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Is informedness the key? An empirical analysis of VET dropouts in Germany

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Abstract

In 2022, one in four vocational education and training (VET) contracts resulted in premature termination—a potential sign of inefficiency in the training of urgently needed skilled professionals. This study focuses on the level of perceived informedness of trainees and its potential influence on dropout. This includes trainees' perceived level of information about the characteristics and requirements of an occupation, which may result from various sources of information in the form of social contacts. We draw on theories from the field of career choice and job search to argue that a better level of informedness can reduce uncertainty and enable individuals to make better-informed decisions about their careers. With better informedness, there is a higher probability of finding a suitable match between a trainee and their chosen occupation, ultimately increasing their likelihood of job persistence. This should also lead to a lower probability of dropout among VETs. Using data from the National Educational Panel Study, starting cohort 4, we employed event history analysis. We show that good perceived informedness on the requirements of one's vocational training and the perception of good school-based vocational preparation reduce the probability of dropping out. In contrast, good informedness about alternative training programs increases dropout risk. We also see that the distinction between closer or more distant groups of people from the social network (strong or weak ties) who provide information about training is not decisive.

Keywords: Vocational education and training (VET), Dropout, Informedness, Level of information, NEPS

Introduction

To address current societal trends and challenges, a well-educated workforce will play an increasingly important role in the technological and ecological transformation of the future (Federal Ministry of Education and Research 2023). In this regard, vocational education and training (VET) can be an essential instrument (European Centre for the Development of Vocational Training 2020a; Guo et al. 2022). However, several challenges may hinder the realization of one's full potential due to mismatches and dropouts. For example, in Germany, around 27% of VET contracts are terminated prematurely (Federal Institute for Vocational Education 2024).

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This high number of people dropping out of VET is worrying. Since fewer and fewer people are applying for training and many positions cannot be filled (Federal Ministry of Education and Research 2024), it is crucial that those who do take up VET actually complete it. Researchers have investigated various causes for dropping out of training. Besides aspects of social inequality, personal factors, or social origin (Laporte and Mueller 2013; Gambin and Hogarth 2016; Beckmann 2023), trainees' aspirations and compromises are particularly relevant (Ahrens et al. 2021; Beckmann et al. 2023). In addition, many trainees who drop out state that they did not make the right decision (Boockmann et al. 2014), with insufficient or incorrect information about the profession or employer often being mentioned alongside the influence of various information sources (Böhn and Deutscher 2022).

Although the role of informedness has been mentioned in previous studies, it has yet to be investigated in an in-depth manner; thus, this article addresses the perceived informedness of trainees and its relation to VET dropout rates. Search and matching theory indicates that the level of available information is a powerful feature that matches quality between employees and employers (Stigler 1961; Akerlof 1970). Furthermore, within the framework of career choice theory (Gottfredson 1981), information on occupational characteristics is an essential component that enables young people to develop concrete career aspirations. We assume that information provision can reduce the prevailing information asymmetries among trainees and increase their perceived level of informedness.

The term "informedness" herein refers to trainees' perceived level of information. On one hand, this includes trainees' perceived level of information about the characteristics and requirements of an occupation, with differentiations between their occupation (H1) and alternatives (H2). On the other hand, this perceived level of information can result from various sources in the form of social contacts, where the focus is on the difference between strong and weak ties (H3) and the relevance of school in particular (H4). Consequently, we see trainees' perceived level of information as a multidimensional construct through which we analyze different aspects in detail. We expect that the higher the perceived level of information, the lower the probability of dropping out of training. More specifically, we focus on the following question: What influence does trainees' perceived informedness have on dropout from vocational training?

Short description of the VET system in Germany

VET encompasses variously structured training systems, with a range of approaches aimed at equipping individuals with the necessary skills and abilities to succeed and perform well in their professions. In addition to some VET-related similarities between countries, there are differences in terms of organization, focus, and regulatory framework (Eichhorst et al. 2015). The two predominant forms of VET in Europe are dual and school-based vocational training, both leading to state-recognized, occupation-specific certificates (Solga et al. 2014). In Germany, 79% of all trainees follow the dual system (Federal Statistical Office of Germany et al. 2021). Here, practical training in companies is combined with theoretical instructions at school (see the European Centre for the Development of Vocational Training 2020b). A close link between the public sector and companies and formalized standards ensures the quality of the training

and creates comparability. By combining practice and theory, VET offers trainees good career opportunities in occupations in demand; it also secures the next generation of skilled workers for companies (Solga et al. 2014). The German VET system enjoys a high reputation both domestically and internationally (Solga et al. 2014; Deissinger 2015).

Theoretical framework and previous literature

In terms of a theoretical framework, we draw on theories of career choice and job search as two contexts simultaneously apply in vocational training: on one hand, trainees are still developing their career aspirations during their training. On the other hand, they are labor market participants and are part of the working population, especially since the integration of apprenticeships into the labor market is a special feature of the vocational training system in Germany. A theoretical approach to the interplay between informedness and dropping out of training therefore requires both an examination of vocational orientation and an understanding of labor market processes.

