

Student access to apprenticeships: Evidence from a vignette experiment

April 2020

Abstract

We identify the causal effects of student characteristics on the likelihood of being hired for an apprenticeship, and explore the mechanisms underlying the employer's decision. To this end, we perform a vignette experiment among HR professionals in Belgium, focussing on less-qualified youth. Our results indicate that students with favourable educational records and students revealing being motivated are more likely to obtain an apprenticeship. Furthermore, we find that these characteristics are used by HR professionals as signals of trainability, employability and quit intentions.

Keywords: hiring decisions, employer perceptions, dual system, work placement, education and inequality

JEL: I24, J24.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

1 1. Introduction

2 The great recession has fostered a renewed interest in dual learning programmes that combine classroom-based
3 learning with an apprenticeship in a firm or organisation (Cahuc, Carcillo, Rinne, & Zimmermann, 2013;
4 Eichhorst, Rodríguez-Planas, Schmid, & Zimmermann, 2015). While many countries saw their already high
5 youth unemployment rates soar in the aftermath of the financial crisis, the relatively low youth unemployment
6 rates of traditional dual apprenticeship countries such as Germany,¹ Austria and Denmark were barely hit (Bell
7 & Blanchflower, 2011). This ~~rather~~ anecdotal evidence on the role of dual learning programmes in tackling youth
8 unemployment is complemented with several micro-econometric studies which indicate that young workers with
9 apprenticeship experience face higher employment chances at the start of their careers in comparison to those
10 without apprenticeship experience (Fersterer, Pischke, & Winter-Ebmer, 2008; Parey, 2016; Riphahn &
11 Zibrowius, 2016; Sollogoub & Ulrich, 1999).²

12 While this success in easing school to work transitions is well-established, dual educational systems face
13 several challenges. In particular, since the system crucially depends on the willingness of employers to provide
14 training places, not all youth may gain access to an apprenticeship position (Cahuc et al., 2013). A small number
15 of descriptive studies have indicated that individuals encountering difficulties in gaining access to regular
16 employment, such as individuals with inferior educational records in terms of grade point average (GPA) and
17 grade retention or ethnic minorities, also fail to begin apprenticeships (Helland & Støren 2006; Hupka-Brunner,
18 Sacchi, & Stalder, 2010). Put differently, many of the individuals for whom the problem of youth unemployment
19 is most acute, seem precluded from using apprenticeships as a stepping stone towards regular employment.
20 However, given the non-experimental nature of these studies on access to apprenticeships, this conclusion is
21 potentially biased. Not only may employers select on characteristics that are unobservable to the researcher but
22 correlated with observables, such as one's minority status or past educational record, but these observable factors
23 may also be correlated with supply side factors such as job choice and job search intensity.

24 In this article, we report the results of a study that accounts for these problems by running a survey
25 experiment among 276 human-resources (HR) professionals in Belgium. These professionals are each asked to
26 evaluate six randomised table vignettes that describe apprenticeship applicants that differ with respect to their
27 past educational records (educational track, GPA and grade retention), their personal characteristics (gender and
28 ethnic ancestry) and their knowledge of the company or organisation, allowing us to assess whether these

1 characteristics affect the likelihood of being hired for an apprenticeship and subsequent regular employment in
2 a causal way.

3 To the best of our knowledge, only two other studies have already investigated access to apprenticeships
4 in a causal way.³ Relying on similar survey experiments like ours, both Kübler, Schmid, and Stüber (2018), and
5 Piopiunik, Schwerdt, Simon, and Woessmann (2020) have recently investigated access to apprenticeships in
6 Germany. In line with the aforementioned descriptive studies, these experiments revealed substantial effects of
7 GPA. In addition, Kübler et al. (2018) found access to apprenticeships to be higher for male (as opposed to
8 female) applicants, whereas Piopiunik et al. (2020) found positive effects of one's IT skills and experience with
9 social volunteering. While these previous studies only considered fictitious candidates applying for an
10 apprenticeship after having completed higher secondary education, we focus on less-qualified youth that aim to
11 participate in a dual apprenticeship programme to obtain a minimum qualification. Given that youth
12 unemployment is a greater problem for those without secondary education qualifications and that our focus is
13 on apprenticeships in the context of compulsory education, we consider the problem of unequal access to
14 apprenticeships to be much more pertinent for this group of young people. Moreover, as these dual programs
15 are part of the compulsory education system, our study is not merely about labour market inequalities but also
16 about educational inequalities.

17 Apart from the ability to identify causal effects and our focus on low-skilled applicants, our research
18 contributes in a further important way to the literature. Different from Kübler et al. (2018) and Piopiunik et al.
19 (2020), we also investigate the mechanisms driving employers to hire particular groups of apprentices. In two
20 main ways, employers may realise a net-benefit from hiring apprentices (Smits & Stromback, 2001; Stevens,
21 1994). On the one hand, employers may invest in apprentices with a view to increasing the firm's long-term
22 productivity and offering the apprentices a standard contract after their training. Given this motive, both the
23 student's trainability and quit intentions are essential. On the other hand, apprentices may serve as substitutes
24 for workers with a standard labour contract. In this light, the immediate employability of the apprentice is
25 important. For several reasons, employers may use applicants' past educational records, personal characteristics
26 and revealed motivations as reliable proxies for their trainability, quit intentions and employability, and thus also
27 for the potential net-benefit of hiring an apprentice. First, in line with human capital theory (Becker, 1964),
28 differences in past educational records may indicate different levels of acquired skills during one's education,
29 which in turn affect the perceived trainability, quit intentions and employability of the workers.⁴ Second, in line
30 with theories of signalling (Arrow, 1973; Spence, 1973), statistical discrimination (Arrow, 1973; Phelps, 1972)

1 and screening (Stiglitz, 1975), these characteristics may also offer useful signals of pre-existing abilities and
2 motivations that affect one's trainability, quit intentions and employability.⁵ To map how the student
3 characteristics are perceived to contribute to the firms' productivity, focussing on trainability (human capital and
4 innate abilities), quit intentions, and employability, the HR professionals in our experiment are asked to also
5 evaluate the fictitious applicants in terms of their expected trainability, quit intentions and employability.

6 Our results confirm that students with less favourable educational records and those with lower levels of
7 revealed motivation, as signalled by the applicants' knowledge of the company or organisation, are less likely to
8 obtain access to an apprenticeship position and to subsequent regular employment. The evidence on the
9 importance of personal characteristics is more mixed with ethnic ancestry influencing one's access only to regular
10 employment and gender being unrelated to the outcomes, although some underestimation due to social
11 desirability bias in these cases cannot be excluded. We also find that most of the considered characteristics are
12 used by HR professionals as signals of trainability, employability and quit intentions. Overall, these results are
13 consistent with employers having a preference for candidates that are presumed to generate the largest potential
14 benefit to the firm, both during and after the apprenticeship period.

15 The remainder is structured in the following way. First, we discuss our experimental design and the data.
16 Next, we present our results. We end with the overall conclusions and limitations of our study.

17 2. Institutional Setting

18 Flanders (the Northern, Dutch-speaking region of Belgium) has compulsory schooling until the age of 18. From
19 the age of 15 onwards (in case the first two years of secondary education are completed), students are allowed
20 to fulfil this compulsory schooling in dual programs, which combine learning in an educational institution with
21 learning in a firm or organisation.

22 Flemish secondary education consists of four tracks: general secondary education, arts secondary education,
23 technical secondary education and vocational secondary education. Up until recently, dual learning programmes
24 were organised only alongside these tracks as part of a separate stream of so-called part-time education (Neyt,
25 Verhaest, & Baert, 2018). However, a more recent reform has implemented dual education also as a fully-fledged
26 part of the regular vocational and technical tracks, allowing students to choose within these tracks between a
27 standard school-based programme and an equivalent dual counterpart. While the old regime of so-called part-
28 time education still exists alongside the new regime, it is expected to be integrated in the new regime in the near

1 future. Most of the new-style programs, that are nowadays available, start from the fifth grade in secondary
2 education, leading to a usual starting age of 16.

