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Valuation of labour market entrance positions among (future) apprentices - Results from two discrete choice experiments

Sara Möser*, David Glauser, Rolf Becker

University of Bern, Department of Sociology of Education, Fabrikstrasse 8, CH-3012, Bern, Switzerland

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ABSTRACT

In this paper, we estimate the relative value of different employment characteristics when choosing between apprenticeship and job offers. Further, we test assumptions derived from sociological rational choice theory on preference heterogeneity by individual and context characteristics. For this purpose, we analyse data from two discrete choice experiments, one focusing on the choice of an apprenticeship position and the other on the choice of first employment position after vocational training. The experiments were conducted as part of the DAB panel study on educational and occupational trajectories of adolescents in German-speaking Switzerland on students respectively one year prior to leaving compulsory school, and during vocational training. Our findings show that the most relevant aspect when choosing a labour market entrance position is, that the job should match the desired occupational specialisation. Furthermore, considerable preference heterogeneity is found, which can partly be accounted for by individual- and labour market-specific subjective utility.

1. Introduction

The transition from general education into the labour market via vocational training is of crucial importance in the lives of young adults (Gangl, 2002; Shavit and Müller, 1997). While former research has focused mainly on the development of occupational aspirations and the decision between academic and vocational training (Becker and Blossfeld, 2017; Becker and Glauser, 2018; Blossfeld et al., 2016; Buchmann et al., 2007), our goal is to identify which aspects are relevant when students decide where to train, and when apprentices choose where to work. Taking into account individual- and labour market-specific subjective utility, we explore the factors influencing the valuation of apprenticeship and job offers.

This article thereby contributes to a growing body of literature that investigates the assumptions of subjective expected utility theory by Esser (1999) and rational action theory by Breen and Goldthorpe (1997). This research is mainly based on implicit testing of theoretical assumptions, with some researchers using directly surveyed subjective cost and benefit assessments (e.g. Becker and Glauser, 2018; Becker and Hecken, 2009; Stocké, 2007) or stated preference data (e.g. Johnson and Elder, 2002; Tschopp et al., 2015; Wiswall and Zafar, 2018). These approaches, using conventional survey methods, have the substantial disadvantage that their findings are limited to self-reported valuation. Through the creation of hypothetical decision situations, choice experiments provide a direct measurement of subjective expected utility and are therefore an appropriate approach for testing the viability of rational action theories further (Auspurg and Hinz, 2015; Liebe et al., 2019).

In this article we analyse two discrete choice experiments that were conducted as part of the panel study on determinants of educational and occupational trajectories in German-speaking Switzerland (DAB). The first experiment examines the transition from

* Corresponding author.
E-mail address: sara.moeser@edu.unibe.ch (S. Möser).

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general education to vocational education and training (VET) and was conducted during the second wave of the DAB panel in 2012. Students who were in their last year of compulsory education were presented with hypothetical apprenticeship offers in their prospective profession and were tasked with choosing their preferred position (N = 1 500). The second experiment focuses on the transition from vocational training into first employment. In the fifth wave of the DAB study, in 2016, apprentices were asked to choose between hypothetical employment opportunities in their trained occupation (N = 420). The aim of our analyses is to gain a deeper understanding of the transition from school to work, by identifying the determinants of apprenticeship and job-position choice within a desired occupation. In particular, we analyse the influence of specialisation, wage, duration of commute, working hours and the possibility of being taken on by the company after VET, on the choice of apprenticeship position. And the value of income, commute duration, specialisation, part-time employment and type of contract when choosing a position at labour market entry after VET.

In line with sociological rational choice theories, we expect the valuation of these apprenticeship or job attributes to vary depending on individual characteristics, situation specific requirements and labour market opportunities. By computing separate models according to individual background, educational performance and tracking, intention to undertake further training and the labour market situation, we test a series of hypotheses on the determinants of preferences derived from subjective expected utility theory.

This article is structured as follows: in the next section we discuss the theoretical framework of rational choice behaviour, combined with a brief review of the current state of research. On this basis we then derive and present our hypotheses. In section 3 we provide a description of the data and the statistical procedure. The findings are presented in section 4. In section 5 we discuss limitations and the need for further research prior to summarising findings and drawing conclusions in the sixth and final section.

2. Apprenticeship and employment choice as rational decisions

In this paper we focus on two decisions that students have to make during their transition from school into the labour market: the choice of an apprenticeship position, where the decision for vocational training in a specific occupation has already been made; and the choice of an employment position, in the case that the person has already decided to continue working in the occupation for which they have trained.

We understand both choices to be the result of a rational decision process. From the perspective of sociological *rational choice theory (RCT)*, human action can be viewed as the result of a rational evaluation of alternatives (Boudon, 1996; Breen and Goldthorpe, 1997; Coleman, 1986). People act in the way they perceive to be optimal in terms of *subjective expected utility (SEU)* and choose the option they consider the most beneficial (Kroneberg and Kalter, 2012; Stocké, 2007). According to the *characteristics theory of value*, the utility of any given alternative is derived not from the alternative per se, but from the characteristics it possesses (Lancaster, 1966). Goods and actions are understood as a composition of characteristics, while their overall value is defined as the sum of the values assigned to the characteristics constituting the alternative. The utility of an employment position is therefore understood to be primarily defined by wage and secondarily by further non-monetary characteristics, i.e. the working conditions (Rosen, 1986). The characteristics thereby complement and compensate each other (Brown, 1980). An unattractive employment characteristic on one dimension, e.g. location, can be compensated through a higher wage rate or other beneficial working conditions, e.g. flexible working hours. However, if the combined utility of employment characteristics is less than the subjectively perceived costs of employment, the individual will prefer to be unemployed. This tipping point is known as the *reservation utility* and is reflected by the *reservation wage*, the lowest wage an individual is prepared to work for under ideal employment conditions (Mortensen, 1986). The aim of our choice experiments is to measure the relative importance of different employment characteristics and to thereby identify the determinants of choices between apprenticeships and job offers (for an in-depth introduction and formalised explanation of random utility theory see: Louviere et al., 2000).