The influence of informedness on career aspirations and job matching

Informedness about occupations significantly influences the formation of career aspirations and career choices. According to Gottfredson's (1981) theory of circumscription and compromise, individuals develop a cognitive map of potential occupations from preschool to college. In this process, informedness about the prestige of a job and its gender relatedness and field of operation is crucial. During the circumscription phase, individuals compare their self-concept with occupational images by using information to establish preferences and exclude unsuitable alternatives. In the compromise phase, informedness about occupational constraints and barriers helps individuals adjust their preferences, leading to informed compromises and the identification of their vocational aspirations (Gottfredson 1981, 2002).

According to matching theory, job-seeking individuals want to achieve the best possible match regarding their preferences and aspirations (Mortensen and Pissarides 1994). Uncertainties (e.g., about required skills and tasks) can be minimized through additional information. Therefore, individuals engage in a process of information gathering to reduce uncertainty and find the best match (Stigler 1962). More-informed individuals make better-informed decisions and, thus, optimize the match between their strengths and the job they accept (Pissarides 1979; Mortensen 1982).

However, there can be mismatches between aspirations and jobs, which can lead to the termination of the employment relationship (Jovanovic 1979). Individuals who accept jobs whose characteristics differ significantly from their self-concept can experience distress because of a distorted self-perception in society (Gottfredson 2002). Empirical studies show that discrepancies between occupational aspirations and actual job attainment in VET can result in higher dropout risk (Ahrens et al. 2021).

Empirical studies on the reasons for dropping out of VET have shown that trainees do not feel sufficiently informed, highlighting the importance of informedness. Boockmann et al. (2014) found that German trainees often dropped out due to poor career choices stemming from insufficient information and misconceptions about occupations. Similarly, in Ghana, 25% of trainees cited "wrong career choice or loss of interest" (p. 33) as their reason for dropping out (Donkor 2012). Beicht and Walden (2013) also found

that German trainees terminated training primarily because it was "not the right thing to do." In Switzerland, Stalder and Schmid (2006) noted that insufficient prior knowledge about training and occupation led to dropouts. Neuenschwander and Hofmann (2022) showed that better prior knowledge helps trainees adjust to the company, while Powers and Watt (2021) found that a lack of information about career opportunities after training increased anxiety and dropout intentions.

The influence of social networks and school in the provision of information

Various sources of information can contribute to an individual's perceived level of informedness, thereby affecting their search for or choice of occupation. Gottfredson (1981, 2002) referenced the importance of social networks for career choices. In the process of circumscription, information from the social environment can contribute to reconsiderations of occupational options that were excluded at an early age. Furthermore, Gottfredson found that contacts from one's social networks can influence job accessibility assessments and occupational fit. In particular, the main sources consulted during information searches are those that are reachable and close to the individual. However, such sources mainly help to consolidate decisions that have already been made as opposed to making new ones (Gottfredson 2002).

Moreover, social contacts might affect not just the development of career aspirations but also further career paths. In labor market processes, the effect of social contacts and their impact on an individual's job stability has been described using Granovetter's (1973) network theory, according to which close and strongly connected contacts are called *strong ties*. Strong ties are characterized by intensity, permanence, and reciprocity and are comparable to family relationships. In line with Gottfredson (2002), Granovetter assumed that these ties only provided redundant information and, therefore, did not increase informedness regarding the fit of a position or occupation (Granovetter 1973; Runia 2002). Moreover, Granovetter (1973) emphasized the importance of *weak ties* in the job search process, which are defined by loose connections and primarily contribute to new information (Granovetter 1973; Runia 2002). He argued that information from weak ties contributed to developing a concrete and realistic image of a position and, therefore, fostered long-term career prospects while reducing the risk of resignation (Granovetter 1995).

In addition to strong and weak ties, school might also play a crucial role in shaping pupils' decisions regarding VET. While social networks vary widely across individuals, the school context is intended to provide an information base for all pupils. This institutionalized form of support is aimed at providing age-appropriate content that simplifies complex career concepts for younger students while introducing the full breadth of career options in an accessible manner. School-based career guidance should help students understand and explore their personal career choices, including the influences of gender, social class, ability, and interests, thereby fostering self-awareness and informed decision-making (Gottfredson 1996). This is crucial in helping pupils make informed decisions about their future, ensuring that they choose a vocational path that aligns with their abilities and interests, ultimately reducing dropout.

Empirical studies have revealed the significant influence of strong ties, and parents in particular, during adolescents' transition to their first jobs (Otto 2000; Kramarz and

Skans 2014; Roth 2018; Ulrich et al. 2018). However, further training has revealed that recommendations from parents or, more broadly, strong networks show no correlation with the probability of non-completion of training (Flohr and Protsch 2023; Weißmann and Roth 2023). Tümen (2017) transferred aspects of Granovetter's approach to the career choice of young people and utilized a modeling approach to support the assumption that career guidance from strong ties tends to lead to mismatch. Conversely, advice from weak ties leads to a more secure and stable career path. This correlation is empirically supported by Weißmann and Roth (2023) and confirms that weak contacts with a company that existed before the start of training reduce the risk of premature termination.