3 The reform was implemented as the old Flemish dual learning system was characterised by multiple issues
4 (Flemish Ministry of Education and Training, 2013, 2017; Djait, 2014; Smet et al., 2015): a large proportion of
5 students leaving the education system without a formal qualification, discussions about the validity of the
6 qualifications (despite being evaluated relatively favourable in a recent study by Neyt et al., 2018), low
7 participation rates, and a large share of enrolled students that didn't manage to find an apprenticeship. For
8 instance, in 2014, of the students that were enrolled in an old-style dual program and that were considered to be
9 'ready for work', around one in five did not (yet) find an apprenticeship (Djait, 2014).⁶ At first blush, the new
10 system seems more successful in this respect, as the number of available apprenticeships exceeds the number of
11 students enrolled for most programs in the school year 2019-2020 (Flemish Partnership Dual Learning, 2019b).
12 However, for several reasons, these figures tell us little about the extent to which candidates have access to
13 apprenticeships. First, these figures do not account for potential problems of spatial mismatch. Second, as
14 opposed to the old-style dual program, the new-style programs do not allow one to stay in the system longer
15 than 20 days without being in an apprenticeship. As the latter implies a risk of having to start in a standard
16 school-based program with some delay, students are unlikely to enrol in a dual program if there is no sufficient
17 guarantee for an apprenticeship. And finally, as the number of participating students is hoped to increase
18 substantially in the near future, problems of lack of apprenticeships are likely to become more pressing over
19 time.

20 To be accredited as an apprenticeship firm, one has to fulfil a number of conditions related to its
21 infrastructure, its financial state and the mentor. However, quality control is moderate and less extensive than in
22 traditional apprenticeship countries such as Germany (Verhaest et al., 2018a). For instance, mentors are required
23 to pass a test and their mandatory training usually takes no more than one day. Moreover, there is no central
24 testing of the skills acquired during the apprenticeship and no way to sanction firms other than revoking their
25 accreditation. Also, figures on early termination of apprenticeship contracts point to problems of low quality;
26 over the period 2016-2019, about one in five apprenticeship contracts were terminated because of reasons related
27 to the firm and quality of the apprenticeship position (Flemish Partnership Dual Learning, 2019a). Consequently,
28 one may expect candidates that are less preferred by employers to be also more likely to end up at low-quality
29 positions.

1 The apprenticeship hiring process is not strictly regulated, but typically includes submitting a written
2 application (a concise resume) in combination with a brief unstructured interview. Unlike the German case, HR
3 professionals usually do not get more detailed information from the school, such as grades from a math class or
4 teacher recommendations. However, in case the student relies on personal networks to find an apprenticeship,
5 more detailed information about the background of the student may be available to them.

6 3. Experiment

7 3.1. *Vignette experiments*

8 To investigate which characteristics impact the employer's recruitment decision and what drives the selection of
9 students in apprenticeships, we conducted a vignette experiment. Vignette experiments, frequently used to elicit
10 human judgment, are based on the factorial survey method (Auspurg & Hinz, 2015; Jasso, 2006). In these
11 experiments, researchers present participants with short hypothetical descriptions - in our study descriptions of
12 fictitious applicants for apprenticeship positions - one-by-one. In each description, single attributes (factors) are
13 experimentally varied in their levels (Auspurg & Hinz, 2015), with each participant asked to carefully read and
14 judge a fraction of the descriptions.

15 Using vignettes has multiple interesting advantages. First, all information provided to the participants is
16 controlled by the researchers. Because we provide this information randomly to participants, selection on
17 unobservables or supply-side factors cannot affect the results and, therefore, estimates can be given a causal
18 interpretation. Second, the method allows us to test for the effects of individual attributes under various
19 hypothetical scenarios, for instance regarding the level of apprentice pay or the number of hours per week that
20 the apprentice is expected to be at the company or organisation. Third, vignette experiments are applicable to
21 socially sensitive topics, such as gender and race discrimination (Auspurg & Hinz, 2015). As each participant
22 only observes a fraction of all possible descriptions, it can be difficult for the participant to detect the socially
23 desirable answer (Auspurg & Hinz, 2015; Mutz, 2011). Furthermore, we also test respondents' tendency to
24 answer in a socially desirable way. We return to the potential social desirability bias in the data collection and
25 robustness analyses. Last, as opposed to quasi-experimental designs or correspondence experiments in which
26 fictitious applications are sent to real job openings, a vignette experiment enables us to explore the mechanisms
27 underlying the decision to hire particular groups of apprentices through the inclusion of additional statements
28 concerning these mechanisms after each vignette.⁷

1 3.2. *Vignette factors and factor levels*

2 We focus on Flemish youth with a lower-secondary education degree that aim to participate in a dual
3 apprenticeship programme to obtain an upper-secondary education qualification. We include the following eight
4 factors in our experiment: ethnic ancestry, gender, secondary education track, GPA, grade retention, knowledge
5 of the company or organisation, apprentice pay and the number of hours per week that the student spends at
6 the workplace. These factors are chosen based on the broad literature on access to regular employment, the
7 small body of literature on student access to apprenticeships, a few informal interviews with school
8 administrators that are familiar with the process of matching apprentices to apprenticeship places, and the
9 specific institutional context of Flanders. In addition, we conduct two pilot studies to avoid the inclusion of
10 dominant factors as well as test for the plausibility of the vignettes. Information on these factors and their levels
11 is summarized in Table 1.

12 Regarding ethnic ancestry, we include four groups: Flemish (Belgian), Italian, Turkish and Moroccan. The
13 latter three groups are the main second-generation immigrant groups usually considered in the research literature
14 on migratory and ethnic background in Belgium (Heath, Rethon, & Kilpi, 2008). These three groups are the
15 most significant categories of guest workers that migrated to Belgium after World War II (Poulain & Perrin,
16 2002; Timmerman, Vanderwaeren, & Crul, 2003). Rather than directly mentioning one's ethnic ancestry, these
17 groups are signalled in our experiment through the name of the fictitious applicant. These names were selected
18 based on official statistics on the most frequent first names and surnames of Belgian residents with a Belgian,
19 Italian, Turkish or Moroccan nationality. As we also include the factor gender, both male and female names were
20 selected. We further checked whether these names are not stereotypical and whether individuals living in
21 Flanders are able to make a distinction between the various ethnic groups based on a person's name. The latter
22 was tested using a pre-study whereby a random sample of individuals living in Flanders was asked to link several
23 names to ethnic groups. In total, 188 individuals answered this survey. Based on their answers, we selected, for
24 each ethnic group, two names (one male and one female name) generating maximal agreement.

25 In line with earlier research on this topic, we account for past educational records by including GPA (see
26 among others Kübler et al., 2018; Piopiunik et al., 2020). In our experiment, GPA refers to the previous school
27 year and ranges from 55% to 85%. In addition, we account for grade retention as a feature of one's past
28 educational records (see among others Helland & Støren, 2006; Hupka-Brunner et al., 2010). Since grade
29 retention is an easily observable characteristic that may be correlated with one's abilities and acquired human

1 capital, it is likely to serve as an important signal to employers. Grade retention ranges from zero to two years in
2 our experiment. As a last indicator of one's educational record, we account for the educational track of the
3 student, distinguishing between students that participate in a dual programme as part of either the technical track
4 or the vocational track. While both tracks prepare students for similar occupations, the technical track is generally
5 considered to be relatively more challenging and therefore attracts students that are relatively more favourable
6 in terms of abilities and background in comparison to the vocational track. We, therefore, expect employers to
7 prefer applicants from the technical track.