While the objective of all rational action is to maximise benefit or minimise cost, the individual perception of the utility of an option is subjective (Boudon, 2004; Kroneberg and Kalter, 2012). On the one hand, preferences are determined by individual needs and intentions (Başlevent and Kirmanoğlu, 2013; Wiswall and Zafar, 2018). The valuation of employment characteristics depends on the demands job applicants make towards their employment. For example, wage earners who are the primary breadwinner of their household have been shown to have a stronger preference for higher incomes, while younger employees who are at the beginning of their careers value training opportunities more than do older employees (Bağlevent and Kirmanoğlu, 2013). For women, who typically take on more care responsibilities than men, combining work and family life tends to be more important (Başlevent and Kirmanoğlu, 2013; Wiswall and Zafar, 2018). On the other hand, prior to evaluating offers, apprenticeship- and job-seekers have expectations regarding their future working conditions and wage. Following *prospect theory* (Kahneman and Tversky, 1979), the perceived value of apprenticeship or job offers depends on their relative utility in relation to previous expectations. It has been shown repeatedly that social class, i.e. the parental socio-economic status, is the best predictor of vocational aspirations and status attainment (Sewell et al., 1970; Shavit and Müller, 1997). Children develop work expectations that reflect their parents' positions in the occupational structure (Smith and Powell, 1990), with extrinsic work motivation, e.g. income, security and prestige, being more important to workers from lower social classes, while intrinsic work motivation, e.g. interest, responsibility and autonomy, are of higher relevance for those with a higher social background (Johnson and Elder, 2002; Mortimer and Lorence, 1979). Assuming that job seekers are informed actors and form their expectations rationally (for a discussion of these assumptions see: Manski, 1993, 2004), they will base their expectations on the same factors that objectively influence their chances of finding a good position, i.e. their personal resources and the opportunity structure of the labour market (Breen and Goldthorpe, 1997; Smith and Powell, 1990; Willis and Rosen, 1979). The most important personal resource for a successful transition into the labour market is educational attainment (Hupka-Brunner et al., 2010; Salvisberg and Sacchi, 2014). Through education and training students accumulate knowledge, skills and other characteristics that increase labour productivity and are understood as human capital (Becker, 1975). By acting as an indicator for productivity, educational attainment constitutes the value of an employee on the labour market (Weiss, 1995). Applicants with better grades and higher levels of education

therefore occupy a better bargaining position and can afford to have higher expectations and demands in the application process (Manski, 1983; Smith and Powell, 1990). Following the assumption of fully informed rational actors, applicants are aware of the labour market conditions in their chosen occupation. When anticipating their chances of obtaining a good job, they take into account the opportunities and constraints of the labour market and adapt their expectations and preferences accordingly (Glauser and Becker, 2016; Weßling et al., 2015). Firstly, job seekers are familiar with the common working conditions in their chosen occupation and thus anticipate the working conditions their future position will probably have (Betts, 1996; Wolter, 2000). Students who are unwilling to work at the weekend will for example, not aspire to a career in the health sector, while those who choose to work in health despite the generally unattractive working hours will have to expect to work weekends. Furthermore, the chances of applicants successfully transitioning to their aspired position depend on the supply and demand ratio of the apprenticeships or jobs in question (Gangl, 2002; Salvisberg and Sacchi, 2014). Applicants therefore form expectations according to the prevailing labour market opportunities and constraints. Salladarré et al. (2011) show, in a European comparison, that higher perceived job security leads to lower valuation of job security: Swiss workers, who perceive their personal employment security as very high in comparison to other European countries, rate job security as less important than do most Europeans. Within the specific context of choice of vocational training position, Eberhard and Ulrich, 2017 shows that, for German apprenticeship applicants, those in regions with a more favourable market situation make significantly higher demands on companies.

In line with the theoretical arguments outlined above, we conclude that the choice of an apprenticeship position and the choice of a first employment after VET are rational decisions influenced by individual demands and resources as well as by institutional constraints, and derive the following hypotheses:

Students applying for apprenticeships and apprentices choosing a first job after VET base their decisions on the subjective evaluation of working conditions and wage. We expect beneficial apprenticeship or job characteristics, e.g., higher wage and shorter commuting duration, to increase the SEU of an apprenticeship or employment position, thus raising the probability of a position being chosen (*hypothesis 1*). In addition, we explore the factors determining the valuation of vocational and apprenticeship attributes. Following the theory of SEU, we investigate the contribution of individual resources and intentions, as well as the labour market context, to the explanation of preference heterogeneity. Following RCT, preferences vary depending on the demands that are posed towards employment. We expect the utility of an employment characteristic to depend on its relevance to the decision makers' situation. Hence applicants intending to pursue further training during their future employment, should take the willingness of a company to finance education into account when choosing between positions, while respondents who do not intend to take up further training after VET should be indifferent to whether or not the employer offers to subsidise it (*hypothesis 2*). Work expectations regarding income and working conditions are formed through the experience of parents' occupational situation. We therefore expect the valuation of apprenticeship or job attributes, and hence the determinants of choice of an apprenticeship position and employment within a profession, to vary by socio-economic background (*hypothesis 3*). Following RCT and the current state of research, applicants from higher social backgrounds are expected to have more demanding expectations regarding their future employment, while applicants from lower social backgrounds and less family resources are expected to value employment security and financial returns more strongly. A job seekers employment potential is to a large extent determined by the level of educational attainment. We therefore expect school type and grades to influence the valuation of employment offers (*hypothesis 4*). Students and apprentices from more demanding tracks and with better grades are expected to display a higher reservation utility than respondents who have a weaker bargaining position in the application process due to their lower educational qualifications. Furthermore, due to their poorer labour market prospect students with lower grades and less demanding school tracks are expected to display a higher emphasis on employment security. Besides individual demands and resources we expect the opportunities and constraints of the labour market to shape the preference structure of students and apprentices. The chances of students and apprentices successfully transitioning to their hoped-for position depend on the supply and demand ratio of the apprenticeships or jobs in question. Therefore, we expect respondents applying in occupations with an oversupply of applicants to have a less demanding preference structure, and hence a lower reservation wage than those applying in an industry characterised by an insufficient labour force. In addition, we assume that applicants value job security and prospects more in occupations with a scarcity of vacancies than in occupations with a more relaxed labour market situation (*hypothesis 5*). As informed rational actors, job seekers are aware of the customary working conditions in their chosen profession and adapt their expectations accordingly. We assume that applicants perceive unfavourable job attributes less negatively if they are common in their respective occupational field, while being less willing to forego beneficial attributes if they are prevalent (*hypothesis 6*).

3. Data and methods

3.1. Experimental design

In this contribution, we aim to test the hypotheses outlined in the previous section by conducting and systematically analysing two discrete choice experiments (Louviere et al., 2000), that were included in two waves of the DAB panel study (Glauser, 2015; Glauser and Becker, 2016). The DAB (Determinants of educational choices and vocational training opportunities) panel study tracks the educational and occupational trajectories of adolescents born around 1997 who concluded lower secondary education in regular classes of public schools in the German-speaking cantons of Switzerland in the summer of 2013.[1]

[1] More Information on the DAB panel study, as well as a detailed description of the sample selection and response rate, can be found on the website dab.edu.unibe.ch. The data sets of the first four waves are available at FORS. (https://forsbase.unil.ch/project/studypublic-overview/14834/0/).

As part of the second wave of the DAB study in 2012, an experiment on choice of apprenticeship position was conducted with students who were at the beginning of ninth grade. All respondents who intended to begin an apprenticeship after graduating from general education the following year and had not yet signed an apprenticeship contract took part. Four years later, in 2016, the second experiment on choice of first employment after graduation from VET was carried out in the fifth wave of the DAB panel study. All respondents who intended to take up employment after the end of their current VET were included. The participants were presented with a series of hypothetical but realistic apprenticeship and employment offers in their prospective sector. The positions varied systematically for a set of attributes representing cost and utility dimensions, which are shown in Table 1.