School-based career preparation activities increase career readiness, including pupils' ability to acquire knowledge and choose a career (Dodd et al. 2022). More precisely, adequate school-based support might provide pupils with the knowledge and skills to set and achieve their post-school goals (Falco and Steen 2018). Adequate career choice preparation in the school context can lead to fewer VET dropouts. However, the quality and organization of school-based career orientation processes tend to be rated as ineffective by researchers, teachers, and pupils, as some studies suggest: According to Schudy (2002), generic information offerings and mass events are seen as inadequate, and there is a need for more financial and time resources to deal with individual career biographies. Responsibility often falls on teachers who are not trained in careers guidance, who therefore struggle to provide guidance (Knauf 2009; Mittendorff et al. 2012; Dreer 2020). These factors complicate practical and personalized career planning advice. However, some pupils would like to receive better support from the school in their career orientation process (Schudy 2002; Knauf 2009).

Summary & hypotheses

Overall, theories from career choice, job search, and matching suggest that the perceived informedness of trainees is relevant for them to develop realistic aspirations, make well-informed decisions, and, thus, find the job or position that best suits them. When prospective trainees sufficiently assess their informedness about different training occupations, they can make better-informed decisions about which paths best align with their interests, abilities, and career aspirations. Such informed decision-making reduces the likelihood of a mismatch between individuals and their chosen training programs, leading to a lower dropout probability. Consequently, the perceived level of information is relevant to finding suitable VET positions that can be successfully completed.

However, various sources of information are important. Information from weak ties provides new and diverse perspectives that help individuals make well-informed and realistic career decisions, leading to greater job satisfaction and stability. This reduces the likelihood of dropping out from VET programs. The impacts of weak ties should, therefore, have a more substantial influence on the success of the training than those of strong ties. Similarly, good career information provided by schools through structured career preparation activities increases career readiness. This ensures that students are well prepared and confident in their career choices, further reducing the VET dropout rate. Thus, the following hypotheses were formulated.

H1 The better trainees perceive their informedness on the requirements of their own training, the less likely they are to drop out of training.

H2 The better trainees perceive their informedness on the requirements of other training, the less likely they are to drop out of training.

H3 Trainees who perceive that they have received interesting information from weak ties are less likely to drop out of training than trainees who have received information from strong ties.

H4 The better trainees perceive their informedness on available VET options provided by their school, the less likely they are to drop out of training.

Data and methods

Data set and sample

Data from the National Educational Panel Study (NEPS Network 2023) were used for our empirical analyses. This survey primarily collects longitudinal data on educational stages and decisions over the life course. We used the starting cohort 4 to investigate our research question. In this cohort, the first survey took place in 2010 with nineth-grade pupils, who were repeatedly surveyed to capture their educational decisions. Therefore, their situation was covered during both secondary and post-secondary education. A total of twelve survey waves were available up to the year 2023.

The analysis sample included participants who reported having begun vocational training in a company or vocational school. However, pupils from special needs schools could not be included due to variations in questionnaire design. Individuals with incomplete or implausible information at the start or end of training were removed from the sample (Appendix A). The final analysis sample included 7215 trainees for whom all required data were available.

Dependent and independent variables

Of central interest in this study is the influence of trainees' perceived informedness on the non-completion of VET. We delineated training status for the analyses, as all respondents were asked questions about their last documented training period (Appendix B). We considered a respondent to be a *dropout of VET* if they stated that they had prematurely terminated their first training after graduation from school (n = 958; 13%). If they stated that they were still in training or that there was no further specification of the training status, the corresponding cases were treated as right-censored. Furthermore, the time frame was limited to plausible durations. VETs usually last up to four years, so longer periods are considered *censored* (n = 2859; 40%). Finally, there were instances in which the first set of training after school had been *completed* (n = 3398; 47%). By drawing on all such cases, the calculation of the termination risk in the respective time units could be carried out (cf. chapter "Analysis method").

In operationalizing the trainees' perceived level of informedness, several variables were considered. Within the framework of the available data, we used the most relevant level of information about the first training and operationalized it by the smallest distance

(in days) between the interview and the start of the training. We used two independent variables to indicate how well the trainees assessed their *informedness on the requirements of their own training* ("How well do you know what requirements you face before you finish your vocational training program?" This was anchored on 3-point scale: poor to average, good, very good) and their *informedness on the requirements of alternative training* ("How well informed are you about the requirements and tasks in other training programs?" This was anchored on 3-point scale: poor, average, (very) good). To distinguish between strong and weak ties, we used data on which groups of people informed the trainees about interesting VET positions ("Did anyone from the following groups of persons provide information about interesting vacant vocational training positions to you?" The response options were specified/not specified). We assigned parents, relatives, siblings, and friends to the *strong ties* group and allocated acquaintances from an internship, part-time job, or work experience and others to the *weak ties* group. If people from the strong ties group provided information, this was modeled accordingly in the variable. We could therefore indicate in the variable whether trainees received information exclusively from strong or weak ties, from both, or from neither. In the sample, different cases needed to be distinguished: those who had received information exclusively from strong or weak ties, those who had used both ties, and those who had not utilized any of these groups of people for information purposes. To avoid possible distortions due to different numbers of information sources, which would not have been taken into account due to the aggregation in the variable, the number was treated as a control variable. Additionally, we focused on the influence of trainees' perception of their informedness in the *school* context. For this purpose, we used the trainees' assessment of whether the school provided them with sufficient information about all available training options ("The school gave me sufficient information about all the vocational training options available to me." This was anchored on 3-point scale: (rather) disagree, rather agree, completely agree).