8 Different from other studies in this respect, we also test for the role of motivation as revealed through
9 the student's expressed knowledge of the HR professional's company or organisation. For four main reasons,
10 we believe the inclusion of this information to be important. First, there is ample evidence showing that the
11 intrinsic motivation of employees is an important driver of performance (Cerasoli, Nicklin, & Ford, 2014). Any
12 indication of this motivation thus provides valuable information for the recruiter. Second, the importance of
13 motivation was also highlighted during informal interviews with HR professionals or employers, as well as with
14 the school administrators familiar with the process of matching apprentices. Third, research has shown that also
15 recruiters' perceptions of applicant fit with the organisation plays a crucial role during early interviews (Kristof-
16 Brown, 2000). More extensive knowledge of the organisation might thus not just indicate that the student is
17 highly motivated, but also that she has investigated her fit with the organisation. Fourth, knowledge of the
18 organisation is perhaps the single more direct indicator of motivation that is also observable in more rudimentary
19 recruitment processes, either because applicants reveal this information in their motivation letter or because it is
20 easily queried during a short phone call or selection interview. Including this information should therefore
21 improve the external validity of our experiment. Fifth, this information may deliver a strong indication of quit
22 behaviour, which is likely to be an important factor when considering whether to train apprentices. Sixth, it puts
23 the importance of the other, less easily manipulable attributes into perspective and allows to assess whether
24 negative signals in terms of personal characteristics and educational records are easily compensated by revealing
25 more direct indications about one's motivation.

26 <Table 1 about here>

27 Finally, we incorporate the level of apprentice pay and the number of weekly hours that the student
28 spends at the company or organisation. In Flanders, each of these characteristics is strictly regulated and, given
29 one's program choice, cannot be influenced by the candidate. Therefore, these characteristics are to be

1 considered as being regulatory features rather than behavioural characteristics. We do so for three main reasons.
2 First, there is some variation in these two characteristics in Flanders depending on the programme. By adding
3 these attributes, we ensure that our outcomes are valid across these different contexts and thus create a realistic
4 setting in our vignettes. Second, given the relatively recent reform of the system, these two characteristics are
5 still the subject of debate and may be open to adaptation in regulations in the near future (Verhaest et al., 2018a).
6 By including these two attributes, we aim to guide policy makers in making more informed decisions in this
7 respect. Third, the inclusion of apprentice pay allows to put the relative importance of the other vignette
8 characteristics into perspective. While we expect the effect of apprentice pay on the likelihood to be hired for
9 an apprenticeship to be negative, the impact of the number of weekly hours is theoretically ambiguous. Although
10 an increase in the number of hours increases the time during which the training cost may be recouped, it also
11 increases workplace training requirements, since it results in a reduction of the number of school-based training
12 hours. The level of apprentice pay, which is an allowance rather than a wage in the Flemish context, ranges from
13 zero to ten euros per hour in our experiment, while the number of weekly working hours ranges from eight
14 hours (one day) to thirty-two hours (four days) per week. These intervals encompass current regulations, with
15 apprentice pay ranging from zero if the student spends less than 20 hours per week at the workplace, to
16 approximately 6.1 euro per hour on average if the student spends 20 hours per week or more at the workplace,
17 and weekly working hours ranging from 14 to 24 hours depending on the programme (Flemish Government,
18 2016).

19 **3.3. Vignette selection and presentation**

20 The factorial product of all vignette levels resulted in 9216 (i.e. $4 \times 2 \times 2 \times 4 \times 3 \times 2 \times 6 \times 4$) possible combinations.
21 From this vignette universe, 384 vignettes were drawn using a D-efficient design (Auspurg & Hinz, 2015).⁸ These
22 384 vignettes were then grouped into 64 sets of six vignettes, which were distributed at random to the
23 participants. Furthermore, the vignettes within each set were displayed in a random order to the participant to
24 prevent order effects. The method guarantees that the vignette factors are nearly orthogonal, meaning that the
25 vignette factors are uncorrelated (see Appendix A1 for the post-survey correlations), and that the vignette levels
26 within each factor are nearly balanced, meaning that they appear equally often (see Appendix A2 for descriptive
27 statistics on the vignette factors).

28 Before reading and evaluating the vignettes, participants were introduced to their role as recruiter. A
29 translation of the Dutch introduction along with an example of a vignette is included in Appendix A3. The

1 participant was informed that all described students are at the start of the fifth grade of secondary education and
2 applied for an apprenticeship in September 2018. The goal of the experiment was not communicated. After this
3 introduction, six descriptions and the related questions were displayed one-by-one.

4 In line with Auspurg and Hinz (2015), the information in our descriptions was presented in a tabular way.
5 These researchers argue that, compared to text vignettes, tabulated vignettes are likely to better reflect decision
6 tasks in which the presentation of decision criteria in a tabular way is usual (Auspurg & Hinz, 2015: p. 74).
7 Moreover, these tabular vignettes are frequently used in other state-of-the-art vignette experiments in economics
8 and sociology (see e.g. Karpinska, Henkens, & Schippers, 2013; Kübler et al., 2018; Van Belle, Caers, De Couck,
9 Di Stasio, & Baert, 2019).

10 The use of tabular vignettes has two potential drawbacks. First, the researcher's manipulations might be
11 more easily detected by the participant, potentially causing the participant to answer in a socially desirable way.
12 Fortunately, vignettes reduce this risk by simultaneously manipulating the factors, making it more difficult for
13 the participant to detect the socially desirable answer (Auspurg & Hinz, 2015; Mutz, 2011). Furthermore,
14 research has shown that information about experimenter intent on treatment effects in survey experiments
15 generally does not alter the treatment effects (Mummolo & Peterson, 2019). Nonetheless, we cannot exclude
16 ~~social desirability bias to remain an issue~~ [social desirability bias as a concern](#) with respect to socially sensitive
17 factors like gender and ethnicity. Second, we might overestimate the effect of our vignette characteristics as these
18 characteristics may be less visible in real-life circumstances. However, this should not be a major problem in our
19 case as the considered characteristics in our study are also easily visible in practice, either because they are part
20 of the standard set of CV characteristics, or because they are automatically revealed during the interview.

21 **3.4. Outcome variables**

22 After reading the vignette, participants rated various statements, reported in Table 2. The first two statements
23 are related to the student's labour market outcomes and are both rated on an 11-point Likert scale. First, the
24 participants indicated for each description their intentions to offer the described student an apprenticeship.
25 Second, participants expressed for each description their intentions to offer the described student a regular
26 employment agreement after completing her/his apprenticeship.⁹

27 Next, participants were asked to assess the expected trainability (human capital, and pre-existing abilities
28 and motivations), quit intentions and employability associated with each vignette.¹⁰ To measure perceived
29 trainability, we rely on a total of seven items rated on a 7-point Likert scale which are grouped in two subscales.

1 The first subscale includes four statements that indicate the applicant's trainability because of the human capital
2 being acquired at school (Cronbach's alpha = 0.935). Participants indicated whether they think the described
3 student has acquired sufficient general (statement 1) and vocational (2) knowledge and skills to adequately learn
4 in their company or organisation and whether they think the student would acquire sufficient general (3) and
5 vocational (4) knowledge and skills in the upcoming two years to adequately learn in their company or
6 organisation. The second subscale groups three items indicating the candidate's trainability resulting from
7 pre-existing abilities and motivations (Cronbach's alpha = 0.856). Participants indicated whether they think the
8 described student has a good attitude (1), sufficient talent (2) and sufficient social skills (3) to adequately learn in
9 their organisation.

10 The perceived quit intentions of the described student are assessed by means of two statements each
11 rated on an 11-point Likert scale (Cronbach's alpha = 0.807), one referring to quit intentions during the training
12 period (1) and a second one referring to quit intentions during the first two years after the start as a regular
13 worker (2). A two-year time period was chosen, as employers might end the training period with a net cost and
14 seek post-training benefits, such as saved hiring costs by retaining former apprentices, to recoup their investment
15 (Moretti, Mayeri, Muehleemann, Schlogl & Wolter, 2017).

