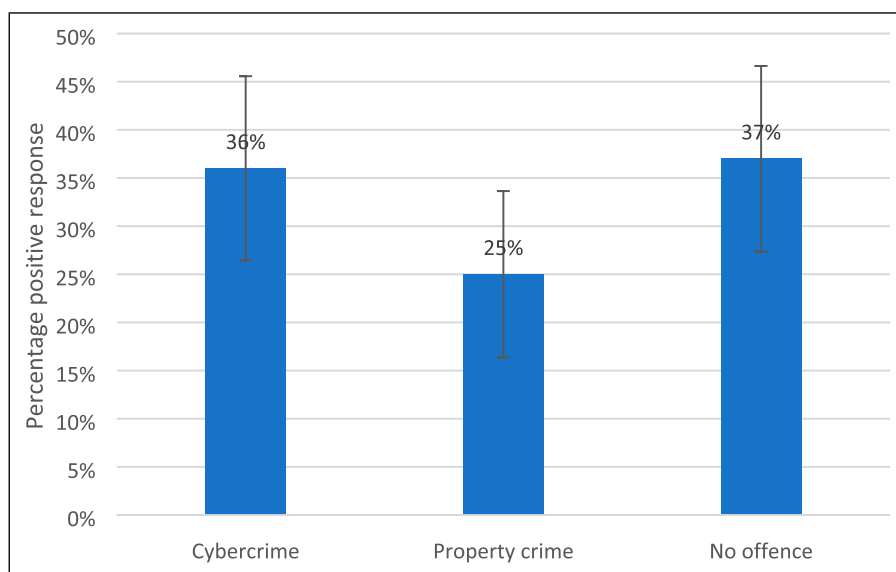
### Type of Offence

[Figure 1](#) shows the percentage of job applications in each offender group that received a positive response. The fictitious applicants who committed a cybercrime received a positive response in 36 percent of the cases. Those who were convicted for a property crime received a positive response in only 25 percent of the cases, while the non-offenders received a positive response in 37 percent of the cases. The results of the regression analyses in Model 1 of [Table 1](#), however, show that these differences are not significant. The pair-wise comparison between the property offenders and non-offenders (not shown in [Table 1](#)) was not significant either (OR = 1.792;  $p = .064$ ).

**Table 1.** Logistic Regression Analyses on Positive Responses.

Variable	Model 1				Model 2			
	B	s.e.	OR	p	B	s.e.	OR	p
<i>Type of crime</i>								
No offence	0.045	0.299	1.046	.881	0.000	0.445	1.000	1.000
Cybercrime	(ref.)				(ref.)			
Property crime	-0.539	0.316	0.584	.088	-0.572	0.484	0.564	.238
<i>Ethnicity</i>								
Dutch	0.749	0.749	2.115	.003**	0.703	0.425	2.020	.098
Turkish	(ref.)				(ref.)			
<i>Interactions</i>								
Ethnicity*No offence					0.081	0.600	1.084	.893
Ethnicity*Cybercrime	(ref.)				(ref.)			
Ethnicity*Property					0.059	0.639	1.061	.926
N	300				300			

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$  (two-sided).

**Figure 1.** Percentage of positive responses by type of crime, CI=95%

### *Ethnicity*

Figure 2 shows how many percent of the fictitious Dutch and Turkish applicants received a positive response to their job application. The fictitious Dutch applicants received a positive response in 41 percent of the cases, while the fictitious Turkish applicants received a positive response in 25 percent of the cases. The odds ratio from the logistic regression analysis indicates that the fictitious Dutch applicants have 2.115 ( $p = .003$ ) times higher odds to receive a positive response to their job application than the fictitious Turkish applicants (see Model 1 in Table 1).