Control variables

Non-completion of VET depends, among other things, on several individual trainee characteristics, which can simultaneously influence the perceived level of information. Therefore, the *respondents' gender* was considered, as previous research has pointed to variations in the dropout behavior of males and females (Laporte and Mueller 2013; Greig 2019). Males and females also differ in information behavior, and it is conceivable that they have differential perceptions of their level of information (Wilson 1997; Urquhart and Yeoman 2010). In addition, the respondents' *migration background* was used as a control variable, as previous research has pointed to differences in their training success (Greig 2019). At the same time, it is known that migrant networks constitute a particularity, which is why a distinction in the perceived level of information is also feasible (Keskiner 2022). The individuals in our study were considered to have a migrant background if they were born abroad themselves or had at least one foreign-born parent or grandparent (Olczyk et al. 2014). To take into account the *socio-economic status* of the trainees, the highest ISEI (International Socio-Economic Index of Occupational Status) (Ganzeboom et al. 1992) of the parents was included as a control variable. This was intended to compensate for potential differences in social capital (Bourdieu 1977) and

minimize existing differences in the risk of dropping out (Glaesser 2006). The trainees' previous school education was also relevant in terms of variation in information offers or opportunities to gather information; consequently, the perceived level of information could differ between schools. In the German education system, a distinction is made between lower (*Hauptschule*), intermediate (*Realschule*), and higher (*Gymnasium*) secondary schools. To address the specific circumstances of occupations and their impact on training completion, the *occupational area,* according to the International Standard Classification of Occupations (ISCO-08), was included. Finally, *geographical variable* (West or East Germany) was used to refer to the training location to account for regional differences in the school structure, curriculum, and regional labor market situation (Bessey and Backes-Gellner 2007; Greig 2019). To handle missing data, we applied multiple imputation using chained equations (Lee and Carlin 2010; White et al. 2011).

Finally, some considerations regarding the timing of the survey should prevent and minimize confounding effects. One influencing factor was the *age* of the trainees at the start of the training, which was also considered (Laporte and Mueller 2013; Gambin and Hogarth 2016). As all the respondents were interviewed for the first time in grade 9 and were roughly the same age, this variable did not necessarily consider cohort effects. Still, it represented age effects and, where applicable, cases in which the first set of training was taken up at a later date. Moreover, the *timing of the survey* was included by adding a variable indicating whether the interview had taken place before or after the start of training. The surveys on some of the key variables occurred at different times, so an additional category "other" had to be accounted for. Information processes that might have affected the perceived level of information *during* the training were considered as much as possible. However, we could not rule out the possibility that the assessment of information had changed at some point. To obtain an overview of the distribution of the key and control variables, a frequency table containing the descriptive statistics is provided in Appendix C.

Analysis method: survival analysis

The statistical analysis was based on event history analysis, more precisely, a piecewise constant exponential (PCE) model. This type of survival analysis is used to consider the duration of a process until an event of interest occurs. It is advantageous if one assumes that the probability of an event occurring is not constant over the entire observable time course and, therefore, cannot be modeled using regression models that assume a single continuous hazard rate (Elandt-Johnson and Johnson 1999; Blossfeld et al. 2019). The hazard rate represents the probability that an event will occur in the following time period if it has not yet occurred in the current time period. The PCE model enables flexible modeling of changes in the hazard rate over time.

Applied to the present case, it showed for each time interval the likelihood of a VET termination occurring if it had not occurred in a previous time interval. Another strength of this data analysis is the modeling of censored data, where the event of interest has not occurred for some individuals by the end of the observation period (Kalbfleisch and Prentice 1982). In addition to the training episodes where it was known whether the trainees had ultimately dropped out or completed their training, cases with unknown outcomes could also be included. In the case of ongoing training episodes, the

possibility remained that they could be terminated in the future. However, the knowledge that trainees had not (yet) dropped out by a specific point in time contributed to the calculation of the dropout risk in the respective period. This expanded the sample of cases examined compared to related studies where censored VET episodes were excluded (Michaelis and Richter 2022; Holtmann and Solga 2023). Thus, our approach followed previous event history analyses in the field (Neuber-Pohl 2021; Beckmann et al. 2023).

Maximum likelihood estimation (MLE) was applied to estimate the parameters of the PCE model. In MLE, model parameters are estimated by finding the values that maximize the likelihood function, which describes the probability of observing the data as a function of the parameters. In the case of the PCE model, the likelihood function is a product of the exponential distributions for each interval (Friedman 1982). To address the research question, single-episode data were used to examine dropout from the first set of training. The process period was started by entering the initial state, that is, the first vocational training after leaving school. It ended with the transition to the destination state, where premature termination from training was considered in the context of this study.