16 Last, to assess the perceptions of the student's employability, we rely on four statements rated on a 7-point
17 Likert scale (Cronbach's alpha = 0.659). They test whether the student is perceived as immediately employable
18 as an apprentice (1) or as a skilled worker (2), or whether she/he needs further training before she/he can be
19 employed (3 and 4). The values of all four scales (trainability – acquired human capital, trainability – pre-existing
20 abilities and motivations, quit intentions, employability) were computed as the average over the relevant
21 statements.¹¹

22 < Table 2 about here >

23 **3.5. Data collection and sample**

24 The online survey was distributed via email from March 2018 to May 2018 to a total of 6024 individuals who
25 were selected from contact persons for vacancies that were published on the website of the Public Employment
26 Agency (PEA) of Flanders from 2017 onwards.¹² Furthermore, to ensure that only HR professionals filled out
27 the survey, a first question asked if the participant was either responsible for or involved in a hiring decision
28 over the last year. Only those answering affirmative to this introductory question were allowed to continue the
29 survey. From the original sample, 767 individuals clicked the survey link. Of these 767 individuals, 107 individuals

1 were excluded from the survey because they lacked hiring experience. Of the remaining 660 individuals, 276 HR
2 professionals (41.8%) screened 1286 hypothetical descriptions, where each participant rated one to six
3 vignettes.¹³ While this response seems low, we neither know how many respondents opened the email, nor do
4 we know the exact proportion of HR respondents in the original sample. Furthermore, our sample is, based on
5 ethnicity and gender, fairly representative of the population, as discussed in the next paragraphs.

6 Along with the experimental questions, the participants got a number of additional queries about their
7 personal characteristics and those of their organisation (see Appendix A5); to assess the overall composition of
8 the sample. Furthermore, to assess respondents' tendency to answer in a socially desirable way and to correct
9 for potential biases in this respect, we included the thirteen item Marlowe-Crowne Social Desirability Scale
10 (Reynolds, 1982); we return to this when outlining our robustness analyses. All of these additional questions
11 were asked after the vignette experiment to ensure participants were not influenced by these questions in their
12 evaluation of the vignettes.

13 A majority of the HR professionals in the sample has a Belgian (Flemish) background (97%) and is female
14 (64%).¹⁴ To assess the representativeness of our sample, we follow Van Belle et al. (2018) and compare our
15 participants' characteristics to the characteristics of HR professionals in the European Social Survey (ESS) waves
16 1 to 9 (see Appendix A6). Within the ESS sample of HR professionals, 95% stated that they belong to the ethnic
17 majority group and 61% is female, which is relatively similar to the composition of our sample.

18 In terms of the size of their organisation, the sample is relatively heterogeneous, with medium-sized
19 organisations (50-249 employees) being the most significant group (36%). Furthermore, approximately 61% of
20 the organisations operate in the private sector, 71% are located outside the main cities, 89% rated the economic
21 status of their organisation rather positive, and 51% stated that they experienced some difficulties in filling
22 vacancies.¹⁵ Finally, around half of the firms in our sample employ mostly lower educated individuals (52%) and
23 almost all firms have trained workers over the past year (87%). Even if our sample is unlikely to be entirely
24 representative to the population of training firms, it is thus sufficiently heterogeneous to ensure that our results
25 are not driven by a specific subgroup ~~and allows us to run sensitivity and to be able to run some sensitivity~~
26 analyses in this respect.

1 4. Results

2 4.1. Hiring decisions

3 We first investigate the causal impact of the vignette characteristics on student access to apprenticeships and to
4 regular employment after the apprenticeship. To this end, we estimate regression models with each hypothetical
5 description as observation unit, the answer on either the apprenticeship hiring scale or the regular job hiring
6 scale as dependent variable, and all vignette factors as independent variables.¹⁶ To account for heterogeneity
7 across HR professionals, firms and jobs, we include individual fixed-effects and correct the standard errors for
8 clustering. For the ease of interpretation, all estimates in our main analysis are based on standard linear regression
9 and robust standard errors to account for heteroscedasticity (cf. Angrist and Pischke, 2008).

10 The results, displayed in Table 3, show that past educational records affect hiring decisions in a statistically
11 significant way. In general, higher-performing students (higher grades, no grade retention, and participation in
12 the technical track) have a higher probability of gaining access both to an apprenticeship and to subsequent
13 regular employment. For grades, the estimate on the likelihood of gaining access to both labour market
14 opportunities is equivalent to an increase in one's hiring chances, measured on a scale from 0 to 10, by 0.043 to
15 0.046 for a one percentage-point increase in grades. For grade retention, we find the effect of a one (two) year
16 grade retention, as opposed to no grade retention, to be equivalent to a reduction in one's hiring chances by
17 0.459 (0.699) for access to an apprenticeship and by 0.442 (0.722) for access to subsequent regular employment
18 on a scale from 0 to 10. Additional tests indicate that the grade retention effect can vary by the nature of the
19 respondent, as grade retention seems to be penalised more (less) in organisations where employees most
20 frequently hold a higher education degree, bachelor or master, (secondary education or lower) and organisations
21 in the private (public) sector.¹⁷ Third, participation in the technical track also increases employment chances, as
22 those with a technical secondary education have a 0.476 (access to an apprenticeship) and 0.367 (access to
23 subsequent regular employment) higher hiring chance than otherwise identical peers in the vocational track.

24 In addition, hiring decisions are affected by the student's motivation, as revealed by the expressed
25 knowledge of the HR professional's organisation. The latter effect is quite substantial; with respect to access to
26 apprenticeships, it is about equivalent to the effect of two years of grade retention or a 15 percent point higher
27 GPA and even exceeds the effect of participation in the technical track (compared to the vocational track).
28 Interestingly, additional tests (reported in Table 3, column b) indicate some interactions between the applicants'
29 motivation, and past educational records. First, we find a negative interaction between revealed motivation and

1 GPA with respect to both outcomes. As the main effect of GPA remains statistically significant for those who
2 reveal being motivated, this indicates that revealing motivation serves as a partial (but not a full) substitute for
3 low GPA. Second, also a negative interaction between motivation and grade retention shows up, albeit regarding
4 access to regular employment only.¹⁸ This suggests both variables to be complements, with revealed motivation
5 being more effective for those without grade retention.

6 The evidence on the importance of personal characteristics is more mixed. While the estimated effect of
7 ethnic ancestry on student's access to apprenticeships is largely statistically insignificant, our results suggest that
8 having an Italian or Turkish sounding name, as opposed to a Flemish sounding one, is detrimental to one's
9 chances of subsequently gaining access to regular employment. The effect is equivalent to reducing one's hiring
10 chances, measured on a scale from 0 to 10, by 0.300 and 0.271 for those with an Italian or Turkish sounding
11 name respectively. Moreover, additional analyses in which we combine all non-Flemish ethnicities (Italian,
12 Turkish and Moroccan) reveal that non-Flemish ancestry negatively affects access to a standard job, rather than
13 access to an apprenticeship.¹⁹ Employers may be more selective when it comes to regular employment because
14 it often implies a long-term agreement. However, the effects might be underestimated due to social desirability.
15 Gender, meanwhile, is not found to influence any of the two hiring decisions when relying on the full sample,
16 although also these estimates are potentially biased due to socially desirable answering.

17 Finally, the results on the importance of the regulatory context are largely in line with expectations.
18 Reasonably, apprentice pay is found to affect one's chances of being hired as an apprentice but not as a regular
19 worker afterwards. The estimate on the likelihood of being hired as an apprentice is strongly statistically
20 significant and equivalent to a reduction in one's hiring chances, measured on a scale from 0 to 10, by 0.058 for
21 a one euro increase in hourly apprentice pay. In contrast, the number of weekly working hours is not found to
22 be related to one's hiring chances, suggesting that the perceived higher benefits resulting from an increase in the
23 time during which training costs may be recouped are entirely compensated by increased perceived training costs
24 resulting from increases in workplace training requirements.

25 < Table 3 about here >

26 **4.2. Perceived trainability, quit intentions and employability**

27 Next, we examine, by means of similar linear regression analyses, how the vignette characteristics causally affect
28 the employers' perception of the students' trainability (resulting either from acquired human capital or from
29 pre-existing abilities and motivations), quit intentions and employability as potential mechanisms underlying their

1 hiring decisions. These results are reported in Table 4. In Appendix A7, we also report more detailed analyses
2 for each of the individual items in the (sub)scales.