Due to the experimental design only a limited number of characteristics can be included in the analyses. In the experiment on choice of an apprenticeship position, five attributes with two to four levels characterised the alternatives. In the experiment on choice of first employment after VET, six attributes with two to three levels described the positions. The monetary revenue of work is taken into consideration by including wage, as well as willingness of the company to finance further training, as a conditional financial benefit. The duration of commute to the workplace and workload (100% or 80% full-time equivalent (FTE)) are included as measures of required time expenditure. Better working hours during the apprenticeship further contribute to the compatibility of work and leisure time and hence increase the attractiveness of the position. In the experiment on choice of apprenticeship position, the prospects of the position are reflected by whether there is the possibility of being taken on by the company after VET. In the experiment on choice of first employment position after VET, the type of contract, whether permanent or temporary, indicated the prospects the job had to offer. Additionally, an attribute specifying whether the apprenticeship or job matched the desired vocational specialisation is included. A disciplinary fit not only improves the expected satisfaction, but also raises the chances of being able to stay in the desired field in the future and not having to go through retraining.

The apprenticeship and job descriptions were presented in choice sets. Each set was displayed as a table and showed three options: Two unlabelled generic alternatives characterised by the attributes outlined above, Offer A and B, and the opt-out alternative labelled *I decline both offers*, where no attribute levels were specified.[2] For each choice set the respondents were asked to state which position they would prefer or if they would reject both. An illustration of both choice experiments is provided in the appendix. For the choice experiment on apprenticeship position a fractional factorial of 192 choice sets was generated out of the full factorial of 4 096. These were then allocated to 32 blocks of six choice sets and assigned randomly to the participants. 1 500 students filled in the experiment section of the questionnaire, so that information on 9 000 choice sets related to the valuation of apprenticeship attributes was collected. For the experiment on employment position choice a fractional factorial of 144 choice sets was generated from the full factorial of 9 216 and split into 36 blocks of four choice sets. 420 respondents took part and 1 662 choices were collected. 18 choice sets were skipped without a decision.

3.2. Analytical strategy

Analysing this choice experiment data via conditional logistic (CL) models enables us to determine the relative importance of employment characteristics by estimating how the choice between nominal alternatives, employment positions, is affected by the characteristics of the alternatives, e.g. wage or working hours (Louviere et al., 2000). According to the econometric approach of *Random Utility Theory* (McFadden, 1974; Manski, 1977), the utility U_m of an alternative m is made up of a systematic component V_m and a random error component ε_m. Thereby the systematic component is assumed to be an additive function of the utilities attributed to its defining characteristics x_k (Lancaster, 1966) and the random error terms ε_m are assumed to follow an extreme value type I distribution with location parameter 0 and scale parameter 1 (McFadden, 1974).

$$U_m = V_m + \varepsilon_m \quad \text{with } V_m = x_{m1}\gamma_1 + x_{m2}\gamma_2 + x_{m3}\gamma_3 + x_{mK}\gamma_K$$

Following the theoretical framework of utility maximisation, individuals choose alternative m if $U_m > U_j$ for $m = 1$ *to* J. Therefore, the probability of choosing alternative m with employment attribute k can be predicted by the CL as the utility of this alternative in relation the utility of all J alternatives using a maximum likelihood estimation (Long and Freese, 2006, p. 297). The effect of an employment characteristic x_k on the probability of choosing one position m over the other, and thus the relative importance of this characteristic, is indicated by the coefficient γ_k.

$$\Pr(m) = \frac{exp(V_{mk})}{\sum_{j=1}^{J} exp(V_{jk})} = \frac{exp(x_m\gamma')}{\sum_{j=1}^{J} exp(x_j\gamma')}$$

Based on the estimation of the CL models the willingness to pay (WTP) is calculated (Hensher et al., 2005). The WTP thereby reflects the marginal rate of substitution between employment characteristics and wage (Willis and Rosen, 1979). The WTP coefficient expresses the value of the attribute by specifying how much additional wage would have to be offered, to compensate for an

(*footnote continued*)
The experimental data can be requested from the authors.

[2] We chose to include the option of opting-out for two reasons. From a theoretical perspective, we were interested in applicants rejecting offers and their rationale for doing so. In addition, we were also aware that at the time of the experiments the transition from school to VET and from VET to employment was not yet imminent and the respondents were thus at a point in their job search process where the risk of unemployment was not particularly pronounced. We would assume, in line with RCT, that a real life choice between two vacancies and unemployment would result in fewer opt-outs than in our hypothetical experiment. However, the underlying rationale is the same and thus the conclusions transferable.

Table 1
Attributes and levels of choice experiments.

Choice Experiment 1: Apprenticeship Position	
Apprentice income in 1st year of VET	400, 500, 600 or 700 CHF[a]
Apprenticeship matches desired specialisation[b]	yes or **no**
Duration of commute (one way)	30 or 60 Minutes
Possibility of being taken on by the company	yes or **no**
Working hours	daytime, Mo.–Fr. (normal) or **also in the evening and on weekends**
Choice Experiment 2: First Employment after Training	
Income	500 CHF less than expected; **as expected**; 500 CHF more than expected[c]
Employment matches desired specialisation[b]	yes or **no**
Duration of commute (one way)	30 or 60 Minutes
Company contributes financially to further training	yes or **no**
Type of contract	permanent or **temporary** position
Workload	part-time 80% or **full-time 100%** position

[a] The wage levels were chosen on the basis of the wage recommendations for apprentices by vocational training representatives and professional associations (DBKS, 2018). Euro equivalent: 333€, 416€, 500€ or 583€ (1 CHF = 0.83 € as of August 2012).

[b] An explanation of what this means is given in the introduction of the choice experiment: whether you can actually do what you are most interested in within a profession. Example: you are a carpenter and want to produce furniture, but the company only manufactures doors.

[c] Euro equivalent: 461€ more or less than expected (1 CHF = 0.92 € as of June 2016).

unfavourable working condition.

To calculate the WTP, the coefficient γ_k is weighted with the coefficient of the monetary attribute γ_{wage} and multiplied by − 1 (Hole, 2007). Confidence intervals were computed using the Krinsky and Robb parametric bootstrap method (Hole, 2007; Poe et al., 2005).

$$\text{WTP} = -\frac{\gamma_k}{\gamma_{wage}}$$

Following RCT, we expect the valuation of apprenticeship and job attributes to vary depending on individual resources and intentions, as well as by the labour market context. In a second analytical step we therefore investigate preference heterogeneity by comparing group-specific models. The underlying variables and descriptive statistics are presented in the following section. As the WTP estimates reflect the utility of the employment characteristic, unequal willingness to pay for favourably employment characteristics between groups are interpreted as group-specific preferences. To test for difference in WTP the complete combinatorial significance test proposed by Poe et al. (2005) is computed. The group-specific WTP for employment attributes and test results are presented graphically in section 4.2. Full model estimates and test results are provided in the appendix.