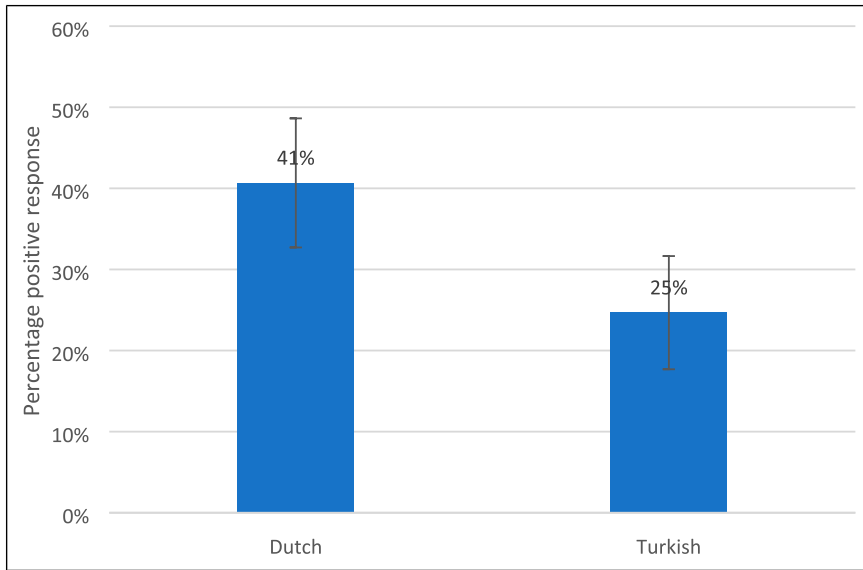


Figure 2. Percentage of positive responses by ethnicity, CI=95%

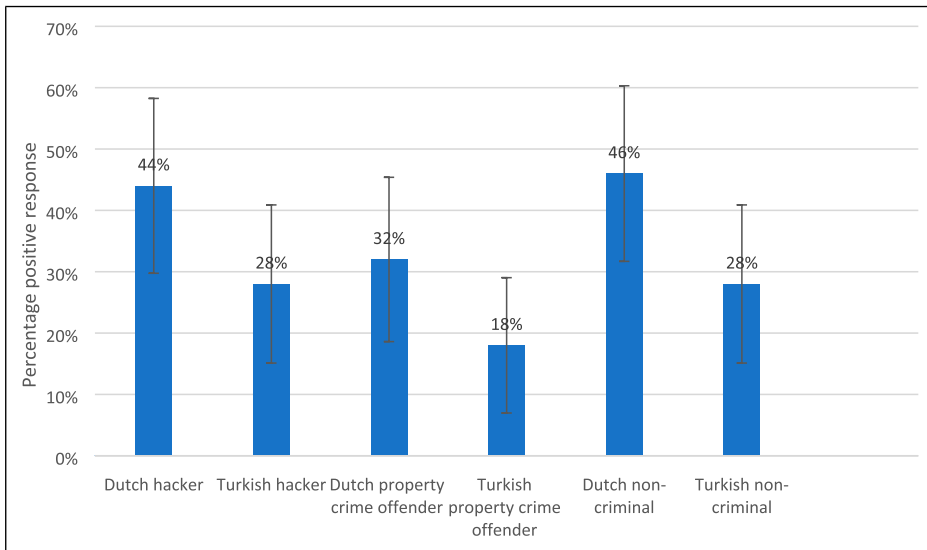


Figure 3. Percentage of positive responses per fictitious job applicant, CI=95%

### Type of Offence and Ethnicity

Finally, Figure 3 demonstrates the positive responses per fictitious applicant, thus showing the combination of type of offence and ethnicity. For all types of offences, the fictitious Dutch applicants received a positive response more often than the fictitious Turkish applicants. Among both the fictitious Dutch and the Turkish applicants, the offender who committed a property crime

received the least number of positive responses (32% and 18%, respectively). Among the fictitious Dutch applicants, the cybercrime offender received slightly fewer positive responses than the non-offender (44% and 46%, respectively). Among the fictitious Turkish applicants, the cybercrime offender and the non-offender received an equal number of positive responses (28%). Remarkably, the fictitious Dutch property offender received more positive responses (32%), than the fictitious Turkish non-offender (28%).

In Model 2 of Table 1, an interaction between ethnic background and type of crime was added to the logistic regression model. The non-significant interaction effect indicates that the effect of type of crime on labour market chances is not different for fictitious Turkish applicants than for fictitious Dutch applicants. Pair-wise comparisons between all six fictitious applicants (not shown in Table 1) show that only the differences of the fictitious Turkish property offender with the fictitious Dutch non-offender (OR = 3.881;  $p = .004$ ) and the fictitious Dutch cybercrime offender were significant (OR = 3.579;  $p = .006$ ).

## Discussion and Conclusion

Previous studies that used field experiments to examine the influence of a criminal record on labour market opportunities only considered traditional crimes (e.g. Pager et al., 2009a, 2009b; Van den Berg et al., 2020), while little is known about the labour market opportunities of cybercrime offenders. This study addressed this gap of knowledge by examining the effects of a criminal record for cybercrime on job applicants' chances of success on the Dutch labour market. In addition to looking at criminal records, the influence of ethnic background was also investigated. A field experiment was conducted in which six fictitious job applicants responded to 300 existing job openings. These applicants had the same resume and motivation letter, but with variations for type of crime (cybercrime, property crime, no offence), ethnic background (Dutch or Turkish) and adjustments to best fit the job vacancy.

In contrast to most previous studies (e.g. Pager et al., 2009a, 2009b, Baert & Verhofdstadt, 2013), we did not find a significant negative effect of having a criminal record, for either a traditional crime or a cybercrime, on the job applicant's chances of success on the labour market. It is, however, important to emphasise that the number of positive responses for the fictitious cybercrime offenders were almost equal to that of the fictitious non-offenders (36% and 37%, respectively), while the fictitious traditional property crime offenders received considerably fewer positive responses on their applications (25%). The lack of significant differences between the fictitious traditional offender and the other two groups of fictitious applicants, therefore, seems to be the consequence of limited statistical power as only 100 job applications per type of offence were sent.