3 Overall, our results are in line with the expectation that favourable educational records signal high
4 trainability, high employability and low quit intentions. However, while GPA seems to consistently affect the
5 rating on all four gauged (sub)scales in a similar way, additional regression analyses based on the deviance
6 between each pair of scales, reported in Appendix A8,²⁰ indicate that the impact of the GPA is larger on the
7 trainability and employability scale, than the perceived quit behaviour scale. While a ten percentage point higher
8 GPA increases one's perceived acquired human capital, pre-existing abilities and motivations, and employability
9 by 0.41, 0.36 and 0.35 respectively, it only decreases one's perceived quit behaviour by 0.25, on a scale from 0 to
10 10. The effects of the educational track and grade retention are also somewhat heterogeneous. Although grade
11 retention affects the rating on all subscales, it seems relatively more indicative of trainability because of lower
12 pre-existing abilities and motivations than because of acquired human capital. We find the effect of a one (two)
13 year grade retention, as opposed to no grade retention, to be equivalent to a reduction in one's perceived
14 pre-existing abilities and motivations by 0.329 (0.675), as opposed to a reduction in perceived acquired human
15 capital by 0.247 (0.453), on a scale from 0 to 10. The educational track, meanwhile, influences the perceptions
16 employers have about the student's trainability and employability, but not about her/his quit intentions.
17 Employers seem to perceive students from the technical track as more trainable because of both their acquired
18 human capital and their pre-existing abilities and motivations. Measured on a scale from 0 to 10, having a
19 technical background increases one's perceived acquired human capital and pre-existing abilities and motivations
20 by 0.425 and 0.320 respectively.

21 Next to the student's educational records, their motivation, as revealed by their knowledge of the company
22 or organisation, is also used as a signal of high trainability, high employability and lack of quit intentions. The
23 size of its effect on the quit intentions, employability and trainability (pre-existing abilities and motivations)
24 subscales is, in absolute terms ranging from 0.322 to 0.697 measured on a scale from 0 to 10, more or less
25 equivalent to the effect of two years of grade retention. More detailed analyses indicate that expressing extensive
26 knowledge of the company or organisation primarily affects perceived trainability because of having a good
27 attitude (see Appendix A7). The effect on perceived trainability through acquired human capital, meanwhile, is
28 somewhat less dominant.

1 Personal characteristics (ethnic ancestry and gender) meanwhile seem to be less important in signalling
2 trainability, quit intentions and employability. Nonetheless, gender does affect perceived employability, with men
3 being perceived as more employable than women. A first potential explanation for this remarkable result may
4 be the difference in the composition of the group of boys and girls in secondary vocational education. Overall,
5 girls participate relatively more often than boys in the general track (Neyt, Verhaest, & Baert, 2018), thus making
6 those girls that participate in vocational education a more (negatively) selected group. Moreover, within tracks,
7 girls on average obtain higher levels of GPA and experience less grade retention. Therefore, among applicants
8 with similar educational records, employers may perceive boys to be more employable than girls. This is in line
9 with the theory of statistical discrimination (Arrow, 1973; Phelps, 1972), which states that employers (who have
10 imperfect information on an applicant's productivity) use statistical information on the group to infer
11 productivity.²¹ A related potential explanation concerns childbearing and family obligations, with women having
12 a higher tendency than men to take a leave of absence, to work part-time or to quit (McIntosh, McQuaid, Munro,
13 & Dabir-Alai, 2012; Paull, 2008).²² As regards ethnic ancestry, the results indicate no significant effects on any
14 of the four (sub)scales. This is consistent with the impact of this variable on access to regular employment being
15 driven by other mechanisms like taste-based discrimination. However, social desirable answering might again
16 bias these results and the analyses based on the individual items do suggest some negative effect of non-native
17 ancestry on perceived trainability because of lower perceived social skills (see Appendix A7).

18 Finally, the results do not indicate that the contextual factors related to apprentice pay and the number of
19 weekly working hours play a major role in shaping the employer's perceptions of the trainability, employability
20 and quit intentions of the apprentice candidate. Overall, this is in line with our expectations since these regulatory
21 characteristics cannot be influenced by the candidate.^{23,24}

22 < Table 4 about here >

23 **4.3. Robustness analyses**

24 We check the robustness of our results in various ways. First, we also perform ordered logistic and probit
25 regressions with participant characteristics and organisation characteristics as control variables, and we also run
26 random-effects linear regression models, random-effects ordered logit and probit regression models. None of
27 these alternative model specifications change any of the results in a notable way.²⁵

28 Second, we re-run our analyses on the hiring chances for various subsamples based on the gender of the
29 HR professional, the size of the organisation, whether the organisation is rather private or public, the economic

1 activity (secondary, tertiary and quaternary sector), and whether the organisation had employed an apprentice
2 within a dual learning program over the last year. A subset of these findings is reported in Table 5 (see Appendix
3 A10 and A11 for the full set of results). While conclusions are largely robust across the various subsamples when
4 considering the likelihood to be hired as an apprentice, a few notable differences are revealed regarding access
5 to regular jobs. First of all, we ~~do~~ find ethnic ancestry to significantly affect this outcome for part of the
6 subsamples only ([large firms](#), [firms in the secondary sector](#), and/or [firms that have recently employed an
7 apprentice](#); see [column b1](#), [column a2.1](#) and [column a3](#) respectively), suggesting some heterogeneity in
8 discriminatory practices across firms and HR professionals. However, the coefficients on ethnic ancestry are in
9 most cases not statistically significantly different across the subsamples. Second, we ~~do~~ find a preference for
10 males (over females) among those that are employed in the secondary sector ([column a2.1](#)), in large firms
11 ([column b1](#)), and/or in firms that have recently employed an apprentice from a dual program ([column a3](#)). The
12 results for large firms and ~~recruiters~~ [firms](#) with recent experience [in hiring](#) with apprentices are consistent with
13 the aforementioned interpretation of statistical discrimination, as one can expect that more experienced
14 recruiters have more accurate information regarding a group's average abilities. However, also other factors like
15 the importance of physical strength for many jobs in the secondary sector might play a role (cf. Kübler et al.,
16 2018). Finally, we ~~do~~ find HR professionals in small organisations to prefer former apprentices that have spent
17 more hours per week in the firm ([column a1](#)), probably because these organisations attach more value to firm-
18 specific skills (cf. Mohrenweiser & Zwick, 2009).

19 < Table 5 about here >

20
21 Third, while the vignette factors are nearly orthogonal and the levels within each factor are nearly balanced
22 in the entire sample, our experiment was originally designed based on sets of six vignettes per respondents.
23 Therefore, we perform our analyses for a subsample of participants based on the number of vignettes evaluated,
24 including only those participants who answered all six vignettes. The results, reported in Appendix A12, are
25 qualitatively similar to those for the full sample, although we now find significant effects on access to regular
26 employment for each of the three non-Belgian ethnic ancestry categories.

27 Finally, we re-analyse our data based on a subsample that excludes those participants with a high tendency
28 to answer in a socially desirable way. To this end, we rely on the Marlowe-Crowne Social Desirability Scale
29 (Reynolds, 1982). This scale is based on the sum of the scores on thirteen items (Cronbach's alpha = 0.562) that
30 are valued with 1 (apply) or 0 (not apply). The higher this score, the more the participant tends to answer in a

1 socially desirable way. We exclude those 130 participants with a score exceeding one standard deviation above
2 the mean. The results based on this subsample, which are reported in Appendix A13, are qualitatively largely
3 similar to those for the full sample. Only the coefficient on the effect of Turkish ancestry on access to regular
4 employment is no longer statistically significant. However, the size of this coefficient remains similar and
5 grouping the three dummies for ethnic background together still delivers a statistically significant negative effect
6 for being of non-Belgian ancestry. Additionally, our conclusions do not change when adopting larger cut off
7 values. Although these results do not disprove social desirability bias to be an issue, they are reassuring.