3.3. Variables and descriptive statistics

The dependent variable of our analyses is the choice of an apprenticeship or employment position per choice set. The characteristics of the hypothetical alternatives, as presented in Table 1, are the explanatory variables. Most attributes are binary coded, the reference category of these dummy variables is indicated in bold in the tables above. The levels of duration of commute and apprentice wage are metric in 30-min and 100-CHF intervals respectively. The opt out levels are set to value 0. In our analyses of preference heterogeneity, we analyse the influence of individual resources, demand and labour market constraints on attribute valuation. Descriptive sample statistics of the following independent variables are presented in Table 2. To evaluate the influence of individual demand, we analyse whether valuation of financial support for further training differs between those respondents who plan to pursue further training and those who state that they have no intention of doing so. As we are interested in the effect of economic resources and parental occupational position on employment preferences, we define social background according to the Erikson–Goldthorpe–Portocarero (EGP) class scheme that takes into account both market situation and working conditions (Erikson and Goldthorpe, 1992).[3] To measure vocational and educational success, we analyse the effect of grades (good, average and below-average grades at school or in the apprenticeship), school type during secondary education (basic or advanced requirements) and type of apprenticeship certificate (with or without a Federal Vocational Baccalaureate (FVB)) on apprenticeship and job preference. To analyse the effect of labour market restrictions, we focus on two context characteristics. First, we take the supply and demand ratio

[3] We derive the information on social class from the parents' employment. If both parents work, the respondents are classified according to the higher occupational position.

Table 2
Descriptive statistics.

	Choice Experiment 1: Apprenticeship Position	Choice Experiment 2: First Employment
Gender		
female	824 (54.93%)	186 (44.29%)
male	676 (45.07%)	234 (55.71%)
Further Training Intentions		
with		211 (52.62%)
without		199 (47.38%)
Occupational Position of Parents		
upper class: EGP I - II	146 (11.78%)	51 (13.97%)
middle class: EGP III	226 (18.24%)	65 (17.81%)
self employed: EGP IV	101 (8.15%)	26 (7.12%)
lower class: EGP V - VII	766 (61.82%)	223 (61.10%)
Grades		
below-average	394 (29.29%)	151 (37.38%)
average	607 (45.13%)	120 (29.70%)
above-average	344 (25.58%)	133 (32.92%)
School Type		
basic requirements	516 (36.57%)	94 (24.48%)
advanced requirements	858 (60.81%)	279 (72.66%)
Industry		
Business, Administration and Law	395 (30.60%)	144 (37.11%)
Engineering, Manufacturing and Construction	467 (36.17%)	134 (34.54%)
Health and Welfare	185 (14.33%)	52 (13.40%)
Labour Market		
few vacancies	402 (34.84%)	151 (38.92%)
average many vacancies	451 (39.08%)	122 (31.44%)
many vacancies	301 (23.30%)	115 (29.64%)
Total	1500 (100%)	420 (100%)

of open positions to job-seekers into account to further determine the influence of labour market situation on preference. The indicators of the apprenticeship market were obtained from the apprenticeship barometer from 2011 to 2012, i.e. the two survey waves prior to the experiment (LINK-Institut, 2011, 2012). The data on vacancies and job seekers were provided by the State Secretariat for Economic Affairs and refer to the year 2015, one year prior to the experiment on choice of first employment after VET (SECO, 2015). We group respondents into three categories (few, average or many vacancies) by supply-demand ratio of open positions in their prospective professions.[4] In a second step, we examine preference variation between industries (due to sample size we can only differentiate between the following fields, as defined by the ISCED fields of education and training 2013 (UNESCO, 2014): the health and welfare sector; engineering; the manufacturing and construction sector; and the business, administration and law sector).

4. Results

4.1. Valuation of apprenticeship and job attributes

Table 3 presents the CL estimations of the two choice experiments. The results are in line with theoretical assumptions and *hypothesis 1*: the higher the expected benefit of an alternative, the higher the probability of choosing that option and vice versa. Both monetary and non-monetary apprenticeship and job characteristics influence the choice of apprenticeship position and choice of first employment after VET. As shown in Table 3 a higher income, a shorter commute, the possibility of being taken on by the company and not working in the evenings or weekends increase the attractiveness of an apprenticeship position. The most important characteristic of an apprenticeship offer, however, is whether the hypothetical apprenticeship matches the desired vocational specialisation.

The second model presented in Table 3 shows the valuation of attributes of first employment after completion of vocational training. Apprentices display *diminishing marginal utility*. If the offered salary is lower than the anticipated income, the subjective utility of the employment option is reduced to a higher extent than the increase in utility caused by a salary that exceeds expectations.

[4] For the experiment on apprenticeship choice vocations with less than 0.8 vacancies per applicant are categorised to be highly competitive (*few vacancies*), vocations with between 0.8 and 1.2 vacancies per applicant are considered *average* and the market for vocations with more than 1.2 open apprenticeship positions per applicant is categorised as relaxed (*many vacancies*). The labour market for skilled jobs is more competitive than the apprenticeship market. According to the SECO Data, there is an shortage of open positions in all occupations. Therefore, the labour market for occupations with more than 5 openings per 10 job-seekers is considered relaxed (*many vacancies*), vocations with between 1.2 and 5 openings per 10 job-seekers are categorised as average, while only occupations with less than 1.2 open positions per 10 job-seekers are considered to have a strained labour market (*few vacancies*).

Table 3
Conditional logistic model.

	Choice Experiment 1: Apprenticeship Position		Choice Experiment 2: First Employment	
	Logit Coefficient	S.E.	Logit Coefficient	S.E.
Alternative-specific constant: Option B	0.024	(0.025)	0.011	(0.060)
Alternative-specific constant: Opt-out	2.494***	(0.121)	0.040	(0.190)
Income in 100 CHF	0.387***	(0.017)		
Income: 500 CHF less than expected			−0.806***	(0.104)
Income: 500 CHF more than expected			0.323***	(0.097)
Position matches specialisation	1.530***	(0.048)	1.376***	(0.100)
Duration of commute (per 30 min)	−0.663***	(0.038)	−0.907***	(0.092)
Possibility of being taken on	1.026***	(0.040)		
Normal working hours	1.044***	(0.042)		
Contribution to further training			0.866***	(0.087)
Permanent position			0.632***	(0.092)
Part time 80%			0.643***	(0.090)
Pseudo r^2	0.220		0.201	
N (Respondents)	9000 (1500)		1662 (420)	

Note: *** $p < 0.001$; Data: DAB panel study.