This observed pattern is in line with our expectation that the negative effects of a criminal record would be weaker for a cybercrime offender than for a traditional street crime offender. While for traditional street crime offenders a negative effect would be expected based on signalling theory (Spence, 1973) and human capital theory (Becker, 1964), these negative effects do not seem to apply to cybercrime offenders. A criminal record for hacking may send a positive or neutral, rather than a negative, signal to employers within the IT sector, as it demonstrates skills that are also beneficial to companies. Moreover, since a cybercrime offender differs from a traditional street crime offender in some respects (Dietrich et al., 2016; Harbinson & Selzer, 2019; Maimon & Louderback, 2019; Leukfeldt, 2017; Schiks et al., 2022), it may be possible that committing a cybercrime is not perceived as adversely as a traditional crime by future employers. Cybercrime offenders could be perceived as curious, creative, and good at problem-solving (Maimon & Louderback, 2019) while traditional street crime offenders are often associated with less job competence, inferior personality (Ramakers et al., 2012) or less

trustworthiness (Holzer et al., 2006; Solinas-Saunders et al., 2015). The perceived skills or perceived characteristics then outweigh the cybercrime conviction (including potential difficulties in obtaining a certificate of conduct), while for a traditional crime conviction this is not the case.

The difference in positive responses for cybercrime offenders and traditional street crime offenders also suggest that theories that suppose a causal effect (e.g. signalling, statistical discrimination, and taste-based discrimination theories) offer a better explanation for the decreased labour market opportunities of offenders than theories that assume a spurious effect (e.g. human capital theory). In this research, the fictitious applicants all had the same human capital (i.e. a bachelor's programme in IT, little work experience), but a different criminal history. Since fictitious applicants who committed a property crime were still less often invited than fictitious cybercrime offenders and non-offenders, this suggests that a criminal record has a causal effect on their labour market opportunities. All fictitious candidates have the adequate human capital for the job they applied for but a criminal record for property crime seems to give a negative signal to a potential employer. These results also indicate that the outcomes of previous studies on traditional offenders are not necessarily generalisable to cybercrime offenders. It is therefore important to replicate criminological studies among this relatively new and growing group of offenders.

The most recent studies in the Netherlands by Dirkwager et al. (2015) and Van den Berg et al. (2020) did not find a negative effect of having a criminal record for a traditional crime on labour market opportunities. Although we did not find a significant negative effect of a traditional criminal record in this study either, the large difference between the fictitious traditional street crime offenders and the fictitious non-offenders suggests more obstacles on the labour market for applicants that have a record for a traditional crime. This difference between the current study and the studies of Dirkwager et al. (2015) and Van den Berg et al. (2020) could possibly be explained by differences in the sectors and the required level of education of the job vacancies which were used in these studies. Having committed a traditional crime might be perceived more negatively when applying to jobs within the IT sector or, more generally, to jobs requiring a high level of education.

Regarding the influence of ethnic background, significantly less labour market opportunities were found for fictitious applicants with a Turkish background. The fictitious Turkish non-offender even received fewer positive responses than the fictitious Dutch traditional offender. Although this is in line with results from various previous studies (e.g. Van den Berg et al., 2020), we expected to find less discrimination in the current study due to the higher level of education of the fictitious job applicants. Based on the literature, it was hypothesised that there would be less ethnic discrimination due to the high level of education of employers which is associated with less ethnic competition and more positive attitudes (Coenders & Scheepers, 2003; Coebanu & Escandell, 2010), combined with the high demand for highly educated people which makes ethnic background less important (Andriessen et al., 2012). Despite the significance of the effect of ethnic discrimination, effect sizes in this study are smaller than in earlier studies in the Netherlands (Dirkwager et al., 2015; Van den Berg et al., 2020). For example, Van den Berg et al. (2020) found that ethnic-minority applicants were more than three times less likely to receive a positive response than ethnic majority applicants, while in the current study the fictitious Turkish applicants were nearly two times less likely to receive a positive response than the fictitious Dutch applicants. Andriessen et al. (2012), who compared ethnic discrimination for low-skill jobs with high-skill jobs, also found that the difference in probability of a positive response between ethnic groups is smaller for jobs requiring a high level of education than when a low level of education is required. This suggests that there is indeed less ethnic discrimination in the high-skill labour market. Nevertheless, it is still very problematic that there is ethnic discrimination at the labour

market for the highly educated. Future studies should test ways to limit this discrimination as much as possible to fight this important societal problem.