8 **5. Conclusion**

9 Using a vignette experiment, we estimated the causal effects of past educational records, personal characteristics,
10 knowledge of the company or organisation (revealed motivation), and several contextual factors on students'
11 access to apprenticeships and subsequent formal employment. We focused on less-qualified youth who aim to
12 participate in a dual apprenticeship programme to obtain a minimum school qualification, a group of individuals
13 that has otherwise been overlooked by the literature.

14 Overall, our results indicate that many of the individuals for whom the problem of youth unemployment
15 is most acute have fewer chances of finding an apprenticeship position. In particular, we found that students
16 with less favourable educational records (in terms of their GPA, grade retention, and educational track) and
17 those with lower levels of revealed motivation, as demonstrated by their knowledge of the company or
18 organisation, are less likely to gain access to an apprenticeship position and to subsequently gain regular
19 employment. Next, apprentice pay was found to negatively affect access to an apprenticeship, suggesting that
20 unequal access to apprenticeships may be reduced by policies of pay differentiation. Finally, the student's ethnic
21 background, signalled through their name, bore an influence on their access to regular employment—consistent
22 with the literature— but not their access to an apprenticeship. It is possible that employers are more selective
23 when hiring for positions that involve a long-term agreement.

24 In contrast to the few other studies on this issue, we investigated the mechanisms driving employers hiring
25 these groups of apprentices through the use of additional statements after each vignette. Overall, our results are
26 consistent with the idea that perceived trainability (either because of acquired human capital or because of
27 pre-existing abilities and motivations), perceived quit intentions, and perceived employability are important
28 mechanisms underlying the effects of educational records and demonstrated knowledge of the company or
29 organisation on one's chances to be hired as an apprentice or as a regular worker thereafter. We found that a

1 student's educational records and knowledge of the company or organisation (revealed motivation) causally
2 affect the HR professional's perceptions about the candidate's trainability, employability, and quit intentions.
3 Overall, these findings are consistent with employers preferring candidates associated with the largest potential
4 benefit to the firm, both during and after the apprenticeship period. Note, however, that the preference for
5 native candidates is an exception in this respect, as ethnic ancestry was not found to causally affect perceived
6 trainability, employability, and quit intentions. The findings for ethnic ancestry thus suggest that other
7 mechanisms, such as taste-based preferences, might also matter in some cases.

8 We end by acknowledging some limitations inherent in the use of vignette designs in general and our
9 study in particular. First, some social desirability bias cannot be excluded with respect to the gender and ethnicity
10 effects, potentially leading to an underestimation of their importance. Second, dominant factors that might
11 strongly or even completely dominate the employers' choices (Amaya-Amaya et al., 2008) can lead to an
12 underestimation of the importance of other factors. As such, we conducted two pilot studies to avoid the
13 presence of dominant factors. Third, as vignettes use hypothetical scenarios, the data collection did not take
14 place under real-life conditions. The former can bias our results in two ways. On the one hand, the lack of
15 real-life conditions can lead to an overestimation of the importance of certain factors, as employers aren't
16 restricted by formal or legal rules. On the other hand, it can lead to an underestimation, as employers might be
17 less fault-finding because their judgement has no real-life consequences such as costly and unnecessary job
18 interviews due to an inaccurate evaluation. However, the lack of real-life conditions is mainly considered an issue
19 for direct question-based surveys (Auspurg & Hinz, 2015); by including HR professionals familiar with hiring
20 decisions only, we targeted the appropriate population for participation. Another limitation is that we did not
21 measure actual behaviour, even if self-reported measures of perceptions based on vignette studies have been
22 found to be highly correlated with actual behaviour (Hainmueller, Hangartner, & Yamamoto, 2015). Fourth, our
23 results do not apply to access to apprenticeships with employers within the students' personal networks. As
24 these employers may have more detailed information about the students' skill set, the effects of characteristics
25 that serve as crude proxies for these skills may be smaller in this context.

26 Finally, while we observe differences in the likelihood to gain access to a particular apprenticeship, we do
27 not know whether these translate into differences in the likelihood of securing an apprenticeship. For instance,
28 it may be the case that, as long as the supply of apprenticeships falls short of the number of available positions,
29 every candidate is ultimately hired. Nonetheless, observing unequal access to individual apprenticeship positions
30 is an important prerequisite for unequal access to the system in general. Moreover, a shortage of positions is a

1 problem that many countries with an apprenticeship system face, either more permanently (Kuczera, 2017) or
2 during times of economic slowdown (Brunello, 2009; Dietrich & Gerner, 2007). Further, even if the number of
3 apprenticeship positions exceeds the number of apprentices, employers are unlikely to hire an apprentice who is
4 assessed as possibly generating a negative net-benefit to the firm. And finally, even in the case that every
5 candidate manages to secure an apprenticeship, candidates at the back of the labour queue face less options and
6 are, therefore, more likely to end up with apprenticeships that are less challenging and of lower quality.

7 That being said, given the lack of studies investigating the motives and mechanisms driving an employer's
8 decision, further research in this direction using similar methods is advised. First, this research may consider the
9 role of mechanisms that were not investigated in this study, such as taste-based preferences, which may in
10 particular be relevant to ~~explaining~~ ~~explicating~~ the effect of ethnic ancestry, and cognitive biases and heuristics.
11 Second, apart from focussing on the behaviour of employers, a compelling issue that ~~warrants~~
12 ~~investigation~~ ~~warrants~~ ~~investigating~~ is the determinants of apprentices' willingness to access apprenticeship offers.
13 And finally, while not the main focus of our study, our results suggest that contextual and regulatory factors are
14 also of significance. We are in favour of more research in this respect as well, investigating both which of these
15 contextual factors matter most and whether and how these contextual factors may affect the impact that
16 individual characteristics have on one's chances of being hired as an apprentice.

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1 **Tables**

2 **Table 1. Factors and Corresponding Levels**

Factor	Levels	Additional information
Ethnic ancestry	1 Flemish (Belgian) 2 Italian 3 Turkish 4 Moroccan	The students' ethnic ancestry was signalled through her/his name. ²⁶
Gender	1 Male 2 Female	The students' gender was signalled through her/his name, as well as mentioned as a factor.
Education	1 Technical Secondary Education 2 Vocational Secondary Education	
Grade point average (GPA)	1 55% 2 65% 3 75% 4 85%	The GPA indicated the overall percentage obtained by the student in the previous school year (2016-2017). The GPA was mentioned during a conversation with the applicant.
Grade retention	1 No grade retention 2 One year of grade retention 3 Two years of grade retention	
Knowledge of the company or organisation	1 Extensive (the student looked up information of the company or organisation) 2 Rather limited	The student's motivation is revealed through the student's knowledge of the company or organisation.
Apprentice pay	1 0 euro/hour 2 2.06 euro/hour 3 4.11 euro/hour 4 6.17 euro/hour 5 8.22 euro/hour 6 10.28 euro/hour	The levels take into account the current regulation in Belgium, where apprentice pay ranges from zero if the student spends less than 20 hours per week at the workplace, to approximately 6.1 euro per hour ²⁷ on average if the student spends 20 hours or more per week at the workplace. Furthermore, the upper level is based on the hourly minimum wage in Belgium. ²⁸
Hours per week at the workplace	1 8 hours/week 2 16 hours/week 3 24 hours/week 4 32 hours/week	The number of hours per week is based on the regulation that the student must spend at least one day per week at a company or organisation (8 hours) and at least study one day at school (32 hours per week at the company or organisation).