Furthermore, the analyses of the choice experiment show that part-time employment is generally preferred.[5] Additionally, a shorter commute, a financial contribution to further training and a permanent contract increase the attractiveness of an employment position. As in the experiment on apprenticeship choice, our analyses of the choice of a first position after VET shows that the match of employment characteristics and individual preferences regarding occupational specialisation is the most important factor.

The willingness to pay estimation (Table 4) reveals that a training company has to offer an additional 395 CHF and the first employer after VET an additional 1 162 CHF monthly income to compensate for a mismatch of desired specialisation and position. Furthermore, for an apprenticeship that does not match the desired specialisation, with an hour commuting distance, without the possibility of being taken on by the company and with shifts at weekends and in the evening, the apprentice wage would have to be at least as high as 1 556 CHF for this alternative to be chosen. The ideal apprenticeship offer, on the other hand, that is in line with the desired specialisation, without a commute, with the possibility of being taken on and with favourable working hours, would be chosen even if the wage was as low as 285 CHF. For the choice of first employment after VET the WTP estimation shows that the salary for a full-time job with an hour commute, without financial support for further training, with a fixed term contract that is not in line with the desired specialisation, would have to be 4 797 CHF higher than for the ideal job.[6]

4.2. Preference heterogeneity

The results presented above provide insight into the general preferences when choosing apprenticeship and employment positions and the relative importance of employment characteristics. In a second analytical step we additionally want to explore the factors determining the valuation of apprenticeship and employment positions by comparing group-specific models based individual demands, educational and parental resources, and the restrictions of the VET specific labour market.

4.2.1. Further training intentions

Based on RCT we expect job attributes to only influence choice if they have implications for the deciding individual (*hypothesis 2*). Therefore, employers' support for further training should be relevant only for those applicants who intend to continue their training during their first employment after VET. Our experimental data supports this claim to some extent. The value of financial support is greater for respondents intending to pursue further training (Fig. 1).[7] If a company is not willing to subsidise training, the monthly wage must be 1 000 CHF above that of a comparable position in a company that supports further training, in order to be appealing to job seekers with training intention. Apprentices who do not plan to continue their training during their first employment, on the other hand, need a significantly lower wage increase of 650 CHF to compensate for the lack of funding for further training. However, following strict RCT assumptions, financial support for further training should be irrelevant for those who do not plan to make use of it and our analysis clearly shows that this is not the case.

[5] Unfortunately, we cannot say conclusively whether there is as a general trend towards part-time work. It is unclear whether part-time work is only preferred under the condition of equal pay or if the accepted wage loss is smaller than a 20% decrease, which would result from a reduction to a 80% FTE part-time position, as we do not know the respondents' *expected* income.

[6] Because the income attribute is coded as a relative measures of wage, we can not estimate a reservation wage in the CE on employment choice.

[7] Significant differences of WTP estimates between groups, according to the Poe et al. (2005) test for WTP inequality, are indicated on the right side of the plot.

Table 4
Willingness to pay estimation.

	Choice Experiment 1: Apprenticeship Position		Choice Experiment 2: First Employment	
	WTP	C.I.	WTP	C.I.
Reservation wage (Opt-Out)	285 CHF	(211; 370)		
Position matches specialisation	395 CHF	(358; 438)	1162 CHF	(923; 1 505)
Duration of commute (per 10 min)	57 CHF	(48; 66)	275 CHF	(206; 362)
Possibility of being taken on	265 CHF	(239; 296)		
Normal working hours	269 CHF	(240; 300)		
Contribution to further training			820 CHF	(610; 1069)
Permanent position			534 CHF	(366; 742)
Part time 80%			601 CHF	(411; 822)
N (Respondents)	9000 (1500)		1 662 (420)	

Note: Based on CL Model; 95% Confidence interval in parenthesis; Data: DAB panel study.

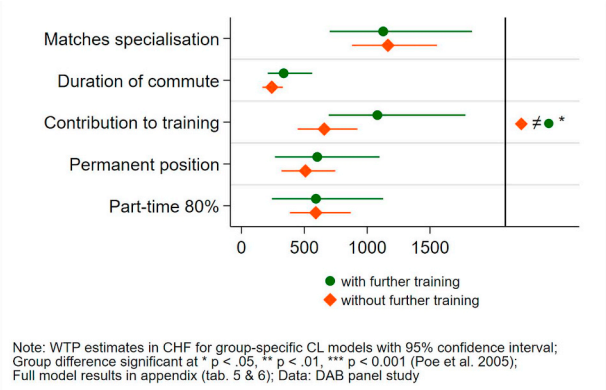

Fig. 1. Willingness to pay for job attributes by intention to pursue further training choice of first employment after training.

4.2.2. Resources – socio-economic background and human capital

Expectations regarding income and working conditions are formed under the experience of parents' positions in the occupational structure, and prior research has shown that employment preferences differ by social class (Johnson and Elder, 2002; Mortimer and Lorence, 1979). Applicants from higher social backgrounds are expected to have more demanding expectations regarding the intrinsic value of their future employment, while applicants from lower social backgrounds are expected to value employment security and financial returns more strongly. The comparison of separate models by socio-economic background, presented in Fig. 2, provides

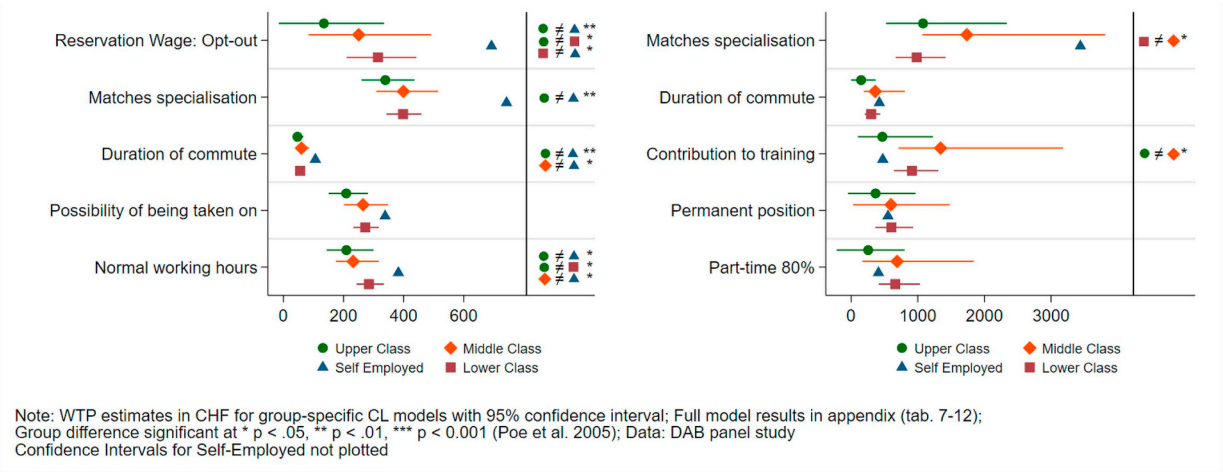

Fig. 2. Willingness to pay for job attributes by occupational position of parents choice of apprenticeship (left) and choice of first employment after training (right).

mixed evidence regarding this *third hypothesis*.