This study was also the first to examine whether discrimination occurs among highly educated ethnic minorities with a criminal record, by testing the differences between the six fictitious applicants. No significant interaction was found between ethnicity and type of crime. This indicates that the negative influence of ethnicity on labour market opportunities is not altered by the influence of a criminal history. Moreover, it shows that having a criminal record for a traditional offence or a cybercrime has the same effect on labour market opportunities among people with and without a migration background

Although this study addressed various gaps of knowledge by investigating the labour market opportunities of cybercrime offenders and the combined influence of ethnicity and a criminal history in the high-skill labour market, there are also some limitations to consider. First, it is worth noting that there was a shortage on the Dutch labour market at the moment of data collection ([Statistics Netherlands, 2021](#)). There was a high demand for people within the IT sector, which means that employers may be less selective in the application process. As a result, employers may feel compelled to hire candidates with criminal records, whereas they would rather not do so if the market would have a higher level of slack. It would be interesting to repeat the current study in times of economic crisis or recession. Differences between offenders and non-offenders may then be larger.

Second, the timing of mentioning the criminal record could be of influence on the results found. This experiment was designed in such a way that the criminal record was always mentioned in the motivation letter, while in practice it could also be mentioned during a later stage of the application process. [Graber and Zitek \(2021\)](#), for example, showed that applicants were more likely to be hired if a drug conviction was revealed after an interview rather than in the application letter. Future studies should further examine whether this study's conclusions remain the same when convictions of (cyber)crime are revealed at different moments of the application process.

Furthermore, a very specific sample is examined in this study, which may limit the generalisability of the results. All fictitious applicants were young males and only jobs within the IT sector in the Netherlands were applied for. Moreover, only two ethnic backgrounds (i.e. Dutch and Turkish) were included in this study. To examine the generalisability of the results of the current study, future research should broaden the scope, for example by including both male and female offenders as well as different ethnic backgrounds. Differences between age groups and countries should be studied as well. Moreover, it would be interesting to investigate whether similar effects are found when applying to jobs in other sectors of the labour market. As the skills of cybercrime offenders are less relevant for jobs outside the IT-sector, a difference in positive responses between cybercrime offenders and traditional street crime offenders may indicate that cybercrime offending is considered less problematic than traditional offending. Finally, the difference between cyber-dependent and cyber-enabled crime would be interesting to study, as these various types of cybercrime might give off different signals to employers.

Based on the findings of this study, several policy recommendations can be made. In this study it has become clear that committing a single cybercrime does not necessarily pose an obstacle to successfully finding a job. This indicates that interventions that are aimed at teaching (young) cybercrime offenders to use their IT-skills for a good cause (e.g. for their employment) might be particularly effective in keeping cybercrime offenders on the right track. This study shows that these interventions could be fruitful because applicants with a cybercrime conviction do indeed get positive responses to their job applications. A past cybercrime conviction, thus, does not have to stand in the way of a successful IT career when one shows to use skills in legal ways. An example of such an intervention in the Netherlands is Hack\_Right. Hack\_Right is developed by

the police and the public prosecution service and aims to prevent recidivism among cybercrime offenders between 12 and 23 years old. First-time offenders are made aware of legal alternatives, such as ethical hacking, and coached to use the IT-skills they possess in a positive way in the future (Schiks et al., 2021).

Another important finding of this study is that ethnic discrimination was found on the labour market for highly educated starters as well: the resumes in this study included an equal level of education and comparable skills, but fictitious applicants with a Turkish name were still invited less often than those with a Dutch name. This once again shows the importance of anonymous job applications, in which it is no longer needed to include one's name, place of birth or picture on a resume (Åslund & Skans, 2012; Krause et al., 2012).

All in all, this research has taken a first step in mapping the effects of a relatively new type of crime on labour market opportunities, opening up the road for more research in this field and policies that can contribute to the prevention of cybercrime specifically.

## Appendix

### Example of resume fictitious job applicant

[Name applicant]

Date of Birth: 03/05/1999

Phone Number: X

Email address: X

Address: X

Driving License B Category

### Work experience

**Sales employee – [Name company] – August 2017 – present**

Stack shelves, checkout

**Intern Credit Risk Analytics – [Name company] – February 2020 – June 2020**

Setting up implementation plan for client to predict default risk of its clients

Grade for final assignment: 7

**Intern ICT management – [Name company] – February 2019 – June 2019**

Support colleagues with ICT and support management of websites of clients

### Education

**HBO IT – 2016 – 2020 – [Name university of applied sciences]**

Specialisation: Business IT & Management

**Havo – 2011 – 2016 – [Name school]**

Profile: Economics & Society

### Skills

JavaScript, Microsoft Office, Python

### Languages

Dutch – Fluent

English – Fluent

### Interests

Listening to music, sports, programming and testing of applications, gaming

### Example of a motivation letter job applicant

Dear Sir/Madam,

I noticed the vacancy for this position via ictergezocht.nl. I am very excited to work for your organisation and would like to apply by means of this letter.