3

Table 2. Vignette questions

	Statement	Rating
Labour market outcomes	<ol style="list-style-type: none"> 1. The probability that I will offer this student an apprenticeship is high. 2. The probability that I will offer this student a regular employment agreement after her/his apprenticeship is high. 	11-point Likert scale
Perceived trainability through acquired human capital (Cronbach's alpha = 0.931)	<ol style="list-style-type: none"> 1. I think that this student so far has acquired sufficient general knowledge and skills at school to adequately learn in the company or organisation. 2. I think that this student so far has acquired sufficient vocational knowledge and skills at school to adequately learn in the company or organisation. 3. I think that this student will acquire sufficient general knowledge and skills at school in the upcoming two years to adequately learn in the company or organisation. 4. I think that this student will acquire sufficient vocational knowledge and skills at school in the upcoming two years to adequately learn in the company or organisation. 	7-point Likert scale
Perceived trainability through pre-existing abilities and motivations (Cronbach's alpha = 0.864)	<ol style="list-style-type: none"> 1. I think that this student has a good attitude to adequately learn in the company or organisation. 2. I think that this student has sufficient talent to adequately learn in the company or organisation. 3. I think that this student has sufficient social skills to adequately learn in the company or organisation. 	7-point Likert scale
Perceived quit intentions (Cronbach's alpha = 0.807)	<ol style="list-style-type: none"> 1. The probability that this student quits the training early is high. 2. The probability that this student quits her/his job within two years after the training is high. 	11-point Likert scale
Perceived employability (Cronbach's alpha = 0.661) ²⁹	<ol style="list-style-type: none"> 1. I think that this student can be employed immediately as an apprentice in our company or organisation. 2. I think that this student can be employed immediately as a skilled worker in our company or organisation. 3. I think that this student needs further training at school before she/he can be employed as an apprentice in our company or organisation. 4. I think that this student needs further training at school before she/he can be employed as a skilled worker in our company or organisation. 	7-point Likert scale

Note. For the regression analyses, the variables measured on a 7-point Likert scale are recoded to an 11-point Likert scale (from 0 to 10) to give an easily comprehensible and comparable overview of the effects.

Table 3. Effect of Vignette Factors on Access to Apprenticeships and to Subsequent Regular Employment

	Access to apprenticeship		Access to regular employment	
	(1a)	(1b)	(2a)	(2b)
Italian	-0.161 (0.140)	-0.165 (0.140)	-0.300** (0.128)	-0.299** (0.128)
Turkish	-0.240* (0.143)	-0.245* (0.142)	-0.271** (0.132)	-0.267** (0.132)
Moroccan	0.003 (0.141)	0.004 (0.141)	-0.141 (0.127)	-0.138 (0.126)
Flemish (reference)				
Male	0.058 (0.108)	0.049 (0.108)	0.128 (0.092)	0.119 (0.092)
Technical secondary education	0.476*** (0.114)	0.478*** (0.115)	0.367*** (0.101)	0.367*** (0.101)
Grade point average (GPA)	0.046*** (0.005)	0.057*** (0.007)	0.043*** (0.005)	0.052*** (0.007)
1 year of grade retention	-0.459*** (0.111)	-0.388** (0.152)	-0.442*** (0.099)	-0.270* (0.141)
2 years of grade retention	-0.699*** (0.133)	-0.617*** (0.177)	-0.722*** (0.116)	-0.536*** (0.167)
No grade retention (reference)				
Extensive knowledge of the company or organisation	0.711*** (0.107)	2.232*** (0.646)	0.619*** (0.100)	1.995*** (0.551)
Apprentice pay	-0.058*** (0.016)	-0.058*** (0.016)	-0.008 (0.014)	-0.008 (0.014)
Hours per week at the workplace	0.003 (0.006)	0.003 (0.006)	0.006 (0.005)	0.006 (0.005)
Extensive knowledge of the company or organisation × Grade point average		-0.020** (0.009)		-0.017** (0.008)
Extensive knowledge of the company or organisation × Grade retention (1 to 2 years)		-0.143 (0.207)		-0.347* (0.190)
Constant	2.205*** (0.387)	1.427*** (0.543)	1.645*** (0.366)	0.933* (0.498)
R-squared	0.205	0.209	0.204	0.209
Adjusted R-squared	0.198	0.201	0.197	0.201

Notes. N = 1286. The number of clusters = 276. The presented statistics are coefficient estimates and standard errors in parentheses based on a fixed-effects (within) regression with the participant as panel variable. The standard errors are corrected for clustering of the observations at the participant level. *** (**) (*) indicates significance at the 1% (5%) (10%) significance level.

Table 4. Effects of the vignette characteristics on perceived trainability, quit intentions and employability

	Perceived trainability: acquired human capital (M_1)	Perceived trainability: pre-existing abilities and motivations (M_2)	Perceived quit intentions (M_3)	Perceived employability (M_4)
	(1)	(2)	(3)	(4)
Italian	-0.055 (0.112)	-0.143 (0.116)	-0.049 (0.132)	-0.025 (0.107)
Turkish	-0.079 (0.103)	-0.150 (0.105)	0.055 (0.129)	-0.139 (0.103)
Moroccan	-0.060 (0.099)	-0.049 (0.095)	-0.038 (0.125)	0.125 (0.105)
Flemish (reference)				
Male	0.000 (0.086)	-0.027 (0.078)	0.097 (0.091)	0.213*** (0.073)
Technical secondary education	0.425*** (0.096)	0.320*** (0.085)	-0.078 (0.082)	0.258*** (0.077)
Grade point average (GPA)	0.041*** (0.004)	0.036*** (0.004)	-0.025*** (0.004)	0.035*** (0.004)
1 year of grade retention	-0.247*** (0.078)	-0.329*** (0.079)	0.143 (0.090)	-0.169** (0.075)
2 years of grade retention	-0.453*** (0.093)	-0.675*** (0.097)	0.487*** (0.113)	-0.451*** (0.090)
No grade retention (reference)				
Extensive knowledge of the company or organisation	0.322*** (0.077)	0.697*** (0.088)	-0.429*** (0.093)	0.414*** (0.072)
Apprentice pay	0.001 (0.010)	0.002 (0.010)	-0.019 (0.012)	-0.001 (0.010)
Hours per week at the workplace	0.001 (0.004)	0.004 (0.004)	0.004 (0.004)	0.005 (0.004)
Constant	2.024*** (0.315)	2.721*** (0.300)	6.136*** (0.341)	1.391*** (0.310)
R-squared	0.196	0.242	0.094	0.185
Adjusted R-squared	0.189	0.235	0.087	0.178

Notes. N = 1286. The number of clusters = 276. The presented statistics are coefficient estimates and standard errors in parentheses based on a fixed-effects (within) regression. The standard errors are corrected for clustering of the observations at the participant level. *** (**) (*) indicates significance at the 1% (5%) (10%) significance level. The mechanisms (M_i) measured on a 7-point Likert scale are recoded to an 11-point Likert scale (from 0 to 10).

Table 5. Robustness analysis on access to regular employment for subsamples of firms and organisations – selected results

	Subsamples based on size of the organisation		Subsamples based on economic activity			Subsamples based on whether the organization employed an apprentice in a dual program during the past year	
	(a12)	(b12)	(a24.1)	(b42)	(a42.2)	(a35)	(b53)
	<50 employees	≥50 employees	Secondary sector	Tertiary sector	Quaternary sector	Yes	No
Italian	-0.177 (0.186)	-0.413** (0.191)	-0.506 (0.304)	-0.177 (0.200)	-0.327 (0.237)	-0.666*** (0.206)	-0.141 (0.161)
Turkish	-0.077 (0.210)	-0.425** (0.169)	-1.054** (0.405)	-0.057 (0.188)	-0.071 (0.231)	-0.121 (0.220)	-0.213 (0.181)
Moroccan	0.074 (0.170)	-0.303 (0.202)	-0.313 (0.393)	0.049 (0.171)	-0.341 (0.224)	-0.149 (0.187)	-0.077 (0.177)
Flemish (reference)							
Male	-0.063 (0.150)	0.360*** (0.117)	0.693** (0.288)	0.099 (0.119)	-0.027 (0.151)	0.472*** (0.128)	-0.008 (0.118)
Hours per week at the workplace	0.019** (0.008)	-0.004 (0.007)	-0.005 (0.013)	0.016* (0.008)	0.005 (0.009)	0.012 (0.009)	0.007 (0.007)
Difference in coefficients							
Italian (a)-(b)	0.236 (0.266)		-0.329 (0.359)		-0.150 (0.311)	-0.525** (0.260)	
Turkish (a)-(b)	0.348 (0.269)		-0.997** (0.439)		-0.014 (0.299)	0.092 (0.283)	
Moroccan (a)-(b)	0.377 (0.263)		-0.362 (0.421)		-0.390 (0.283)	-0.072 (0.256)	
Flemish (reference)							
Male (a)-(b)	-0.423** (0.190)		0.594* (0.307)		-0.126 (0.193)	0.480*** (0.173)	
Hours per week at the workplace (a)-(b)	0.023** (0.011)		-0.021 (0.015)		-0.010 (0.013)	0.005 (0.011)	
N	579	572	197	534	379	359	744
Number of clusters	104	99	34	95	66	63	132
R-squared	0.215	0.207	0.332	0.201	0.162	0.195	0.227
Adjusted R-squared	0.200	0.191	0.292	0.184	0.137	0.170	0.216