The experiment on choice of apprenticeship positions, as can be seen on the left side of Fig. 2, points out the specific preference structure of children of self-employed parents. They display a significantly higher willingness to accept lower wages in exchange for advantageous employment characteristics while also displaying a higher reservation wage. Due to the limited sample size for respondents with self employed parents the confidence intervals of the WTP estimates are too large to be plotted[8] and the Poe-test indicated no statistically significant group differences in the experiment on employment choice (Fig. 2, right).

Furthermore, children from the lower class have a significantly higher reservation wage when choosing their apprenticeship position (Fig. 2, left) than those from the upper class, while displaying a stronger preference for normal working hours. When choosing their first employment after vocational training (Fig. 2, right), respondents with a middle class background attach higher importance to the match of the described job and their desired specialisation than children from the upper class, while also valuing financial support for further training stronger than those with a lower class background. Larger family resources seem to enable students from upper class backgrounds to accept attractive apprenticeship offers despite poor wages, while not increasing their willingness to substitute income for favourable employment characteristics. Regarding the importance of employment stability, the choice experiments do not show differences by socio-economic background. Intrinsic work values - specifically the match of task and specialisation as well as and training opportunities - are most highly valued by respondents with a middle class background, not as was expected from the highest social classes. However, it must be borne in mind that the sample consists only of (future) apprentices and the choice of vocational training over general education has been repeatedly shown to be highly selective by social background (Glauser, 2015). Upper class students are significantly less likely to transition into VET and are likely to be a negatively selected group regarding educational attainment and motivational characteristics (Glauser, 2015).

In line with human capital theory, we expect the decision-making process between apprenticeship and job positions to be influenced by educational track and performance (*hypothesis 4*). Due to their higher market value in the workplace, applicants with better grades and more demanding certificates have a better bargaining position in the application process. We assume that students and apprentices with better performance, measured in grades, a higher track at secondary level and a cognitive more demanding type of vocational degree have higher expectations regarding their future position and our analysis of the first choice experiment on apprenticeship choice supports this hypothesis. Students who have a wider range of options at the transition from lower to upper secondary education, due to attending a more demanding school track (Glauser, 2015), place greater emphasis on ensuring that their apprenticeship matches their desired specialisation (Fig. 3, left) not, however, when choosing their first employment after training (Fig. 3, right).

Furthermore, students who attended a school type with advanced requirements display a significantly higher reservation wage than students from less demanding school types (Fig. 3, left bottom). This indicates that they are aware of their better bargaining position and enter the labour market with higher demands. Additionally students from the school type with advances requirements are more reluctant to accept positions with weekend and evening work (Fig. 3, left bottom), while apprentices with better grades display a greater preference towards part-time employment (Fig. 3, right top). The type of vocational degree, with or without FVB (Fig. 3, right bottom), does not seem to influence the valuation of employment characteristics. We therefore conclude, that educational success leads to a more demanding attitude when choosing an apprenticeship position within profession, and furthermore to a distinct preference structure, which is characterised by a greater emphasis on disciplinary fit of training.

4.2.3. Opportunity structure

Assuming informed rational actors, who take the opportunities and constraints of the labour market into account, we expect the preferences of students and apprentices to be influenced by the supply and demand ratio of open positions and the customary working conditions in their preferred profession. Due to the limited opportunities of labour market applicants in vocations with few vacancies, respondents in these occupations should value job security more than those, applying in an industry with a more relaxed labour market situation, who can afford a more demanding preference structure (*hypothesis 5*). However, our analyses, as presented in Fig. 4, are inconclusive. We find preference heterogeneity when comparing the willingness to pay of respondents applying in occupations with an oversupply of applicants to those with a more even vacancies-to-applicants ratio; not, however, when compared with occupations with many open positions per applicant. The highest reservation wage and also the strongest emphasis on job security - namely the possibility to be taken on after training - is displayed not by those applying for positions with few vacancies, but by those applying in occupations where there are average many open positions per applicant. Regarding the value of a permanent contract, that following RCT should be most valued in strained labour markets, we find no significant differences by opportunity structure. We conclude that the level of competition on the labour market does not seem to have a strong impact on the perceived subjective utility of an offered position.

Finally, we assumed that applicants take the industry specific opportunity structure into account when assessing their chances of finding employment. Applicants evaluate job offers in relation to the prevalent working conditions and therefore poor working conditions are expected to be perceived less negatively when they are common (*hypothesis 6*). When analysing the choice experiments by sector we find that, while neither the reservation wage nor the importance of commute duration, the chance of being taken on and support for further training vary across industries, the sector-specific attributes - working hours, part-time employment and type of contract - do (Fig. 5). Apprentices in the health sector, where part time employment is common and nearly all jobs require evening and weekend work (Hämmig et al., 2005, p. 37–47), place less value on regular working hours (Fig. 5, left) and find part-time employment less attractive (Fig. 5, right). Furthermore, apprentices working in business, where temporary employment contracts are

[8] In the first experiment 65 respondents had self employed parents and 26 in the second experiment. The full model results are included in the appendix.