Selection of time intervals

Methodologically, care should be taken to ensure a balanced number of time intervals within the episodes. The baseline hazard may be incorrectly estimated if the number is too small. However, too many intervals can distort the results and make generalization difficult (Blossfeld et al. 2019). With regard to VET, the risk of dropping out changes over time. This risk is initially very high, decreasing over time and increasing again after a few years (Fig. 1). Therefore, it is reasonable to assume that different hazard rates exist. The German training system has a maximum statutory probationary period of four months. During this period, trainees can terminate their contract themselves on short notice, and the employer can dismiss them without further explanation or postponement. This period is, therefore, likely to be of particular significance. The hazard rates

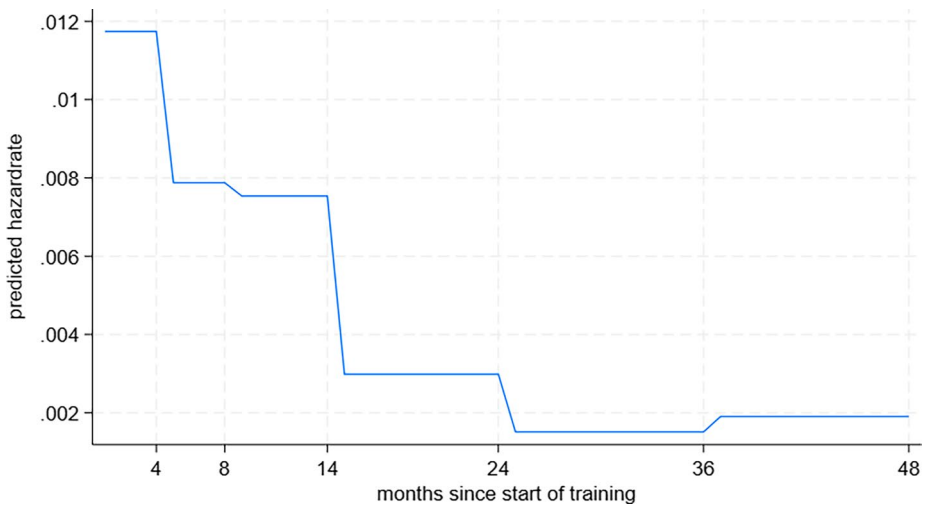

Fig. 1 Predicted hazard rate

were considered when delimiting the periods, and content-related considerations were made. As there are stronger fluctuations in the first year of training, shorter intervals were set after four and eight months. After 14 months, this stabilizes, and larger intervals can be set. Thus, we used intervals that ended after two years (24 months) and three years (36 months), corresponding to the usual training durations.

Results

The influence of different aspects of trainees' perceived informedness on dropout risk is analyzed in the following section using event history analysis. It is conceivable that the effect of informedness only influenced earlier dropouts. However, the effects of being informed proved to be robust, with hardly any change—in fact, they increased slightly for the most part—when the time under consideration was limited to the first 14 months (Appendix D). The model was highly significant, meaning that the group of variables was significantly related to the outcome variable [$F(35, 1, 600{,}000) = 634.17$, $p < 0.001$].

Perceived level of information on requirements

Our theoretical foundations suggest that a good perceived level of informedness about requirements led to better decisions in the labor market. The better the perceived level of information, the better the alternatives could be evaluated, and thus, the most suitable occupation could be chosen. Hypotheses 1 and 2 suggested that a good perceived level of information about the requirements of one's training (H1) and alternative training (H2) would reduce the probability of dropping out. The results of the multivariate analysis support the assumption of H1 (Table 1). If trainees perceive that their informedness about the requirements of their training is good, they are 26.7%[1] less likely to drop out of their training than trainees who state that they are poorly or moderately informed about the prerequisites ($p < 0.001$). Furthermore, trainees with a very good perceived level of informedness about their own training requirements were less likely to drop out compared to those who were poorly informed (27.4%, $p < 0.001$).

Conversely, H2 was not supported by the analyses. Instead, our results showed that trainees who perceived that their level of informedness about alternative training programs was average were more likely to drop out than poorly informed trainees (23.4%; $p = 0.016$). Trainees who perceived that they were well informed about other training programs were 43.3% more likely to drop out than those who perceived that they were poorly informed ($p < 0.001$). Subsequently, our results could not support that a good perceived level of information about alternative training programs would reduce the probability of dropping out.

Informedness through strong and weak ties and school

Regarding information sources, we assumed that trainees who had obtained information from strong ties mainly received redundant information. As a result, their choices would not be based on sufficient information, and a premature contract termination would be more likely. If the information comes from weak ties, the trainees might receive

[1] To convert the parameters into percentages and, therefore, facilitate interpretation, the following calculations were made: $\left(e^{\beta} - 1\right) * 100\%$, where e is the base of the natural logarithm, and β is the value of the parameter.