Notes. The presented statistics are coefficient estimates and standard errors in parentheses based on a fixed-effects (within) regression with the participant as panel variable, excluding those participants that did not answer all six vignettes. The standard errors are corrected for clustering of the observations at the participant level. *** (**) (*) indicates significance at the 1% (5%) (10%) significance level. The difference in coefficients between the subsamples is estimated by means of the estimation of fully interacted models. All analyses control for educational track, grade point average (GPA), grade retention, knowledge of the company or organisation, and apprentice pay. The full set of results is available in Appendix A11.

Notes

¹ For more information as to why we might observe the apparent resilience of the German training system, we refer to Busemeyer, Neubäumer, Pfeifer and Wenzelmann (2012).

² While this evidence pertains to employment chances at the start of the career, the evidence on starting wages (Parey, 2016; Sollogoub & Ulrich, 1999) or on employment chances at the end of the career (Hampf & Woessman, 2017; Hanushek, Schwerdt, Woessmann, & Zhang, 2017) are more mixed. In general, similar conclusions on the importance of vocational skills and workplace-based learning for initial labour market outcomes emerge when vocationally educated individuals (with or without apprenticeship) are compared to more generally educated individuals (Vogtenhuber, 2014; Verhaest, Lavrijsen, Van Trier, Nicaise, & Omey, 2018b). For an overview of the literature on the labour market effects of apprenticeships, we refer to Ryan (2001). Some of the more recent studies are reviewed in Lerman (2017).

³ Many of the considered factors have been investigated more extensively in the context of the regular labour market. However, the context of the apprenticeship market is largely different, with strict regulations on aspects like the provision of training, apprentice pay or the duration of the apprenticeship contract.

⁴ The idea that individuals invest in education to enhance their trainability dates back to Rosen (1976).

⁵ A specific application of signalling theory in this context is offered by Thurow (1975), who assumed that employers use education as a signal for abilities that enhance trainability.

⁶ This is an approximation as Djait (2014) did not report exact numbers on this issue.

⁷ Van Belle, Di Stasio, Caers, De Couck and Baert (2018) conducted a similar application in the context of the regular labour market. However, their focus was on the signalling value of former labour market experiences rather than of educational characteristics.

⁸ D-efficiency = 97.659, where D-efficiency reflects both orthogonality and level balance, and ranges from 0 to 100, 100 indicating the most efficient design (Auspurg & Hinz, 2015; Dülmer, 2007).

⁹ The latter assessment is merely based on information available prior to the apprenticeship, and therefore does not depend on the student's performance during the apprenticeship. Nonetheless, it is interesting to identify future investment strategies, as employers are likely to hire apprentices to increase the firm's long-term productivity and to offer the apprentices a standard contract after their training.

¹⁰ Confirmatory factor analysis yields a comparable composition of these four (sub)scales, indicating that there indeed are latent variable representations for the data that are consistent with our theoretical framework.

¹¹ The last two items on the employability scale (3 and 4) are reverse coded.

¹² This website is one of the major job sites in Belgium used to search and find jobs (Valsamis & Van Den Broeck, 2010; Randstad, 2019). According to Randstad (2019), over half of Belgian job seekers (54%) rely on the PEA to search for jobs, and 28% find their job using this channel. In an international perspective, Belgian citizens use public employment services twice as much to search and find jobs (Randstad, 2019). This dominance of the PEA, is, according to Randstad, partly due to their early adoption of digital tools and their collaborations with many private actors, agencies and job sites, leading to the simultaneous publication of vacancies

on both the website of the private job sites and the website of the PES.

¹³ While each participant was provided with a survey including six vignettes, not all participants evaluated all vignettes. This is most likely attributed to the mildly demanding nature of vignette experiments. An overview of the number of vignettes evaluated by each participant is provided in Appendix A4. Furthermore, we run robustness analyses for a subsamples of participants who answered all six vignettes (see section 3.4).

¹⁴ For the computation of these percentages, we abstract from missing values on these variables.

¹⁵ For the latter two percentages, we use six as our cut-off value (greater than or equal to six).

¹⁶ Ethnic ancestry, gender, education, grade retention, and knowledge of the company or organisation are included as dummy variables, with Flemish, female, vocational, no grade retention, and a rather limited knowledge of the company or organisation as reference categories. GPA, apprentice pay and hours per week are included as continuous variables.

¹⁷ These results are available upon request.

¹⁸ We also tested for interactions between motivation and the other vignette characteristics, but none of them were statistically significant. These results are available upon request.

¹⁹ These results are available upon request.

²⁰ The results hardly change when using standardized outcomes.

²¹ In our view, taste discrimination is unlikely to be the entire explanation, as one would expect this to translate in different hiring and job invitation chances without translating into different employability perceptions.

²² Note that if women indeed have a higher tendency than men to take time off work, this explanation is in line with the theory of statistical discrimination (Arrow, 1973; Phelps, 1972). If this explanation is untrue, our results might reflect an incorrect stereotype.

²³ Conducting separate estimates on the individual items (see Appendix A7), we do find an effect of apprenticeship pay on the perceived quit intentions during the apprenticeship period (but not afterwards).

²⁴ These results are consistent with perceived trainability, quit intentions and employability being important mechanisms underlying the relationship between the vignette characteristics and the hiring decisions. To investigate this more directly, we also ran an additional regression analysis on the job interview and hiring equation in which we included these mechanisms as explanatory variables along with the vignette characteristics. Note that these coefficients cannot be given a causal interpretation since these mediators were, as opposed to the vignette characteristics, not randomly distributed across the vignettes. Since other (unknown) mechanisms, such as taste-based preferences (cf. Becker, 1957) or cognitive biases and the reliance on heuristics (Kahneman, Slovic, & Tversky, 1982), may also be of significance, these coefficients may thus generate biased conclusions concerning the true causal effects of perceived trainability, employability and quit intentions on hiring decisions. Nonetheless, as shown in Appendix A9, all coefficients of the four measured mechanisms are highly statistically significant ($p < 0.01$ for quit intentions and $p < 0.001$ for the other mechanisms), making it rather unlikely that these mechanisms are of minor importance.

²⁵ These results are available upon request.

²⁶ The chosen Flemish names are Lucas Martens (male) and Ella Hendrickx (female). The selected Italian names are Leonardo Barbieri (male) and Roberta Mancini (female). The chosen Turkish names are Yunus Koç (male) and Gamze Küçük (female). Last,

the selected Moroccan names are Walid El Amrani (male) and Fatima Messaoudi (female).

²⁷ Apprentice pay is proportional to the competence level (competences) and experience of the student. There are three possible pay levels: 444.30 euro, 490.30 euro or 528.60 euro per month based on a 20-hour workweek (Flemish Government, 2016). This gives us an hourly contribution of 6.10 euro = $[(444.30+490.30+528.60)/3] / (4 \text{ weeks per month} \times 20 \text{ hours per week})$.

²⁸ The monthly minimum wage, in July 2017, was equal to 1562.59 euro based on a 38-hour workweek (before deduction of income tax and social security contributions) (Eurostat, 2018).

²⁹ Item 3 and 4 are reverse coded for this scale.