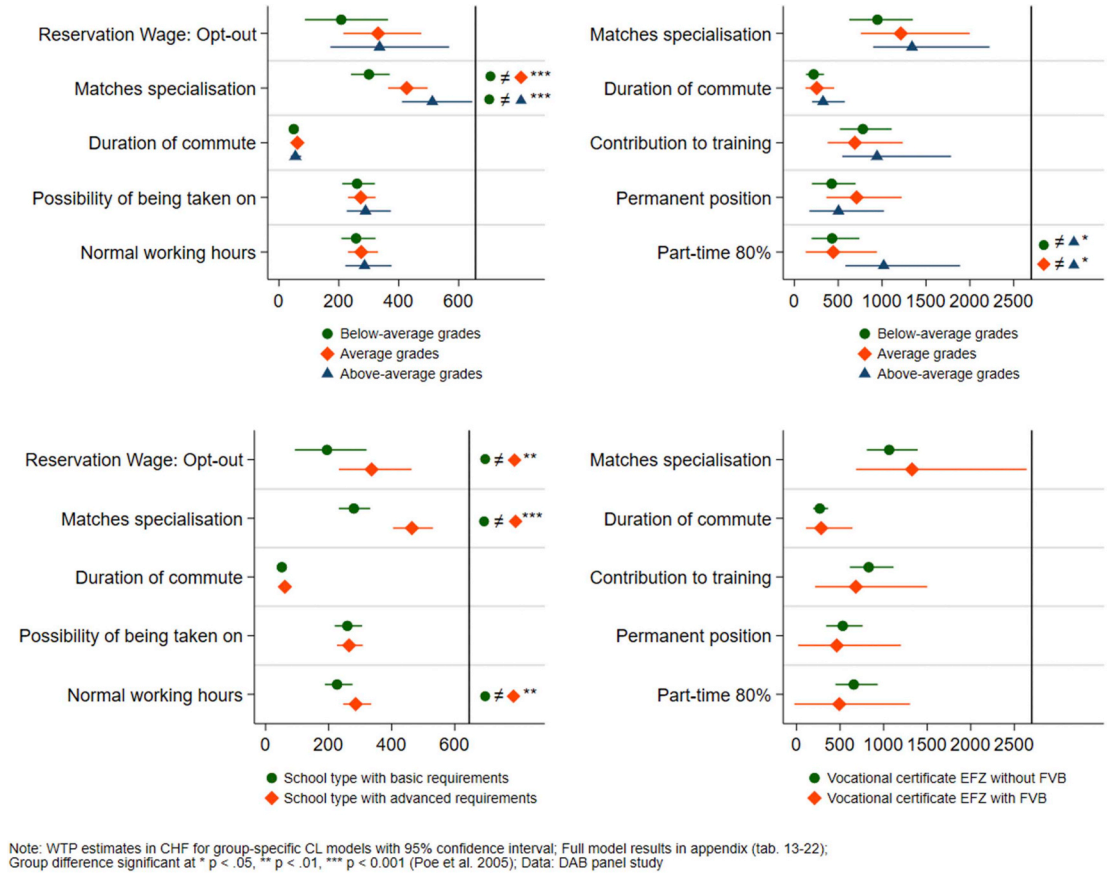

Fig. 3. Willingness to pay for job attributes by educational performance, school type and type of vocational certificate choice of apprenticeship (left) and choice of first employment after training (right).

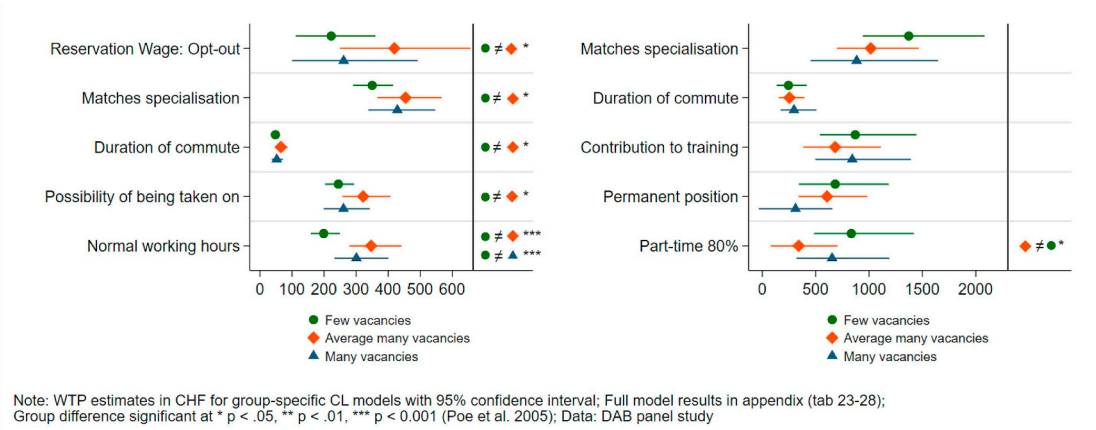

Fig. 4. Willingness to pay for job attributes by opportunity structure choice of apprenticeship (left) and choice of first employment after training (right).

rather common (Hämmig et al., 2005, p. 50), have a greater WTP for a permanent contract than in engineering, while also placing a greater emphasis on disciplinary fit than those in the health sector. This provides support for the hypothesis that students and apprentices adapt their expectations according to the opportunities and constraints of sector specific labour markets, while the amount of open vacancies per job-seeker does not seem to influence the valuation of apprenticeship and job specific attributes in the theoretically assumed way.

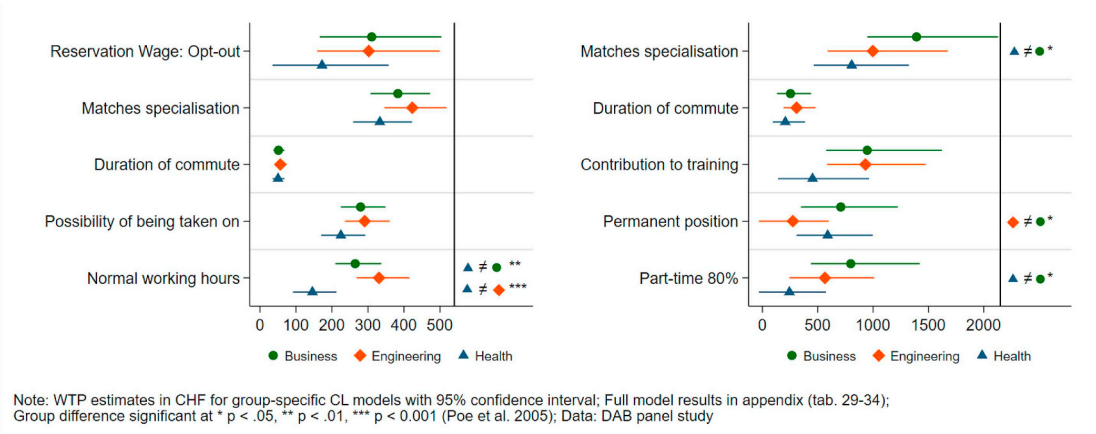

Fig. 5. Willingness to pay for job attributes by industry choice of apprenticeship (left) and choice of first employment after training (right).

5. Discussion

There are several limitations to our study that will be addressed in the following section. By design, the scope of our findings is limited. We draw conclusions only on observed heterogeneity, i.e. the five apprenticeship characteristics and six employment attributes included in our experiments. We focused on job and apprenticeship attributes that were repeatedly shown to influence the choice of position and assigned levels that were realistic for the Swiss VET system and labour market. The research literature, however, identifies numerous other factors influencing employment choice that were not accounted for in these experiments, e.g. the size, the reputation or the hierarchical structure of the company (Demel et al., 2019; Eberhard and Ulrich, 2017). Since the selection and wording of attributes and attribute levels determine the scope of possible analyses and conclusions, the experiments were designed with great care. However, there are limitations regarding the validity of our measurements. Our analyses show that the match of the apprenticeship or employment and the desired specialisation is the most relevant factor for the choice of a position. However, it must be noted that this attribute can not be applied equally to all professions and had a rather vague wording. Therefore, we can not know precisely what kind of deviation from the desired field of work the respondents envisioned when evaluating the choice sets. Additionally, some of the reported group differences are significant only at a low significance level. For further understanding of the importance of interests and specialisations in the process of apprenticeship and employment choice, it is therefore necessary to carry out more choice experiments and to take the mentioned pitfalls into account.

By comparing WTP estimations using the approach suggested by Poe et al. (2005), we can identify group-specific willingness to substitute the monetary income of employment for favourable working conditions. However, with this approach, it is not possible to take into account the fact that the salary of a job is also an employment characteristic that can be valued differently across groups, depending on individual resources and opportunities.