Table 1 PCE model including all control variables

	Coef	p	se
Knowledge of own training (ref. poor/average)			
Good	− 0.31	0.000***	0.09
Very good	− 0.32	0.001***	0.10
Knowledge of alternative trainings (ref. poor)			
Average	0.21	0.016**	0.09
Good	0.36	0.000***	0.10
Information from networks (ref. (only) information from strong ties)			
(Only) information from weak ties	− 0.13	0.339	0.14
No information from strong or weak ties	0.05	0.668	0.11
Information from both	− 0.01	0.903	0.10
Good school-based career preparation [ref. (rather) disagree]			
Rather agree	− 0.22	0.003***	0.08
Completely agree	− 0.21	0.019**	0.09
Control variables			
Number of information sources	− 0.006	0.869	0.04
Time of survey (ref. after start of VET)			
Before/ at start of VET	0.29	0.018**	0.12
Mixed	1.03	0.000	0.09
Graduation (ref. lower secondary school)			
Intermediate secondary school	− 0.68	0.000***	0.09
Higher secondary school	− 0.77	0.000***	0.12
Mixed	− 0.16	0.095	0.10
Gender (female)			
Male	− 0.06	0.440	0.07
Migration background (none)			
Existing	0.23	0.007***	0.09
Location of training (ref. east Germany)			
West Germany	− 0.27	0.011**	0.10
Age	0.04	0.048**	0.02
Parents ' ISEI (log)	0.09	0.280	0.08
Occupational area (ref. services and sales)			
Managers	0.28	0.780	1.00
Professionals	− 0.16	0.537	0.25
Technicians & associate professionals	− 0.19	0.110	0.12
Clerical support	− 0.29	0.040**	0.14
Agricultural, forestry & fishery	− 0.81	0.052*	0.42
Craft and related trades	− 0.50	0.000***	0.13
Plant/machine operators & assemblers	− 0.32	0.127	0.21
Elementary occupations	− 0.10	0.306	0.09
Not specified + military	− 0.28	0.008**	0.10
Duration of vocational training			
0–4 months	− 3.25	0.000***	0.51
5–8 months	− 3.62	0.000***	0.51
9–14 months	− 3.65	0.000***	0.51
15–24 months	− 4.54	0.000***	0.51
25–36 months	− 5.19	0.000***	0.52
37–46 months	− 4.95	0.000***	0.58
Observations		28,945	

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

additional information and improve their choices, reducing the likelihood of dropping out (H3). This hypothesis, however, could not be supported.

We found a non-significant effect for trainees who perceived that they had received interesting information exclusively from weak ties (contacts from internships, part-time jobs, trial work, or others). They had a 12.2% lower probability of dropping out than trainees who had the feeling that they had received interesting information only from strong ties (parents, friends, siblings, or relatives) ($p = 0.339$).

Furthermore, we investigated whether an institutionalized source of information through school could positively influence the risk of dropping out (H4). Here, the preparation for future working life should be of high quality. Therefore, we assumed that trainees' perception of having received good information on VET options from school would reduce the probability of dropping out. The analyses confirmed this assumption. Trainees who fully agreed with the statement that they had received sufficient information from school about training options were 19.7% less likely to drop out of training than trainees who disagreed or strongly disagreed with this statement ($p = 0.003$). A similar effect was observed among trainees who moderately agreed with this statement. They had an 18.9% lower dropout probability than the reference category ($p = 0.019$).

Demographic and occupation variables

The results regarding the control variables were consistent with those of previous studies on adverse factors in VET (Böhn and Deutscher 2022). Trainees who graduated from intermediate or higher secondary school showed a lower dropout probability than those who graduated from lower secondary school (49.3%, $p < 0.001$; 53.7%, $p < 0.001$). Males did not significantly differ from females regarding the dropout probability. However, there was a significantly higher dropout risk of 25.9% ($p = 0.007$) for trainees with a migration background compared to individuals without a migration background. For trainees located in West Germany, the dropout probability was 23.7% lower than for those in East Germany ($p = 0.011$). Higher age, representing age effects, and later entry into VET increased the dropout probability by 4.1% ($p = 0.048$). Parental ISEI did not affect the dropout probability. Most of the occupational areas showed no significant differences regarding the dropout probability; however, trainees in clerical support, agricultural, forestry, and fisheries showed lower dropout probabilities (23.4%, $p = 0.091$; 58.1%, $p = 0.086$) than those in the reference category of services and sales. There was a more significant difference for trainees in craft and related trades, who showed a 36.2% lower dropout probability than those in the reference group ($p = 0.002$).

Discussion

Motivated by the high contract termination and non-completion rates in VET, which are considered critical due to the shortage of skilled workers, we used event history analysis to investigate the influence of trainees' perceived level of informedness on VET dropouts. Our results did not support our hypothesis that the probability of dropout would decrease with an increased perceived level of information. Instead, a more precise differentiation of informedness on the requirements was necessary: our results showed that a better perceived informedness about one's education lowered the probability of non-completion and that VET was less likely to be prematurely terminated if it was preceded

by good school preparation. In contrast, the perception of being well informed about alternative VET programs increased the likelihood of early termination.

Informedness on requirements

Our research highlights that it is detrimental to successful training completion if trainees perceive that they are not sufficiently well informed about requirements. This supports previous findings pointing to poor informedness as a reason for premature termination (Stalder and Schmid 2006; Donkor 2012; Beicht and Walden 2013). It highlights the responsibility of training companies in particular, which could support their trainees by communicating the tasks and requirements transparently and making sure that they feel well informed. Companies could provide a good information base for young people seeking training in the recruitment and application process and support them in their choices.