I will introduce myself: My name is [Name applicant] and last summer I finished my bachelor's in IT at the [Name university of applied sciences]. During my studies I decided to specialise in

Business IT & Management, but thanks to electives and my internships, I have a broad knowledge of IT. For instance, during my internship at [Name company] I helped colleagues with IT problems and with the management of websites. Because of this, I am able to solve various practical problems effectively. In addition, I made sure that I communicated the problems and their solutions in a clear manner to my colleagues. During my final internship at [Name company], I was involved in drawing up an implementation plan for a client, so that this client could better assess the default risk of various clients. During these internships I learned that I can really contribute to an organisation and that my knowledge can also be used in a broader sense.

I am a hard worker and curious to discover new things. Not only during my studies I work a lot on the computer, but also in my spare time I enjoy testing new software and applications, gaming and hacking. At the end of last year, I was sentenced to community service for hacking, which has taught me not to cross the legal line again. I prefer to be open about this straight away because I don't want it to lead to rejection later on in the application process.

I hope I have convinced you that I am a suitable candidate for this position because of my education, internship experiences and hobbies.

I would be pleased to explain my resume and motivation letter in a (online) job interview.

Kind regards,

[Name applicant]

### **Declaration of Conflicting Interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### **Funding**

The author(s) received no financial support for the research, authorship, and/or publication of this article.

### **Ethical Committee Approval**

The authors received a positive advice to conduct this research from the Ethics Committee for Legal and Criminological Research (CERCO) of the Faculty of Law of the VU University Amsterdam on March 6<sup>th</sup> 2021.

### **ORCID iD**

Steve G. A. van de Weijer  <https://orcid.org/0000-0001-5914-5966>

### **Notes**

1. A certificate of conduct is a declaration by the Dutch Minister of Legal Protection in which it is stated that an individual has not committed any crime relevant for the job (Ministry of Justice and Security, 2020). A person who has committed a sexual offence towards minors will most likely not get a certificate of conduct for working with children, but that person could still get a certificate of conduct for an accountancy job.
2. For several companies, applicants had applied to the same job opening twice. An additional analysis was carried out without these 'double' applications. Results and conclusions remained the same.
3. Common names on social media networks Facebook and LinkedIn were chosen for the fictitious applicants in this study. Since it was possible that a recruiter would look some of the fictitious applicants up on these social media networks, using a common name made it less likely for a recruiter to continue his/her search on social media due to the high number of profiles. This would increase the chance that an employer or



recruiter would base his/her choice on the resume and motivation letter sent, instead of on information seen elsewhere.