Additionally the estimation of group-specific CL does not allow us to control for possible confounding effects. It is not possible to separate the effects of the labour market situation and industry specific constraints. At the time of the experiment there were roughly two job seekers per open vacancy in the health sector and four in the business and administrative industry, whereas there was only roughly one vacancy per job seeker in the engineering industry. It is possible that our inconclusive findings regarding the influence of the labour market situation are due to such systematic differences between sectors. Additionally, desired occupation and gender correlate highly in our data. While the business and health workers-to-be are mainly female, the engineering industry is male dominated.[9]

Our analysis is furthermore restricted to students and apprentices of one specific school leaver cohort in the German-speaking cantons of Switzerland. This restriction is beneficial to our analysis as it allows us to study a reasonably homogeneous group and limits the external heterogeneity of the institutional setting. However, the conclusions of our study can be transferred to the context of other countries to a limited degree. As our analysis has shown that institutional and labour market context is of great importance in the explanation of preference heterogeneity, a cross-country comparison of experimental data would greatly add to the state of research. Additionally, our experiments focus on job search at a very early career stage and it would be of great interest to test whether the revealed preference heterogeneity is stable over the life course. Equally, an analysis of the effect of experience of success and failure in the course of one's career can be expected to affect the valuation of job attributes. We plan to analyse this in future by combining the collection and analyses of panel data and experimental data.

Research on attitudes and values towards work has been based predominantly on the analyses of stated preference data, where survey respondents are asked to rate the importance of work characteristics on a Likert-scale from not important to very important (e.g. Esser and Lindh, 2018; Tschopp et al., 2015). Using choice experiments to measure preferences enables the analyses of

[9] We find gender-specific preferences for the experiment on apprenticeship choice regarding all attributes except working hours and no significant differences for the choice of first employment after training.

counterfactual situations in a setting of reduced complexity and complete transparency, and thereby creating the opportunity to single out the valuation of particular attributes. As the theoretical foundation of choice experiments – random utility modelling - has a strong coherence to sociological rational choice theory, this approach enables a closer integration of data collection and analysis with theory than is possible in conventional survey research. This experimental approach to survey research is fairly novel in social science research, having originated in market and transport research where consumer preferences for products and services are of practical interest (Liebe et al., 2019; Louviere et al., 2000). In this paper, we show how discrete choice experiments may be applied when preference heterogeneity is investigated from a sociological perspective. To fully understand the potential choice modelling offers for social sciences, further research is needed. Survey experiments have to be applied more broadly across disciplines, to explore the opportunities and limitations of this methodological approach for social science.

6. Summary and conclusion

The aim of this article is to contribute to the research on school-to-work transitions by investigating the determinants of choice between labour market entrance positions, and thereby examining the validity of assumptions derived from sociological rational choice theory. On the basis of two discrete choice experiments, one focusing on the choice of an apprenticeship position and the other on the choice of first employment position after vocational training, which were conducted as part of the DAB panel study, we estimate the relative value of different employment characteristics and test assumptions derived from RCT on preference heterogeneity by individual and context characteristics.

Our results are in line with the theoretical assumptions that the choice between employment offers is based on a rational evaluation of monetary and non-monetary characteristics. The higher the expected benefit of an apprenticeship or job offer, the higher the probability of choosing it and vice versa. Additionally, the data shows that for (future) apprentices in Switzerland, the most important factor in the choice of an apprenticeship position as well as in the choice of first employment position after training is, that the offer matches the desired specialisation. Further attributes shown to influence the decision between offers are: wage, duration of commute, working hours, part-time work, type of contract and possibility of being taken on by the company after VET.

Following sociological rational choice theories, we assumed we would find heterogeneity in the valuation of these attributes, depending on such factors as the intention to pursue further training, socio-economic background, educational attainment and the labour market situation. Our analysis provides mixed evidence in support of these assumptions. Contrary to strict theoretical assumptions derived from RCT, we find that financial support for further training through the employer is valued, even by respondents who do not actually plan on pursuing further education. However, it is valued more strongly by those who intend to take up training during their first employment after VET. The subjectively perceived benefit of an attribute cannot necessarily be derived directly from the obvious benefit. The perceived value that employees associate with companies offering financial support for education seems to go beyond reducing the financial burden of further training.

Even though earlier research has repeatedly shown that work values differ by parents' positions in the occupational structure (Johnson and Elder, 2002; Mortimer and Lorence, 1979), our analyses suggest that applicants with an upper class background have roughly the same preference structure when comparing job offers as those with a lower class background regarding the importance of disciplinary fit and general working conditions. On the other hand, our data provides evidence that parental resources enable students to display a higher reservation wage and thereby to accept attractive apprenticeship positions despite low wages. Additionally, our data provides insight into the apparently distinctive preference structure of children from self-employed households, who seem to have high reservation wages and highly value the match between employment and desired specialisation. The validity of the SEU approach in the explanation of socially selective educational and occupational decisions between occupations and educational pathways has been confirmed repeatedly (Becker and Hecken, 2009; Becker, 2003; Breen and Goldthorpe, 1997; Stocké, 2007). With the presented analyses we have shown that the choice of a specific apprenticeship or employment position within an occupation is also influenced by parental resources.

Assuming that informed rational actors base their decision between job offers on the same factors that objectively influence their chances of finding a good position, the valuation of employment offers should be influenced by educational tracking and performance. As an indicator for labour productivity, educational track and grades constitute the value of an employee on the labour market (Manski, 1993; Weiss, 1995). Applicants with better grades and those from more demanding tracks therefore have better opportunities on the labour market, which should lead them to have higher expectations regarding their future position. In support of this hypothesis we find that students from the school type with advanced requirements display a higher reservation wage. However, this does not hold true for school grade and type of vocational degree. Additionally, we find that students with better grades and from a school type with advanced requirements, value the disciplinary fit of their future apprenticeship and their desired specialisation more. We conclude that the type of secondary school is highly relevant not only for the choice between academic and vocational upper secondary education, but also for the choice of an apprenticeship position within an occupational field.

Furthermore, our analysis confirms the significance of contextual factors. While we were not able to find conclusive support for the claim that applicants adapt their preferences to the level of competition on the labour market. We have shown that the valuation of non-monetary apprenticeship and job attributes varies between occupational sectors. The prevalence of irregular working hours in the health sector seems to make apprentices perceive them as less problematic, while permanent employment opportunities are valued more highly when temporary contracts are widespread.

While some of our assumptions derived from RCT have not been upheld, we have shown that preferences vary considerably depending on individual and context characteristics. Overall, our analyses of two discrete choice experiments provide mixed evidence of valuation heterogeneity in line with SEU. More research, utilising the diversity of methodological techniques available, is needed to further study the determinants of labour market preferences and employment choice from a sociological perspective.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jocm.2019.100180.

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