However, the answer to the low completion rate in VET cannot consist only of a mere expansion of information. Our results show that good perceived informedness about alternatives can also promote dropout. This result arguably reflects great uncertainty among trainees in their choice of training. If, due to vague ideas, young people inform themselves very broadly and accumulate a sizeable mass of unspecific information, this could, contrary to certain theoretical assumptions, further complicate their choice. However, this does not necessarily mean reducing the amount of information but shaping it in a targeted way. Nevertheless, this result could also show that trainees are reorienting themselves and are more likely to step out of their current deficient training program, encouraged by information regarding alternative options. The elaboration of appropriate alternatives, especially in the case of unsuitable training, can, therefore, be a task for career counseling.

Support of social networks and school in career choice

In addition, the distinction between strong and weak ties with regard to sources for information was not statistically significant. Thus, our results could not confirm the assumptions of other authors about the differential impacts of strong or weak ties (Granovetter 1973; Tümen 2017). However, our approach contrasts with those of studies emphasizing parental importance in providing career guidance (Otto 2000; Kramarz and Skans 2014). This could be an indication that parents influence their children's career choice less with factual information and implicitly through socialization and being role models (Bryant et al. 2006). However, this potentially shows that other groups of people also influence young people when it comes to career guidance. Regular dialogue between pupils and trained staff could provide support and guidance in choosing an occupation. Furthermore, incorporating internships during the school years could promote the exchange of information, clear up possible misconceptions about certain VETs, and help order the amount of information. Evaluating such measures can be a valuable approach for further research.

Finally, our results show the strong impact of good vocational preparation in school—as suggested in other studies (Schudy 2002; Knauf 2009; Falco and Steen 2018; Dodd et al. 2022)—which can prevent trainees from dropping out of VET. In line with previous studies classifying the quality of school vocational preparation as poor (Knauf 2009;

Schloss 2011; Mittendorff et al. 2012; Dreer 2020), we argue that the quality needs to be improved because there is great potential for good school-based vocational preparation. Teachers' career orientation varies greatly and depends on commitment (Schudy 2002; Knauf 2009; Schloss 2011; Mittendorff et al. 2012). Conversations were not considered helpful in some cases. With regard to the tasks of teachers, there needs to be a discussion around the extent to which teachers should fulfill this role and what part professional career counselors might play. However, suitable teacher qualifications are the starting point for a helpful school-based career orientation, in turn leading to a strengthening of the individual competencies of pupils in their career choice process (Dreer 2020). Consequently, it can be assumed that better teacher training or the involvement of specially qualified advisors is associated with better career guidance for pupils.

Limitations and future research

Some limitations ought to be considered in interpreting the results of the study. Our findings indicate that the perceived level of informedness is a multifaceted construct that includes several aspects and can have various impacts. Our study addressed, in particular, trainees' subjective perception of how well informed they were. It did not cover how much information they had received, nor did it judge the quality or the trainees' knowledge about occupational characteristics. Furthermore, we did not analyze the kind of information or content that trainees received and how this related to their choice of occupation.

Due to the survey scheduling, a great deal of the responses were only available after the start of the training. Despite controlling for whether the survey would take place before or after the start of training, we could not completely rule out the influence of reorientation thoughts on the level of information depicted. We further argue that information consists of various aspects. However, there might be further aspects that we have not considered regarding the level of information. Other sources of information not covered in our study may be relevant for trainees, such as professional career advice, career fairs, or different ways of gathering information. Other elements might also play a role. For example, we did not address the frequency or amount of information received by trainees.

Furthermore, we did not consider what trainees did after non-completion of their first training or why they left. On one hand, we summarize premature terminations in general terms and make no further distinctions. Subsequent research could take a closer look at this to assess whether trainees' information impacts their path after the contract has terminated. On the other hand, we did not take a closer look at the reasons for the termination. However, this could be relevant, as some premature termination reasons may not be countered with the appropriate information, for example, health problems or personal conflicts. Further research could investigate types of termination that are mainly influenced by better information. In addition, experiments with information treatments could test our results. Experimental studies point to the influence of information in the context of schools or universities (Ehlert et al. 2017; Piepenburg and Fervers 2022). Following this research, the effect of different information treatments could also be captured with regard to VET.

Conclusion

Our research implies that the provision of information on the requirements and tasks of an occupation or position might be a suitable instrument to increase trainees' perceived level of information. This level of informedness has the potential to prevent premature VET termination, especially if it is derived from relevant sources. We were able to highlight the potential of information treatments, as they have been tested in the school sector for higher education. While these treatments have been somewhat marginal, our results show that a good perception of informedness and the corresponding sources of information can contribute to preventing training dropout. Therefore, instead of directing information only to the trainee, further interventions involving real insights into professions and their everyday life and a good school-based vocational preparation are also helpful. Taken together, they can contribute to a good perceived level of information and, thus, the successful completion of vocational training. Ideally, providing the best possible information can increase the efficiency of VET and may prove to be a key element in efforts to overcome the shortage of skilled workers.