## References

- Agan, A., & Starr, S. (2018). Ban the box, criminal records, and racial discrimination: A field experiment. *The Quarterly Journal of Economics*, 133(1), 191–235. <https://doi.org/10.1093/qje/qjx028>
- Ahmed, A. M., & Lång, E. (2017). The employability of ex-offenders: A field experiment in the Swedish labor market. *IZA journal of Labor Policy*, 6(1), 1–23. DOI: <https://doi.org/10.1186/s40173-017-0084-2>
- Andriessen, I., Nievers, E., Dagevos, J., & Faulk, L. (2012). Ethnic discrimination in the Dutch labor market: Its relationship with job characteristics and multiple group membership. *Work and Occupations*, 39(3), 237–269. <https://doi.org/10.1177/0730888412444783>
- Åslund, O., & Skans, O. N. (2012). Do anonymous job application procedures level the playing field? *ILR Review*, 65(1), 82–107. <https://doi.org/10.1177/001979391206500105>
- Baert, S., & Verhofstadt, E. (2013). Labour market discrimination against former juvenile delinquents: Evidence from a field experiment. *Applied Economics*, 47(11), 1061–1072. <https://doi.org/10.1080/00036846.2014.990620>
- Banerjee, A., Bertrand, M., Datta, S., & Mullainathan, S. (2009). Labor market discrimination in Delhi: Evidence from a field experiment. *Journal of Comparative Economics*, 37(1), 14–27. <https://doi.org/10.1016/j.jce.2008.09.002>
- Becker, G. S. (1964). *Human capital theory*. New York: Columbia University Press.
- Berg, M. T., & Huebner, B. M. (2011). Reentry and the ties that bind: An examination of social ties, employment, and recidivism. *Justice Quarterly*, 28(2), 382–410. <https://doi.org/10.1080/07418825.2010.498383>
- Bergh, D. D., Connelly, B. L., Ketchen, D. J. Jr, & Shannon, L. M. (2014). Signalling theory and equilibrium in strategic management research: An assessment and a research agenda. *Journal of Management Studies*, 51(8), 1334–1360. <https://doi.org/10.1111/joms.12097>
- Bertrand, M., & Duflo, E. (2017). Field experiments on discrimination. In A. V. Banerjee & E. Duflo (Eds.), *Handbook of economic field experiments* (Vol. 1). Elsevier.
- Blommaert, L., Coenders, M., & Tubergen, Fv (2013). Discrimination of Arabic-named applicants in the Netherlands: An internet-based field experiment examining different phases in online recruitment procedures. *Social Forces*, 92(3), 957–982. <https://doi.org/10.1093/sf/sot124>
- Boshier, R., & Johnson, D. (1974). Does conviction affect employment opportunities. *British Journal of Criminology*, 14(3), 264–268. <https://doi.org/10.1093/oxfordjournals.bjc.a046561>
- Buikhuisen, W., & Dijksterhuis, F. P. (1969). Sollicitatiekansen van delinquenten. *Nederlands Tijdschrift Voor Criminologie*, 11(1), 50–58.
- Bushway, S. D., & Apel, R. (2012). A signaling perspective on employment-based reentry programming. *Criminology and Public Policy*, 11(1), 21–50. <https://doi.org/10.1111/j.1745-9133.2012.00786.x>
- Cai, Y. (2013). Graduate employability: A conceptual framework for understanding employers' perceptions. *Higher Education*, 65(4), 457–469. <https://doi.org/10.1007/s10734-012-9556-x>
- Ceobanu, A. M., & Escandell, X. (2010). Comparative analyses of public attitudes toward immigrants and immigration using multinational survey data: A review of theories and research. *Annual Review of Sociology*, 36(1), 309–328. <https://doi.org/10.1146/annurev.soc.012809.102651>
- Coenders, M., & Scheepers, P. (2003). The effect of education on nationalism and ethnic exclusionism: An international comparison. *Political Psychology*, 24(2), 313–343. <https://doi.org/10.1111/0162-895X.00330>
- De Graaf-Zijl, M., Josten, E., Boeters, S., Eggink, E., Bolhaar, J., Ooms, I., & Woittiez, I. (2015). *De onderkant van de arbeidsmarkt in 2025 [The bottom of the labour market in 2025]*. Netherlands Bureau for Economic Policy Analysis & Social and Cultural Planning Office.

- Decker, S. H., Spohn, C., Ortiz, N. R., & Hedberg, E. (2014). *Criminal stigma, race, gender, and employment: An expanded assessment of the consequences of imprisonment for employment*. National Institute of Justice.
- Deliens, L. (1983). Ongelijke sociale distributie van de tewerkstellingskansen van ex- gedetineerden]. *Panopticon*, 4(6), 530–541.
- Denver, M., Siwach, G., & Bushway, S. D. (2017). A new look at the employment and recidivism relationship through the lens of a criminal background check. *Criminology*, 55(1), 174–204. <https://doi.org/10.1111/1745-9125.12130>
- Dietrich, D., Kasper, K., & Bulanova-Hristova, G. (2016). Literature review. In G. Bulanova-Hristova, K. Kasper, G. Odinet, M. Verhoeven, R. Pool, C. de Poot, Y. Werner, & L. Korsell (Eds.), *Cyber-OC: Scope and manifestations in selected EU member states*. Wiesbaden: BKA, Bra, WODC.
- Dirkzwager, A., Blokland, A., Nannes, K., & Vroonland, M. (2015). Effecten van detentie op het vinden van werk en woning. *Tijdschrift voor Criminologie*, 57(1), 5–30. <https://doi.org/10.5553/TvC/0165182X2015057001001>
- Gaddis, S. M. (2018). An introduction to audit studies in the social sciences. In S. Gaddis (Ed.), *Audit studies: Behind the scenes with theory, method, and nuance*. Springer.
- Galgano, S.W. (2009). Barriers to reintegration: an audit study of the impact of race and offender status on employment opportunities for women. *Social Thought & Research*, 30(1), 21–37.
- Graber, J., & Zitek, E. M. (2021). Reducing criminal record discrimination through banning the box: The importance of timing and explanation in the reveal of a drug conviction. *Psychology, Crime & Law*, <https://doi.org/10.1080/1068316X.2021.1909018>
- Harbinson, E., & Selzer, N. (2019). The risk and needs of cyber-dependent offenders sentenced in the United States. *Journal of Crime and Justice*, 42(5), 582–598. <https://doi.org/10.1080/0735648X.2019.1692422>
- Holt, T. J., & Bossler, A. M. (2014). An assessment of the current state of cybercrime scholarship. *Deviant Behavior*, 35(1), 20–40. <https://doi.org/10.1080/01639625.2013.822209>
- Holzer, H. J., Raphael, S., & Stoll, M. A. (2006). Perceived criminality, criminal background checks, and the racial hiring practices of employers. *The Journal of Law and Economics*, 49(2), 451–480. <https://doi.org/10.1086/501089>
- Jongen, E., Bolhaar, J., Van Elk, R., Koot, P., & Van Vuuren, D. (2019). *Inkomensongelijkheid naar migratieachtergrond*. [Income inequality by migration background]. Netherlands Bureau for Economic Policy Analysis.
- KNAW (2003). *Gedragcode voor gebruik van persoonsgegevens in wetenschappelijk onderzoek. Advies van de Sociaal-Wetenschappelijke Raad*. Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen.
- Krause, A., Rinne, U., & Zimmermann, K. F. (2012). Anonymous job applications in Europe. *IZA Journal of European Labor Studies*, 1(1), 1–20. <https://doi.org/10.1186/2193-9012-1-5>
- Leasure, P. (2019). Misdemeanor records and employment outcomes: An experimental study. *Crime & Delinquency*, 65(13), 1850–1872. <https://doi.org/10.1177/0011128718806683>
- Leasure, P., & Stevens Andersen, T. (2017). Recognizing redemption: Old criminal records and employment outcomes. *NYU Review of Law and Social Change, The Harbinger*, 41(1), 271–286.
- Leukfeldt, E. R. (Ed.). (2017). *The human factor in cybercrime and cybersecurity: Research Agenda*. The Netherlands: Eleven International Publishing.
- Maimon, D., & Louderback, E. R. (2019). Cyber-dependent crimes: An interdisciplinary review. *Annual Review of Criminology*, 2(1), 191–216. <https://doi.org/10.1146/annurev-criminol-032317-092057>
- McGuire, M., & Dowling, S. (2013). *Cyber crime: A review of the evidence* (Vol. 75). United Kingdom: Home Office.
- Mesters, G., van der Geest, V., & Bijleveld, C. C. J. H. (2015). Crime, employment and social welfare: An individual-level study on disadvantaged males. *Journal of quantitative criminology*, 32(2), 159–190. DOI: <https://doi.org/10.1007/s10940-015-9258-5>

- Ministry of Justice and Security. (2020). *Certificate of conduct*. <https://www.justis.nl/producten/vog/certificate-of-conduct.aspx>
- Nally, J. M., Lockwood, S., Ho, T., & Knutson, K. (2014). Post-release recidivism and employment among different types of released offenders: A 5-year follow-up study in the United States. *International Journal of Criminal Justice Sciences*, 9(1), 16–34.
- Pager, D. (2003). The mark of a criminal record. *American journal of sociology*, 108(5), 937–975. DOI: <https://doi.org/10.1086/374403>
- Pager, D. (2007). The use of field experiments for studies of employment discrimination: Contributions, critiques, and directions for the future. *The Annals of the American Academy of Political and Social Science*, 609(1), 104–133. <https://doi.org/10.1177/0002716206294796>
- Pager, D., Bonikowski, B., & Western, B. (2009a). Discrimination in a low-wage labor market: A field experiment. *American sociological review*, 74(5), 777–799. <https://doi.org/10.1177/000312240907400505>
- Pager, D., Western, B., & Sugie, N. (2009b). Sequencing disadvantage: Barriers to employment facing young black and white men with criminal records. *The ANNALS of the American Academy of Political and Social Science*, 623, 195–213. <https://doi.org/10.1177/0002716208330793>
- Ramakers, A., Van Wilsem, J., & Apel, R. (2012). The effect of labour market absence on finding employment: A comparison between ex-prisoners and unemployed future prisoners. *European Journal of Criminology*, 9(4), 442–461. <https://doi.org/10.1177/1477370812448278>
- Savelkoul, M., Scheepers, P., Tolsma, J., & Hagendoorn, L. (2011). Anti-Muslim attitudes in the Netherlands: Tests of contradictory hypotheses derived from ethnic competition theory and intergroup contact theory. *European Sociological Review*, 27(6), 741–758. <https://doi.org/10.1093/esr/jcq035>
- Scheepers, P., Gijsberts, M., & Coenders, M. (2002). Ethnic exclusionism in European countries. Public opposition to civil rights for legal migrants as a response to perceived ethnic threat. *European Sociological Review*, 18(1), 17–34. <https://doi.org/10.1093/esr/18.1.17>
- Schiks, J. A. M., Van 't Hoff-de Goede, M. S., & Leukfeldt, E. R. (2021). *Een alternatief voor jeugdige hackers? Plan- en procesevaluatie van Hack\_Right [An alternative for juvenile hackers? Evaluation of Hack\_Right]*. The Hague: Politie en Wetenschap.
- Schiks, J. A. M., Van de Weijer, S. G. A., & Leukfeldt, E. R. (2022). High tech crime, high intellectual crime? Comparing the intellectual capabilities of cybercriminals, traditional criminals and non-criminals. *Computers in Human Behavior*, 126, 106985. <https://doi.org/10.1016/j.chb.2021.106985>
- Solinas-Saunders, M., Stacer, M. J., & Guy, R. (2015). Ex-offender barriers to employment: Racial disparities in labor markets with asymmetric information. *Journal of Crime and Justice*, 38(2), 249–269. <https://doi.org/10.1080/0735648X.2013.870492>
- Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economics*, 87(3), 355–374. DOI: <https://doi.org/10.1016/B978-0-12-214850-7.50025-5>
- Statistics Netherlands. (2016). Bevolking naar migratieachtergrond. [Population by migration background] <https://www.cbs.nl/nl-nl/achtergrond/2016/47/bevolking-naar-migratieachtergrond>
- Statistics Netherlands. (2020). *Veiligheidsmonitor 2019*. [Safety Monitor 2019]. The Hague: Centraal Bureau voor de Statistiek.
- Statistics Netherlands. (2021). *Banengroei naar bedrijfstak [Job growth by industry]*. [https://www.cbs.nl/?sc\\_itemid=d9948ff8-3e87-4305-8a7e-c674310ff46e&sc\\_lang=nl-nl](https://www.cbs.nl/?sc_itemid=d9948ff8-3e87-4305-8a7e-c674310ff46e&sc_lang=nl-nl)
- Steinmetz, K. F. (2015). Craft(y)ness: An ethnographic study of hacking. *The British Journal of Criminology*, 55(1), 125–145. <https://doi.org/10.1093/bjc/azu061>
- Tripodi, S. J., Kim, J. S., & Bender, K. (2010). Is employment associated with reduced recidivism? The complex relationship between employment and crime. *International Journal of Offender Therapy and Comparative Criminology*, 54(5), 706–720. <https://doi.org/10.1177/0306624X09342980>
- Uggen, C. (2000). Work as a turning point in the life course of criminals: A duration model of age, employment, and recidivism. *American Sociological Review*, 65(4), 529–546. <https://doi.org/10.2307/2657381>