Appendices

Appendix A: Exclusion of cases from the original sample

Cases	Reason for exclusion
16,425	Initial analysis population
− 1186	Exclusion of special needs pupils
− 7998	Limitation to persons with data on vocational training
− 3	Participants with missing values for the start of training
− 17	Participants with implausible indications on the start of training
− 6	Participants with missing values for the end of training
7215	Final analysis population

Appendix B: Dependent variable: status of training

cases	Last recorded status	Items
(958)	"Dropout"	= "Did you end the vocational training program early or did you stay to the end but not earn the qualification?" → 1: "ended prematurely"
(2.859)	"Graduation"	= "Did you successfully complete this vocational training at the end?" → 1: "yes"
(3398)	"Censored"	= "Are you currently still doing this vocational training program?" → "yes"
		= "Did you end the vocational training program early or did you stay to the end but not earn the qualification?" → 2: "Stayed to the end but did but not graduate" & "Did you successfully complete this vocational training at the end?" → 2: "no"
		= Missing values

Appendix C: Frequency table (without imputed values)

Variable: name, categories	Obs	Percent		
Independent variables				
Knowledge of own training	7215			
Poor/average	1364	18.91		
Good	3215	44.56		
Very good	2369	32.83		
Missing	267	3.70		
Knowledge of alternative trainings	7215			
Poor	2146	30.98		
Average	3152	45.39		
Good	1650	23.64		
Missing	267	3.70		
Information from networks	7215			
(Only) information from strong ties	2807	38.91		
(Only) information from weak ties	539	7.47		
Information from none of them	1724	23.89		
Information from both	2141	29.67		
Missing	4	0.06		
Good school-based career preparation	7215			
(Rather) disagree	2339	32.42		
Rather agree	3155	43.73		
Completely agree	1720	23.84		
Missing	1	0.01		
Number of information sources	Min	Max	Mean	sd
	0	6	1.96	1.54
Time of survey	7215			
After start of VET	5986	82.97		
Before/at start of VET	482	6.68		
Mixed	747	10.35		
Previous school education	7215			
Lower secondary school (Hauptschule)	2509	34.77		
Intermdiate secondary school (Realschule)	1911	26.49		
Higher secondary school (Gymnasium)	1281	17.75		
Mixed	1514	20.98		
Gender	7215			
Female	3399	47.37		
Male	3777	52.63		
Migration background	7215			
None	5996	83.10		
Existing	1135	15.73		
Missing	84	1.16		
Location of training (state)	7215			
Former east Germany	924	12.81		
Former west Germany	6266	86.85		
Missing	25	0.35		
Age	Min	Max	Mean	sd
	15	25	18.12	1.73
Parents' ISEI (log)				
	2.45	4.49	3.74	0.45

Variable: name, categories	Obs	Percent
Occupational area	7215	
Managers	6	0.08
Professionals	137	1.90
Technicians and associate professionals	760	10.53
Clerical support	566	7.84
Services and sales	1431	19.83
Agricultural, forestry and fishery workers	88	1.22
Craft and related trades	868	12.03
Plant and machine operators and assemblers	212	2.94
Elementary occupations	1679	23.27
Not specified + military	1468	20.35

Appendix D: Robustness check—PCE model (restricted to first 14 months of VET)

	Coef	p	se
Knowledge of own training (ref. poor/average)			
Good	−0.32	0.001***	0.10
Very good	−0.35	0.001***	0.11
Knowledge of alternative trainings (ref. poor)			
Average	0.23	0.018**	0.10
Good	0.38	0.001***	0.11
Information from networks: [Ref. (only) information from strong ties]			
(Only) information from weak ties	−0.11	0.454	0.15
No information from strong or weak ties	−0.03	0.816	0.12
Information from both	−0.05	0.689	0.11
Good school-based career preparation [Ref. (rather) disagree]			
Rather agree	−0.23	0.007***	0.08
Completely agree	−0.26	0.010**	0.10
Control variables			
Number of information sources	0.002	0.964	0.04
Time of survey (ref. after start of VET)			
Before/at start of VET	0.31	0.024**	0.14
Mixed	1.09	0.000***	0.09
Graduation (ref. lower secondary school)			
Intermediate secondary school	−0.63	0.000***	0.10
Higher secondary school	−0.71	0.000***	0.13
Mixed	−0.18	0.102	0.11
Gender (female)			
Male	−0.12	0.145	0.08
Migration background (none)			
Existing	0.28	0.004***	0.09
Location of training (ref. east Germany)			
West Germany	−0.35	0.002***	0.12
Age	−0.06	0.024	0.02
Parents' ISEI (log)	0.09	0.333	0.09
Occupational area (ref. services and sales)			
Managers	0.47	0.641	1.01
Professionals	−0.04	0.889	0.27

	Coef	p	se
Technicians & associate professionals	−0.11	0.391	0.13
Clerical support	−0.27	0.091*	0.16
Agricultural, forestry & fishery	−0.87	0.086*	0.51
Craft and related trades	−0.45	0.002***	0.15
Plant/machine operators & assemblers	−0.18	0.427	0.23
Elementary occupations	−0.09	0.408	0.10
Not specified + military	−0.29	0.012**	0.12
Duration of vocational training			
0–4 months	−2.98	0.000***	0.57
5–8 months	−3.36	0.000***	0.57
9–14 months	−3.38	0.000***	0.57
Observations		19,324	

* p < 0.1, ** p < 0.05, *** p < 0.01

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Declarations

Competing interests
The authors report that they have no competing interests.

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