- Van den Berg, C. J. W., Blommaert, L., Bijleveld, C. C. J. H., & Ruiters, S. (2020). Employment opportunities for ex-offenders: A field experiment on how type of crime and applicants' ethnic background affect employment opportunities for low-educated men in the Netherlands. *Research in Social Stratification and Mobility*, 65, 100476. <https://doi.org/10.1016/j.rssm.2020.100476>
- Van der Wagen, W., Van 't Zand-Kurtovic, E.G., Matthijsse, S.R., & Fischer, T.F.C. (2019). *Cybercriminaliteit: unieke profiel, unieke aanpak? Een onderzoek naar kenmerken van en passende interventies voor daders van cybercriminaliteit in enge zin.*[*Cybercrime: Unique profile, unique approach? A study on characteristics and interventions of cyber-dependent crimes*]. The Hague: WODC.
- Visher, C. A., Debus-Sherrill, S. A., & Yahner, J. (2011). Employment after prison: A longitudinal study of former prisoners. *Justice Quarterly*, 28(5), 698–718. <https://doi.org/10.1080/07418825.2010.53555353>
- Zschimt, E., & Ruedin, D. (2016). Ethnic discrimination in hiring decisions: A meta-analysis of correspondence tests 1990-2015. *Journal of Ethnic and Migration Studies*, 42(7), 1115–1134. DOI: <https://doi.org/10.1080/1369183X.2015.1133279>

### Author Biography

**Anuschka Peelen** studied Sociology and is currently enrolled in the Research Master Social and Cultural Science at the Radboud University Nijmegen. At the Netherlands Institute for the Study of Crime and Law Enforcement (NSCR) she studied labour market opportunities of cybercriminals and extremism among high school students. Dr. Steve van de Weijer is senior researcher at the Netherlands Institute for the Study of Crime and Law Enforcement (NSCR). His research interests include intergenerational transmission of crime, developmental and life-course criminology, biosocial criminology, and cybercrime offenders and victims. Dr. Chantal van den Berg is an Assistant Professor Criminology at the Vrije Universiteit Amsterdam and a researcher at the Netherlands Institute for the Study of Crime and Law Enforcement (NSCR). Her research interest include labour market opportunities and discrimination, (juvenile) sexual offending, victimization of sexual violence, risk assessment for (sexual) offending and collateral consequences of criminal conviction (specifically the Certificate of conduct – VOG). Dr. Rutger Leukfeldt is Senior Researcher at the Netherlands Institute for the Study of Crime and Law Enforcement (NSCR) and Academic Director of Centre of Expertise Cybersecurity of the Hague University of Applied Sciences. His work focusses on the human factor in cybercrime and cybersecurity.